



IDP BRIDGES News

IDP BRIDGES - Bridging Plant Sciences and Policy

No 3, 2015

Upcoming training

PSC Policy Workshop: Building political support

5 Nov - 1 Dec 2015
University of Zurich


PSC Policy Workshop: Understanding policy evaluation

12 Jan - 19 Feb 2016
University of Zurich

2nd Annual Meeting

26 - 28 Oct 2015
Männedorf, Zurich

- Midterm review
- PhD retreat
- Green business workshop
- Policy workshop: Strengthening the effective engagement of researchers with the public policy process
- Targeted mentoring

<p>1</p> <p>MANKIND!!</p> 	<p>2</p> <p>ENSURE/IMPROVE THE RESILIENCE AND DIVERSITY OF RICE PRODUCTION SYSTEMS</p>	<p>3</p> <p>• NO. RICE VARIET. MAINTAINED ON-FARM • AREA (HC) WHERE TRAD. VARIETIES OF RICE ARE GROWN</p>	<p>GROUP 5: Maintaining rice varieties on-farm</p>
<p>4</p> <p>- FARMERS - LOCAL GOVERNMENT - INVESTOR</p>	<p>5</p> <p>- incentives / compensation - farm land, rice varieties - farming / employment - participation and collaboration - local-, national-, international</p>	<p>6</p> <p>- MARKET BEHAVIOUR - INTERNATIONAL REGULATORY MECHANISM - CLIMATE & CATASTROPHES - INDEPENDENT EXPERTS - OTHER GROUPS NOT INV. BUT WORKING IN THE AREA</p>	
<p>7</p> <p>FARMERS EXPERTS AGRONOMY EXPERTS ECONOMY AND MARKET, (PES) - LOCAL NGO - ETH TD TEAM</p>	<p>8</p> <p>- TRADITIONAL KNOW. - AGRONOMIC & GENETIC KNOW - PARTICIPATORY & FACILITATION SKILLS</p>	<p>9</p> <p>- WIDE S. HOLDER DIALOGUE & COLLABORATION - EXPERTS (AGRONOMY, ECONOMY) - MONITORING EXP. - RECOGNITION FROM INTERNATIONAL TREATY AND/OR OTHER POLICY MAK.</p>	
<p>10</p> <p>PRIVATE CORPORATIONS D AGRO BUSINESSES GOV. PROGRAMMES OTHER NGOs ANY OTHER GROUP PROP. N ALTERNATIVE USE OF THE LAND COMMUNITIES NOT TARGETED/ INVOLVED</p>	<p>11</p> <p>- LONG-TERM OCCUPATION OF LAND - HINDERING SEED-COMPANIES / SYSTEM</p>	<p>12</p> <p>- CONSULTATIONS WITH FOCUS GROUPS OF VARIOUS INTERESTS FOR PROBLEM SOLVING AND</p>	



Welcome note



It is with great pleasure that I have the opportunity to introduce myself. I am taking over the position as coordinator of the PSC PhD Program Sciences and Policy and the program officer of IDP BRIDGES. I will apply my scientific experience in a broad range of relevant environmental, agricultural as well as socio-economic studies. During my PhD, I investigated biodiversity on low-input farming and the assessment of genetic diversity in agricultural production systems. My personal and professional interest in the implementation of scientific results in the political environment was subsequently strengthened by different postdoctoral positions. For example, my mandate as long-term expert in a Foresight exercise of the Standing Committee of Agricultural Research SCAR comprised the active gathering of scientific knowledge and information in the field of bio-economy, agriculture and food systems, and its transfer to scientific stakeholders as well as public authorities such as the European Commission and the Swiss Federal Office for Agriculture.

Now, in my new position, I aim to contribute to the improvement of bridging science and policy by supporting young scientists integrating and transferring their research into political action. This will not only include the provision of theory, such as tools and methods for improving communication and interaction at a challenging interface, but also provide opportunities to share firsthand experience with political actors, educators and experienced scientists at national and international level.

Luisa Last
Coordinator PSC PhD Program Science and Policy, program officer of IDP BRIDGES



It is my great pleasure to introduce myself in the IDP BRIDGES newsletter. I began working with the PSC in June. For the moment I am taking over the position of program officer of the PLANT FELLOWS fellowship program during the maternity leave of Romy Kohlmann. I also manage the finances of the PSC and in particular of the IDP BRIDGES program. With a background in plant chemistry, plant-insect interactions and insect perception, I had the opportunity to do research in France, Switzerland and UK. I also worked in the industry for a little time, before coming back to the academic world where I changed to event organisation and management of research projects for the Biology and Physics groups at the University of Neuchatel. By working with the PSC, I hope to complement the coordination team with my experience in collaborating with industries and managing EU projects. I also wish to participate to the implementation of new challenging programs for PhD and Post docs in plant sciences.

Sandrine Gouinguené
Program officer of PLANT FELLOWS,
administrative support of IDP BRIDGES

Editorial

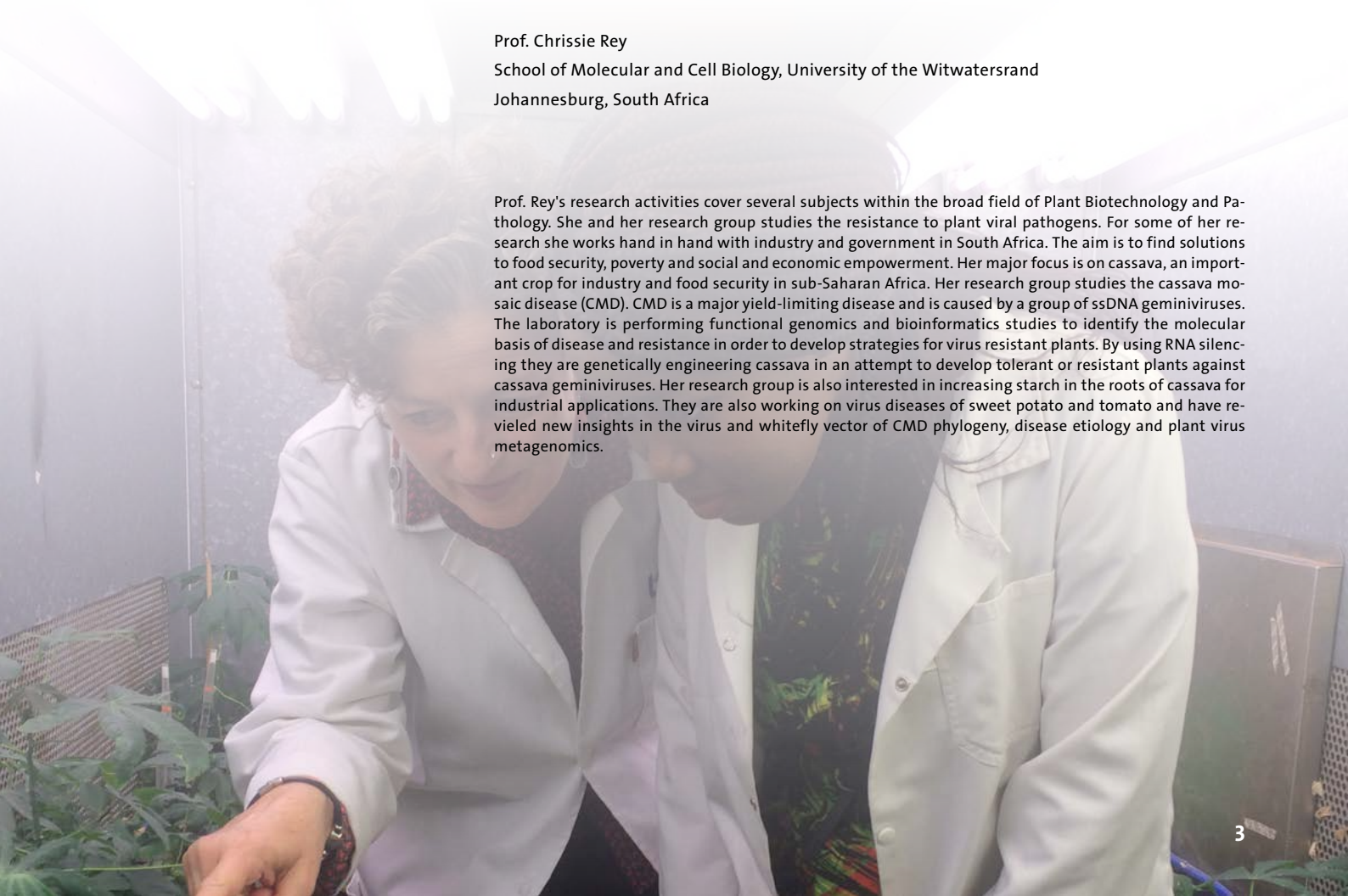
WHAT IS A WICKED PROBLEM?

A wicked problem in my opinion is one where there is a perceived opinion or conflicting opinions. There is not enough information to solve the problem and each side refuses to listen to each others point of view. A wicked problem needs a fresh or alternate way of thinking. A way that challenges and excites interested people. It may be difficult to achieve solutions for a wicked problem, often due to closed thinking, dogmatism and entrenched practices.

In my field, for example, a wicked problem is the case about cassava. Cassava is a security crop grown by subsistence farmers. The perception that this is a poor mans crop has impeded the progress into developing this carbohydrate-rich plant for industrial and other applications. This wicked problem requires a multi-disciplinary approach to change perception and to move subsistence farmers out of poverty into small-scale and commercial farming for social and economic empowerment. In terms of cultivating plants with improved traits such as yield and virus resistance we need to explore the potential of genetic engineering. This will not be easy in light of the resistance in certain countries to GM crops, a problem created by wickedness. Wick- edness in this context is the spread of misinformation about GM without the facts, and fuelled by creating fear in the public domain. Often the perpetrators perpetuate this for their own selfish ends or careers. On the other side, the scientists need to engage more with public opinion. This tension can be solved if both parties agree to move towards a common goal and change their attitudes.

Prof. Chrissie Rey
School of Molecular and Cell Biology, University of the Witwatersrand
Johannesburg, South Africa

Prof. Rey's research activities cover several subjects within the broad field of Plant Biotechnology and Pa- thology. She and her research group studies the resistance to plant viral pathogens. For some of her re- search she works hand in hand with industry and government in South Africa. The aim is to find solutions to food security, poverty and social and economic empowerment. Her major focus is on cassava, an im- portant crop for industry and food security in sub-Saharan Africa. Her research group studies the cassava mo- saic disease (CMD). CMD is a major yield-limiting disease and is caused by a group of ssDNA geminiviruses. The laboratory is performing functional genomics and bioinformatics studies to identify the molecular basis of disease and resistance in order to develop strategies for virus resistant plants. By using RNA silen- cing they are genetically engineering cassava in an attempt to develop tolerant or resistant plants against cassava geminiviruses. Her research group is also interested in increasing starch in the roots of cassava for industrial applications. They are also working on virus diseases of sweet potato and tomato and have re- veiled new insights in the virus and whitefly vector of CMD phylogeny, disease etiology and plant virus metagenomics.



TACKLING WICKED PROBLEMS

Melanie Paschke

A number of recent problems are wicked problems. They are all in the area of the grand challenges, e.g. food security, sustainable agriculture, climate change, resource efficiency - only naming a few in the area of plant sciences. They are sometimes also referred to as messy problems because they are very complex, have numerable causes and are impossible to solve in a defined timeframe by traditional approaches, processes or tools such as linear, analytical problem solving tools. A wicked problem is hard to define since a wide range of knowledge and stakeholder agreements (i.e. values, priorities) will create different perspectives about what the problem is and what the solution should be. Moreover, there will never be the right solution for every aspect of the problem due to strong interdependencies and multi-causality. The use of classical processes to solve common problems not only fails to tackle wicked problems, but they may evolve the problem by generating undesirable consequences. In general, all anticipated processes toward solutions need to consider the necessity for transformations of social systems, e.g. through changes of behavior of individuals or of normative beliefs in society.

What can we do about wicked problems?

They need to be tackled in an atmosphere of respectful open and collective inquiry with different stakeholders that bring in different knowledge cultures. The terminology of knowledge cultures moves behind stakeholder approaches by setting the focus on the identification of the knowledge and evidence that each culture is willing to create, translate and accept as credible, relevant and legitimate. In the process of collaborative inquiry all stakeholders will need to shift some of their paradigms to become open to the values and beliefs that any of the other knowledge cultures can offer.



Retrospect

Luisa Last

The IDP BRIDGES summer school "Tackling wicked problems" was carried out between Sept 21 to 25, 2015 in Einsiedeln in Switzerland and organized by Andrea Pfisterer and Melanie Paschke, both Zurich-Basel Plant Science Center. 20 PhD students had the opportunity to practice the process of open inquiry and its corresponding methods and approaches in case studies as well as in role play scenarios. First of all, tackling a wicked problem requires the definition and the framing of the problem. The identification of research gaps and involved disciplines is as important as the consideration of stakeholder values and perspectives as Christian Pohl from TdLab ETH Zurich worked out. Second, tackling a wicked problem and the design of solutions requires systems thinking. This includes the understanding of inter-relationships, engaging with multiple perspectives, and reflecting on boundary judgments. Here, Critical System Heuristics (CSH) with Marin Reynolds, Open University in UK, is an approach for the systemic analysis of sources of influence (e.g. motivation, control, knowledge, etc.) affecting any systemic design and systemic evaluation. Third, the analysis of wicked problems and other challenges requires the consideration from an ethical perspective as provided by Ivo Wallimann-Helmer, University of Zurich. This is of major importance in order to develop strategies that fit social demands as much as others. Finally, the search for the best solution to tackle wicked problems should also consider envisioning the future and understanding system transformation as a long-term change process as shown by Julia Backhaus from Maastricht University. These four aspects are steps within the framework of open inquiry, which were investigated actively in different workshops. Other lecturers and trainers in the summer school: Gerd Folkers, Collegium Helveticum, Robert Carteret from System Games and Peter Stegmeier from University Twente in The Netherlands.

More information at:

www.plantsciences.uzh.ch/teaching/summerschool.html

CASE STUDY 1

NOVEL PLANT BREEDING TECHNOLOGIES: HIGH HOPES / HIGH FEARS

New breeding technologies developed recently (including CRISPR/Cas9, ZFN, RNA silencing etc.) present novel challenges to regulators in terms of classifying products of these techniques as GM (Genetically Modified) or not. This is because although all these techniques require genetic engineering, the products of several are often indistinguishable from natural plant varieties. Under current regulations in Switzerland and in Europe, these products may be considered GMOs (Genetically Modified Organisms) since the definition of GMO is 'process' based. This is in contrast to regulations in the US and elsewhere which are 'product' based. Internationally, there is only one common definition of GMOs (or LMOs, Living Modified Organisms) as stated in the Cartagena Protocol on Biosafety (2000). The definition regards LMOs to be "any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology"—clearly a process based definition. The issue is inherently uncertain—are these techniques equivalent to genetic modification? The answer differs depending on who you ask and in what context. Additional uncertainty exists due to differing ideas about defining and regulating GMOs. The issue has also become extremely emotionally charged with activists on both sides of the debate resorting to ad hominem attacks and misinformation. The issue also involves many stakeholders/actors, with very conflicting world-views, values and interactions. For example, seed companies place value on profit and returns for

their shareholders, scientists value knowledge, activists value transparency and ecosystem welfare, developing nations value economic growth while developed nations also emphasize democratic processes and are cautious about unfettered industrial growth etc. This uncertainty is framed by global challenges such as income inequality, globalization, population growth and associated fears about food insecurity as well as increasing awareness of climate change, of science, of ecosystem services. ...

We propose that a redefinition of the term GMO (or LMO) be made in a collaborative manner and, ideally, be acceptable to all the stakeholders described in the figure below. Moreover,

new regulations specific to the new breeding techniques are also necessary to tackle the wicked problem we are dealing with. Both these systems of intervention encompass the interaction between scientific and legal/social areas. Values such as transparency, openness, and evidence-based policy making decisions are the basis of this interaction. In our opinion, several long term trends affect our idea to redefine the term GMO. Over the 20th century, globalization and global economic activity have changed the way human societies are organized and interact. A major feature of this "flattening" of the world has been an increase in international

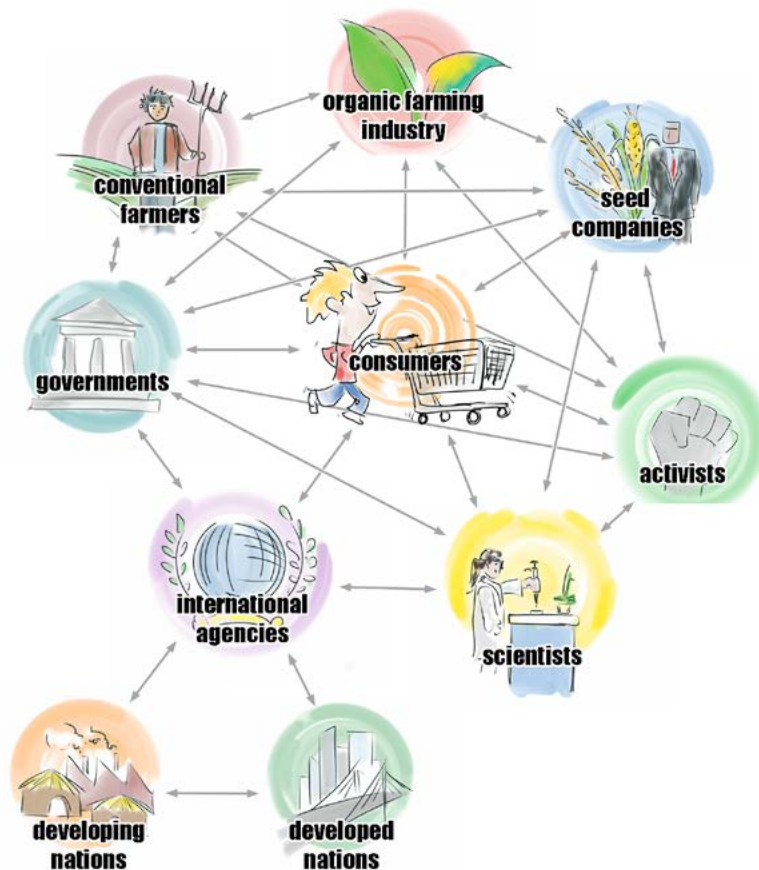


Illustration: Devang Mehta

trade, capital movement, migration and dissemination of knowledge (International Monetary Fund, 2000). We hypothesize that this trend towards greater connectedness has and will lead to the widespread adoption of new breeding technologies and GMOs in emerging economies, perhaps leading to a re-evaluation of these terms for in their more developed trading partners.

Extract of the case study work of Arianna Nigro, Devang Mehta, Stefan Lindner and Wuyan Wang

Case study facilitator: Andrea Pfisterer, PSC

CASE STUDY 2

PERMACULTURE AS COUNTERCULTURE: SECURING FOOD SUSTAINABILITY?

Securing food sustainably is one of the major challenges that our society will face in the future. Up-to-date, global food security is threatened by the unequal access (i.e. affordability, allocation, preference) and availability (i.e. production, distribution, exchange) as well as by unequal food utilization (i.e. nutritional value, social value, food safety) and its inefficient use (i.e. distribution, post-harvest managements, markets), see also Gregory et al. 2005: Climate change and food security. As many diverse factors have an influence on food security it makes it even more challenging to secure it sustainably. Diverse factors that have an influence are climatic changes (i.e. extreme drought or flooding events that cause harvest loss), the high number of involved stakeholders with opposing opinions and conflicting political interests, entrenched cultural practices, the current political environment and the unequal distribution of productive land (e.g. Central Europe vs. Sahel region). ... When considering permaculture as a means to secure food sustainably, many different stakeholders have to be taken into account. ... These stakeholders include local farmers (especially those using conventional agriculture so far), investors, government (represented at different levels) as well as environmental inter-

est groups (e.g. non-governmental organisations (NGOs)). These different stakeholders have different interests based on different values and ethical considerations. ... For the local population of communities chosen for permaculture projects, affordable food may be crucial. Food produced by permaculture, however, will probably be more expensive than food produced by conventional agriculture, at least initially. On the other hand, the same people may value the expected increase in well-being and quality of life as well as the long-term protection of the local ecosystem for future generations. Although permaculture is able to produce food sustainably, it is not the single solution. Sustainable food production, including but not restricted to permaculture, should be regarded as an ever-changing system. As such, flexibility in response to change, including unintended consequences needs to be accounted for from the very beginning. ... The political framework in which agricultural production is embedded would need to change to accommodate new production methods. ... A shift in global production systems towards life-preservation-oriented methods requires nothing less than a paradigm shift, from profit-based to life-based. Whether this happens forcefully or emerges gradually from multiple sectors across the world is yet to be seen.

Extract of the case study work from Nadine Brinkmann, Simone Günther, Claudia Hahn and Viviana Loaiza

Case study facilitator: Julia Backhaus, Maastricht University



"I was impressed by the diverse but highly participating student teams. We had a lot of communication. I especially liked addressing the complexity of wicked problems by system games."

Wuyan Wang

CASE STUDY 3

LEGALIZATION OF BUSHMEAT IN TICOYA RESERVE, COLOMBIA

Bushmeat hunting refers to the hunting of wildlife in tropical forests as a means of food procurement. This activity is practiced throughout the world and has attracted attention as populations of wildlife have been observed to decline. Over-hunting has led to the endangerment and extinction of many wild species, resulting in an ecological imbalance, a syndrome referred to as "empty forests". The region of the indigenous Ticoya reserve clearly reflects the complex nature of the bushmeat crisis. On one hand, over-hunting poses a severe threat to the sustainability of local wild animal populations. On the other hand, the indigenous population heavily depends on bushmeat as a traditional source of protein. Within the indigenous reserve, hunting is legal but only for local consumption, meanwhile the bushmeat trade has been banned. However, the illegal bushmeat trade is a growing market that generates revenues of millions of dollars per year. Under these uncoordinated illegal hunting practices, the bushmeat trade not only represents a potential threat to the environment and a potential irreversible loss of food source for local consumption, but has raised several more issues such as the increased transmission of lethal diseases (e.g. by ticks living in the animals' skin), concerns over food security and local livelihoods and questions over the autonomy of a region to control its resources. Most of these issues apply at the local level and are associated with contra-

dicting world-views by different stakeholders: centralized versus decentralized control, strict conservation of wildlife versus sustainable use management, legal versus illegal status of trade to protect biodiversity. In such a situation, a top down approach of a predefined intervention would conflict with some of these world-views, and would jeopardize the legitimacy of the process. We would rather focus our intervention in the frame of a larger co-creation of knowledge, eventually backed up by a transdisciplinary research approach. We would prefer to explore multiple solutions and trade-offs through participation processes and allow the emergence of new solutions by the stakeholders. The imbalance of power between the state authorities and local communities could be mitigated by researchers valorising local ecological knowledge within the community needs, whereas a mutual control system, where the same stakeholders are involved in ensuring compliance to the agreed plan could increase the legitimacy of the process. The sole use of traditional indicators such as income, education level, etc. as a measurement of success could limit our understanding of the worldview conflicts we are trying to solve. We would recommend to also use impact measurements (i.e. social transformation processes) that will not only show the full picture of the problem, but also aid in the development of new emerging solutions that assure the rights of all the stakeholders. We think this approach would increase the legitimacy of the method and agreed plan.

Extract of the case study work from Lisa King, Charlotte Pavageau, Carlos Eduardo Flores Tinoco and Gianni Pedrazzini
Case study facilitator: Claudia Garcia, ETH Zurich, ForDev



Links

www.fordev.ethz.ch/research/research-and-thesis-projects/latin-america/TICOYA.html

www.cifor.org/bushmeat/

CASE STUDY 4

BIODIVERSITY CONSERVATION THROUGH COFFEE AGROFORESTRY

Coffee is a major economic source of income in the Kodagu district of the Western Ghats, whereby coffee agroforestry systems represent the majority of remaining biodiversity outside the protected forest. The area of protected forest has declined by 50% over the last 40 years. A development of coffee intensification and shade tree homogenization has taken place due to many factors. One main factor that has been identified is the law implemented by the ministry of forestry. It prohibits the logging of native tree species which results in farmer's preference for exotic tree species. This preference originates from the profitability of selling the timber of the fast growing exotic species. Previous research has struggled with the complexity of the problem at hand, consisting of how to maintain or even increase the biodiversity at a landscape scale. This is due to the interconnectedness of a multitude of system components and the contrasting perspectives, objectives and needs of the different stakeholders involved. The problem has been identified as being a wicked problem since interventions have always been accompanied by negative side-effects. Moreover, multiple objectives and perceptions have hindered successful implementation of suggested measures. Erratic changes of conditional

factors on different scales such as the volatility of coffee and timber prices, climate variability and climate change but also unintended consequences of intervention measures result in a need for continuous adaptation. ... In order to achieve a more resilient ecosystem and maintain/increase farmers' livelihoods, we propose co-producing locally adapted sustainable agricultural practices together with farmers, taking into account the institutional context. These objectives are based on the following values: i) biodiversity provides a resilient and stable ecosystem over the long-term (sustainability) and ii) human rights, e.g. equal availability to resources, work, respect, economic welfare, etc. ... There are several stakeholders, such as the NGO (ATREE) and the forestry-ministry, in the position of making decisions about the needed human, financial, natural, and political resources. It is of great importance that the decision makers are ideally independent of the decision environment. ... It is crucial to consider any possible risks and side-effects caused by the project implementation to assure legitimacy. This is done by considering potential victims (e.g. current generation of farmers and their families, parts of the ecosystem or the government budget), negative impacts that should be avoided (e.g. increased deforestation of primary forest or human-wildlife conflict) and the different world-views of the involved actors.

Extract of the case study work from Yuanyuan Huang, Nestor Pöll, Laura Damerius and Eric Rahn

Case study facilitator: Claude Garcia, ETH Zurich, ForDev



Links

www.fordev.ethz.ch/research/research-and-thesis-projects/south-asia/landscape-transition--impacts-on-pollination-service-in-the-west.html

www.blackbazacoffee.com

CASE STUDY 5

ON-FARM MANAGEMENT OF TRADITIONAL RICE VARIETIES

Apart from providing food and livelihoods for hundreds of millions of farmers, local crops and varieties are the biological basis for adapting crops to changing climatic conditions, improving productivity and developing the quality of the products. Several conservation strategies and methods are currently used to maintain crop diversity, including in genebanks (*ex situ*) and on-farm (*in situ*). Despite the significant progress that has been made in the systematic conservation of crop diversity in gene banks, this approach alone is inadequate to provide effective conservation and management of all categories of potentially useful agricultural genetic diversity. The wicked problem in this case is: How to conserve crop diversity in farmers fields - especially in developing countries where most of the crop diversity currently exists. Complexity and interconnectedness in this case arise through the potential trade-off between maintaining crop diversity for future generations versus ways to improve the livelihoods of the farmers that currently safeguard it (e.g. through means such as introducing higher yielding crops). Although solutions have been sought separately around

these two issues, no long-term solution that encompasses both poverty reduction and on-farm management of crop diversity as a joint problem has been found. ... After evaluating this case using the three methods of ethics assessment (empirical, deontological & virtue ethics) we determined that farmers need to be offered more than one pre-determined intervention or incentive to remain on the farm and grow traditional crop varieties. Extensive consultation with the farmers and other actors will be necessary to develop a system which includes alternatives and real choices. ... In anticipation of these potential frictions, consultations with focus groups of various interests could be held for problem solving and idea sharing. One type of interventions that could potentially contribute positive in this case is more promotion and marketing of traditional and neglected varieties, providing income opportunities for farmers who maintain these. Furthermore political decision makers would be inspired to upscale traditional varieties and farming practices, and challenge the current practices of relying too much on *ex situ* seed storage, which is currently static and does not generate public wealth to a farming community.

Extract of the case study work from Sofia Nobre, Anna Geddes, Linn Borgen Nilsen and Tobias Schmid
Case study facilitator: Linn Borgen Nilsen, ETH Zurich

<p>1</p> <p>MANKIND!</p> 	<p>2 ENSURE/IMPROVE THE RESILIENCE AND DIVERSITY OF RICE PRODUCTION SYSTEMS</p>	<p>3</p> <ul style="list-style-type: none"> • No. RICE VARIET. MAINTAINED ON-FARM • AREA (HC) WHERE TRAD. VARIETIES OF RICE ARE GROWN 	<p>GROUP 5: Maintaining rice varieties</p>
<p>4</p> <ul style="list-style-type: none"> - FARMERS - LOCAL GOVERNMENT - INVESTOR 	<p>5</p> <ul style="list-style-type: none"> - incentives/compensation - farm land, rice varieties - farming/employment - participation and collaboration - local-, national-, international 	<p>6</p> <ul style="list-style-type: none"> - MARKET BEHAVIOUR - INTERNATIONAL REGULATORY MECHANISM - CLIMATE & CATASTROPHES - INDEPENDENT EXPERTS - OTHER GROUPS NOT INV. BUT WORKING IN THE AREA 	
<p>7</p> <ul style="list-style-type: none"> - FARMERS - EXPERTS AGRONOMY - EXPERTS ECONOMY 	<p>8</p> <ul style="list-style-type: none"> - TRADITIONAL KNOW. - AGRONOMIC & GENETIC KNOW. 	<p>9</p> <ul style="list-style-type: none"> - WIDE S.HOLDER DIALOGUE & COLLABORATION - EXPERTS (AGRONOMY) 	

“Working on complex systems within groups was both fascinating and challenging while the enhanced incorporation of multiple perspectives really brought new solution pathways and a better understanding in general.”

Nestor Pöhl



Wuyan Wang and Prof. Zerihun Tadele surrounded by tef at the University of Berne

Developing starch diversity in the orphan crop *Eragrostis tef*

WUYAN WANG

Knowledge about starch metabolism in the model plant *Arabidopsis thaliana* can be utilized to improve crops, such as *Eragrostis tef* (tef). The aim of my project is to modify starch properties in tef seeds to diversify its functionality as a food and thereby increase its value. During one of my secondments at Zerihun Tadele's research group at the University of Bern, I had the opportunity to access high-throughput techniques to develop lodging resistant and drought tolerant tef cultivars. Thus, through the cooperation with Prof. Tadele, I have access to plenty of tef resources. Also, I learnt to use a technique called TILLING (Targeting Induced Local Lesions IN Genomes) that can be used for screening for mutated starch related genes in tef. Until now, I was able to screen for 6 tef plants that show mutation sites in GBSS1 (Granule bound starch synthase 1) genome region. This result needs to be confirmed in the next steps including the validation of these mutants and the analysis of

starch structure at the laboratories of ETH Zurich.

In addition to the positive experimental results achieved I gained a personal deep impression on collaboration. Working in a different group enriches my research experience. The experiment organization with new colleagues offers me the chance to improve my communication skills with people both in and out of the scientific field. It is great to work there and I appreciate a lot of the support from Zerihun and all researchers in his group.

Wuyan will perform a second secondment at the Ethiopian Institute of Agricultural Research (EIAR). There she will evaluate the agronomic performance of the new varieties in the field. During this time, she aims to transfer knowledge of plant biochemistry and molecular breeding techniques of crops to the students and researchers in Ethiopia. In doing so, she would like to contribute to improved research communication and the study of other crops in Ethiopia.

About EIAR

EIAR comprise 55 research centers and sites located across various agro-ecological zones. In addition to research, EIAR provides coordination of agricultural research countrywide, and advises the government on agricultural research policy formulation.

www.eiar.gov.et

Sucrose metabolism during drought stress in *Arabidopsis*

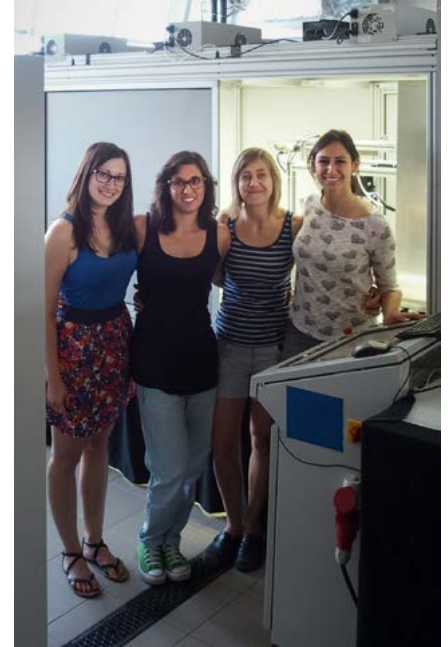
ARIANNA NIGRO

"Are you performing your phenotyping experiments directly at the Company?" a professor asked me during a workshop. "You are in the right place!" he replied. During my secondment I spent seven weeks at PSI (Photon System Instruments), company located in the beautiful Moravian countryside, in a small village close to the city of Brno. I performed a so called non-invasive high throughput screening using the PlantScreen™ Phenotyping System at PSI. The automated phenotypic analysis includes chlorophyll fluorescence imaging, thermal imaging, RGB imaging and hyperspectral imaging.

A few days after I arrived, I was actively involved in the organization of the International Plant and Algal Phenomics meeting and workshop. It was a unique insight for me into how academia and industry worlds can be integrated, for example, how industry can support basic research for knowledge creation. The atmosphere of collaboration and exchange created by the attendees had very positive benefits to me. The enthusiasm of the people towards hi-tech products developed at the company and the possibility to apply these technologies to face new agricultural challenges gave a boost to my motivation. The valuable contribution and commitment of my Associated Partner, Klara Panzarová, made this event possible. Working together with Klara has shown me what it means to apply scientific research to industrial goals. She is for me a concrete example of a successful career started with a PhD and developed into a position in the industry. Staying with her gave me many elements to think about

Arabidopsis thaliana plants grown in control or high salinity conditions.

my future career. I also had the great chance to learn from her about Czech Republic, the South Moravian region and its culture. Among the many activities I was engaged with at PSI, I had the opportunity to welcome Colin Boswell - pioneering garlic farmer from the Isle of Wight (UK) - and a group of Czech researchers. I led them through the plant and illustrated some of the products the company offers. Later we were engaged in a vivid discussion about how the leading edge technology developed at PSI is fascinating and relevant to many studies ongoing all around the world. This real-life exposure to the industrial world has also fostered my networking. At PSI I met and worked with Mariam Awlia, PhD student in the research group of Professor Mark Tester at KAUST (Saudi Arabia). The collaboration born this Summer will clearly contribute to my further work. On the way back to Zurich I thought again about what the professor said. It was true, I was in the right place!



Ing. Radka Mezulanikova, Arianna Nigro, Dr. Klara Panzarova (AP) and Mariam Awlia, PhD student at KAUST (Saudi Arabia) in the lab at the PSI.

About PSI

PSI designs and manufactures sophisticated, high-end instrumentation for research in biological sciences.

<http://psi.cz>



Identification of factors influencing the effectiveness of microbial inoculants on a global level

LUKAS SCHÜTZ

In my dissertation I am associated to the ISCB (IndoSwiss Collaboration in Biotechnology) project BIOFI (Bio-Irrigation and -Fertilization) and study the use of microbial inoculants for crop production. The diversity and number of microorganisms in the soil ecosystem is incredibly high and some are beneficial to plants, but others are pathogenic and lethal. By selecting the most beneficial ones and multiplying them in the lab, they can be applied with the sowing to support the seedling from germination on. The most advanced is the use of microorganisms to promote plant growth via an improved uptake of nutrients from the soil and fertilizers and by the secretion of plant hormones.

While my study approach is experimental, for my secondment at the FiBL I strictly focus on literature evaluation, where I compile existing knowledge on water and nutrient use efficiency as influenced by the application of microbial inoculants in field studies. Through my second supervisor Dr. Paul Mäder I had the opportunity to dock onto an existing project led by Dr. Andreas Gattinger studying the water and nutrient use efficiency in the context of a changing climate (Project title: The Potential of Sustainable Farming Systems to Promote Adaptation to Climate Change). Research on microbial inoculants is especially prominent in tropical countries, where soil quality is often poor. By identifying the influencing factors e.g. soil type, way of application, organic matter content of the soil etc. a successful inoculation could be predicted more easily. Even not being there physically, for me

it is a journey across the world in front of the computer. Main countries in this field are India and Iran, but also Brazil, Pakistan and Turkey. I learn about crops and can study in depth the design of field experiments with biofertilizers. This gives me also great inspiration to pursue my studies on biofertilizers further. Hence this work is improving my own understanding of my research topic and it is greatly increasing my knowledge base of the use of microbial inoculants.

Yet the big challenge is to compile all data from eligible studies in order to quantify the impact of bio-inoculant application on water and nutrient use efficiency by means of meta-analytical statistical tools. This work will bridge a knowledge gap in the field application of biofertilizers and I hope it will make an impact to the scientific community but also to other relevant stakeholders.

About FiBL

FiBL is an independent, non-profit, research institute in the field of organic agriculture. FiBL's research team works together with farmers to develop innovative and cost-effective solutions to boost agricultural productivity. FiBL gives high priority to transferring knowledge into agricultural practice through advisory work, training and conferences.

www.fibl.org

Lukas Schütz doing literature research at the FiBL in Frick. This research focuses on the evaluation of biofertilizers with published field studies and the identification of factors influencing its efficiency.





On the 5-6 of September 2015, Wuyan Wang and Devang Metha presented their research projects at the Scientifica. More than 700 visitors had a taste of bread and research made of tef. By visiting the Cassava plant exhibition they learnt about the impact of virus infection on local cassava plants from Africa and visually compare them with the Devang's resistant variety.

Claudia Hahn presented her research on grassland productivity in response to seasonal droughts to teachers participating in the Plant Science at School workshops. These workshops are regularly organized by the Zurich-Basel Plant Science Center. In one-day filled with practical experiments, teachers learn cutting-edge research methods and experiments. The format is designed so that teachers can use the knowledge and experiments afterwards in their own classrooms.

Guillaume Lacavé, Sofia Nobre and Arianna Nigro moderated the Science & Policy Panel and Plenary Discussion on "Plant Sciences, Patents and Food Security" on 9th of October 2015. More than 70 participants discussed how intellectual property rights and international policies influence the use of plant biotechnology for development in tropical countries. The event was organized together with Dr. Philipp Aerni of the Center for Corporate Responsibility and Sustainability CCRS at the University of Zurich.

Charlotte Pavageau presented her work on coffee agroforestry systems during the opening ceremony of Zurich week in the Swiss Pavilion at Expo Milano 2015.

Science & Policy Panel and Plenary Discussion
 Friday 9 October 2015, 16.15 – 18.15
 ETH Zurich, Building LEE E 101, Leonhardstrasse 21

Plant Sciences, Patents and Food Security

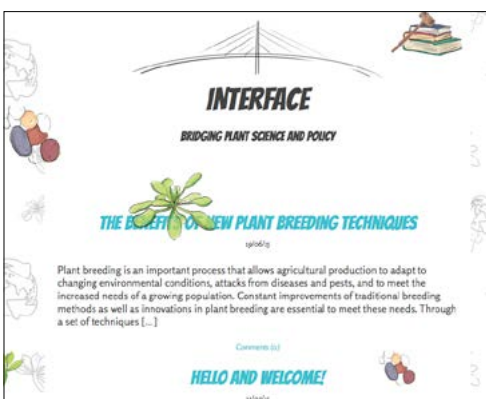
Prof. em. Chris Leaver
 Department of Plant Sciences, University of Oxford
 Founding trustee «Sense about Science» and senior science advisor «Biosciences for farming in Africa» (www.b4fa.org)

Jayashree Watal
 Counselor in the Intellectual Property Division of the World Trade Organization WTO
 Co-editor of Handbook on the WTO TRIPS Agreement (Cambridge University Press, 2012)

Karin Nichterlein
 Agricultural Research Officer at the UN Food and Agriculture Organization FAO
 Member of the FAO based Secretariat of the Tropical Agriculture Platform TAP, a G20 Initiative to promote capacity development for agricultural innovation in tropical countries



MILANO 2015



Interface – the Science & Policy blog was launched in March 2015. In this blog IDP BRIDGES PhD students discuss up-to-date topics related to plant science and policy.

<http://blogs.ethz.ch/interface>

2nd ANNUAL MEETING 26 – 28 OCTOBER, 2015

At this event, all fellows, PIs and associated partners will meet and discuss research progress and strategic reflections

Monday, October 26, 2015

- 8.00 – 16.00 Mid-term review of the program and individual projects
 17.00 Individual arrival at the Boldern
 18.30 Joint dinner
 19.30 Targeted mentoring with the IDP BRIDGES Angel: Dr. Michele Garfinkel

Tuesday, October 27, 2015

- 8.00 Breakfast
 9.45 – 13.00 PhD retreat session I: Maintaining plant production through the advanced use of technologies
 13.00 Lunch
 14.00 – 16.00 PhD retreat session II: Ensuring sustainable land use and environmental protection
 16.15 – 18.45 Policy workshop: Strengthening the effective engagement of researchers with the public policy process
 18.45 – 20.00 Dinner
 20.00 Social Event
 In parallel: Supervisory board meeting (all PIs & associated partners)

Wednesday, October 28, 2015

- 8.00 Breakfast
 9.00 - 13.00 Green Business Workshop
 13.00 Lunch
 Afternoon Departure or time for individual thesis committee meetings

Website

www.plantsciences.uzh.ch/research/fellowships/idpbridges.html

Contact

Luisa Last, llast@ethz.ch

Location

The Conference Center Boldern in Männedorf (approx. 20 km from Zurich) is the first hotel in Switzerland to be awarded the European Ecolabel Tourism.

www.boldern.ch

Mentoring

Targeted mentoring at the interface between science and policy with Michele Garfinkel, Science Policy Program of EMBO.

Policy Workshop

Sharing experiences, ideas and visions about strengthening the effective engagement of researchers with the public policy process. The ultimate aim of the workshop is an opinion letter about mentoring for an impactful science-policy dialogue.

Moderation: Dr. Antonietta Di Giulio

PhD Retreat

All fellows present and discuss their PhD projects together with supervisors, associated partners and peers in the light of the interface of science and policy-making. The expertise of the associated partners will play a pivotal role.

Green Business Workshop

Philipp Winteler from venturelab will provide insight to business models especially focussing on sustainable business, Triple Bottom Line and the Business Model Canvas. Under the supervision of the facilitator, students will work on their personal business model by using selected projects of the program.

Consortium: ETH Zurich, University of Zurich, University of Basel
 Coordinator: Prof. Samuel C. Zeeman, ETH Zurich
 Project Management: Dr. Melanie Paschke, Zurich-Basel Plant Science Center
 Project Officer: Dr. Luisa Last, Zurich-Basel Plant Science Center
 Financial Administration: Sandrine Gouinguéné, Zurich-Basel Plant Science Center

Principal Investigators

ETH Zurich: Dr. Eduardo Perez, PD Dr. Hervé Vanderschuren, Prof. Achim Walter, Prof. Samuel Zeeman, Prof. Bruno Studer, Prof. Jaboury Ghazoul
University of Basel: PD Dr. Mikhail Pooggin, Prof. Thomas Boller, Prof. Ansgar Kahmen, Prof. Jürg Stöcklin
University of Zurich: PD Dr. Diana Santelia, Prof. Bernhard Schmid, Prof. Pascal Niklaus, Prof. Ueli Grossniklaus

Fellows

ETH Zurich: Guillaume Lacavé, Devang Mehta, Wuyan Wang, Timothy Sykes, Lisa King, Charlotte Pavageau
University of Basel: Silvia Turco, Claudia Hahn, Michael Thieme, Constantin Pöll, Lukas Schütz
University of Zurich: Arianna Nigro, Yuanyuan Huang, Margarida Sofia Nobre

Associated Partners

Dr. María Elvira Zúñiga - Centro Regional de Estudios en Alimentos Saludables, Chile
Prof. Maria Emma Christine Rey - University of Witwatersrand, South Africa
Dr. Monika Messmer, Dr. Lucius Tamm and Dr. Paul Mäder - Research Institute of Organic Agriculture, FiBL, Switzerland
Dr. Willy Kessler and PD Dr. Andreas Lüscher - Agroscope Reckenholz, Switzerland
Dr. Klara Simkova - PSI, Czech Republic
Dr. Kebebew Assefa - Ethiopian Institute of Agricultural Research, Ethiopia
Dr. Zerihun Tadele - University of Bern, Switzerland
Dr. Torben Asp - Aarhus University, Denmark
Prof. David S. Wilcove - Princeton University, USA
Dr. Uma Shaanker - ATREE, India
Prof. Ma Keping - Chinese Academy of Sciences, China
Dr. Daniela Pauli and Prof. Markus Fischer - Swiss Biodiversity Forum, Switzerland
Dr. Samuel Vogel - Federal Office for Agriculture, Switzerland
Dr. Richard Jefferson - CAMBIA, Australia
Prof. Lian Pin Koh - University of Adelaide, Australia
Dr. Etienne Bucher - Institut de Recherche en Horticulture et Semences, France

Mentors

Dr. Gerlind Wallon - EMBO Deputy Director, Manager for Women in Science Activities, EMBO Young Investigator Program
Dr. Michele Garfinkel - EMBO Science Policy Program
Regina Ammann - Head of Public Policy, Syngenta International AG
Dr. Gunter Festel - FESTEL CAPITAL
Dr. Eva Spehn - Swiss Biodiversity Forum SCNAT, Global Mountain Biodiversity Assessment of DIVERSITAS, University of Basel

Work Package MANAGEMENT

Lead: Dr. Melanie Paschke

Work Package RESEARCH

Lead: Prof. Samuel C. Zeeman

Work Package TRAINING

Lead: Dr. Melanie Paschke

Work Package EXPLOITATION

Lead: Dr. Manuela Dahinden

Work Package OUTREACH

Lead: Dr. Manuela Dahinden

IDP BRIDGES is an Innovative Doctoral Program supporting 14 PhD student's work in the most challenging areas of the plant sciences and policy. This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no PITN-GA-2013-608422 – IDP BRIDGES. It is coordinated by the Zurich-Basel Plant Science Center - a competence center linking and serving the plant science research community of the University of Zurich, ETH Zurich and University of Basel.

Our twice-yearly newsletter is distributed to all IDP BRIDGES participants and other interested people. It provides information about scheduled training and outreach events as well as highlights of significant research results and policy outcomes.

Contributions are always welcome! If you are interested in contributing to the next issue, please contact luisa.last@usys.ethz.ch

© Plant Science Center (PSC)
IDP BRIDGES Newsletter No. 3, 2015

Publisher
Zurich-Basel Plant Science Center
Coordination Office
Universitätstrasse 2, ETH Zurich, LFW
8092 Zurich, Switzerland
Phone +41 44 632 02 71

www.plantsciences.ch

Editors
Luisa Last, Manuela Dahinden, Melanie Paschke

Layout
Manuela Dahinden

English language consultant
Ann-Marie Durisch

Pictures
PSC team

