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Mexico

IUNR

magazine
2018

Internationalization

The future begins
today

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A visit to India

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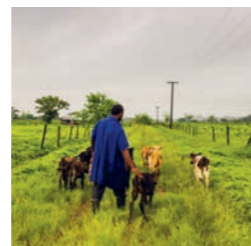
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International exchange at Wädenswil – a transformative experience

There is no doubt about it: global problems such as climate change, environmental impacts of non-renewable energy sources, and food security cannot be solved by a small country such as Switzerland alone. These challenges require a global approach involving cooperation between countries and researchers around the world. More than 95 % of new knowledge is now generated outside Switzerland, so it is all the more important for us to exchange knowledge and experience in international research networks.

The Institute of Natural Resource Sciences (IUNR) is a pioneer of sustainable solutions to problems at the interfaces between society, the environment and technology. In our research we focus on agrofood and human systems, biodiversity and ecosystems, and ecological engineering. Cooperation with outstanding research partners worldwide enhances the quality and the visibility of our own research. Our international relations currently focus on Europe, but we also promote exchange and cooperation between researchers and students in developing and emerging countries.

Exchange programmes for our students and staff are an important way of establishing and strengthening collaboration. The experience of different cultures provided by these programmes leads to a broader general understanding of society and the environment. The participants' professional and methodological skills are expanded, and their social and personal competences developed, making it easier for students to start on their career paths. A further bonus is an improvement in foreign language skills.

We strongly encourage our own students and staff to take part in an international exchange, and are delighted to have foreign students on our attractive Bachelor's and Master's study programmes. Visiting members of universities are also welcome to present their expertise here in Wädenswil. Our Grüental campus is situated in a unique location overlooking the Lake of Zurich. With its wonderful gardens and outdoor facilities, it offers an exceptional environment for creative and stimulating research and learning. For both outgoing and incoming students, the international exchange programme provides an opportunity to take part in a truly life-changing experience!

Rolf Krebs

Director of Institute of Natural Resource Sciences



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Sustainability – the common denominator

A cooperative project between the Institute of Natural Resource Sciences (IUNR) and the Institute of Sustainable Development Eberswalde (HNEE) is taking shape. At the end of 2016 Swiss-European Mobility Programme (SEMP) contracts between the IUNR and the HNEE were signed near Berlin, and since then, a good deal has happened. Lara Haslimeier – an undergraduate environmental engineer specialising in nature management – is currently spending an exchange semester at the HNEE. More details of this follow, after a brief look at where it all started.



Simone Gruber
Tourism and Sustainable
Development

How it all began

In my search for a university in German-speaking countries that, like the IUNR, deals intensively with issues of sustainable development, I came across the HNEE. I was interested in what sustainability means to companies, and with the aim of finding a suitable Master's degree programme, I discovered the Master's programme in 'Strategic Sustainability Management' at the HNEE. The introductory sentence 'Strategic sustainability management supports you – your company – your non-profit organisation in developing in a future-orientated and sustainable way' caught my interest. After thoroughly researching the different modules, I registered for the 2014–2016 Master's degree programme. While at the HNEE, I had the opportunity to interact with their lecturers, staff and students on the Bachelor's and Master's programmes, and experience Eberswalde campus life firsthand. It didn't take me long to realise that there were many similarities between the IUNR and HNEE. For example, the Bachelor's and Master's programmes cover environmental issues such as the use of landscapes, nature conservation, organic farming, agricultural marketing, regional development, renewable energies and environmental awareness, all with the aim of developing solutions for the sustainability challenges of today. And there it was, the common denominator – sustainability! A cooperative project between the IUNR and the HNEE via SEMP was the obvious next step.

From idea to implementation

At the end of 2016, I had my first exploratory discussions with the Dean of the Faculty of Landscape Management and Nature Conservation. The profile of this faculty, with its focus on organic agriculture, land use and nature conservation, regional planning and environmental education, is very similar to the IUNR's Bachelor's programme in Natural Resource Sciences. The idea of initiating cooperation between the universities to promote both student and lecturer mobility was consolidated quite quickly. In addition, initial discussions took place about how both univer-

sities could work together on digitisation and learning with the idea, for example, of developing and offering e-learning courses. In May 2017, an HNEE delegation visited the IUNR to continue the talks and put ideas into more concrete terms. In a larger discussion, an exciting exchange and a comprehensive collection of ideas were generated. In November 2017, the Head of the IUNR's Research Unit Organic Agriculture and representatives of the Nature Management specialisation (one from the student advisory service and myself from the Environmental Systems and Sustainable Development specialisation) went to Eberswalde for a return visit. Further intensive discussions and workshops took place on what form the cooperation between the two universities should take. Last but not least, presentations for students were given, and Prof. Jürgen Peters took us on a wonderful stroll through the old town of Eberswalde. With plenty to do and our heads full of ideas, we returned home.

What have we achieved so far?

Lecturer mobility: As a first step, Dr. Christina Bantle, a visiting Professor of Politics and Markets in the Agricultural and Food industry at the HNEE, worked on the newly launched Master of Science in Environment and Natural Resources (ENR) in the Agrofood Systems major, and gave lectures on methods of empirical social research over two days.

Student mobility: As previously mentioned, Lara Haslimeier (24) is studying Landscape Management and Nature Conservation for one semester at the HNEE. The subjects she is studying include, for example, applied landscape ecology, land use, geocology, GIS, species recognition of flora and fauna, and cross-border nature conservation. Once she has completed her exchange semester, she will write a report detailing her experiences at HNEE.

Joint programmes: Every year a five-day conference on renewable energies – 'Master Class Course Conference Renewable Energies' – is held at the HNEE.



The talks between Prof. Jürg Rohrer, Head of the Research Group for Renewable Energy, and Frank Torkler, Faculty of Landscape Management and Nature Conservation, were recorded on video with an invitation to our IUNR students. The Master Class Course Conference Renewable Energies (MCCRE) was included in the 3rd semester of the IUNR Master's Research Unit Ecological Engineering (4 ECTS points). This means that the MCCRE is open to IUNR Master's students with full accreditation of ECTS points.

New e-learning proposal as a preparatory course for future Master's students: A joint e-learning programme for future Master's students at the HNEE and the IUNR is currently being developed. The aim is to close gaps in preparatory agricultural education and to provide important knowledge for the forthcoming Master's programme. The e-learning programme is being developed jointly, but will be implemented at each university within its own framework. Students will be able to acquire up to 6 ECTS points. Topics such as basic principles of organic farming, agricultural markets, organic crop production, and organic animal husbandry will be covered. The launch is scheduled for August 2018.

Challenges remaining

Despite many commonalities and ideas, the devil is often in the details when universities implement cooperative projects. Do courses fit into the semester



Greenhouses and photovoltaic systems on the IUNR campus (upper picture). HNEE representatives visiting the IUNR campus (lower picture, with author in the middle).

Photos: Frank Bröderli / Simone Gruber

schedule? Do courses take place as block courses or are they spread over the semester? In addition to content requirements, the framework conditions for student and lecturer mobility must also offer sufficient scope for fruitful university cooperation. We are working on these issues!

Outlook

What we are left with and continues to motivate us at the IUNR and the HNEE is the idea of promoting sustainability together with our students. We are looking forward to continuing our exciting partnership!

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Ten years of partnership with the University of Ljubljana

Good things come to those who work together!

Similar research interests and a potential for mutually beneficial exchange programmes have led to a close collaboration between the IUNR and the University of Ljubljana. Over the past few years, various joint research projects have been successfully realised, and both students and staff have profited from mobility programmes. The most recent achievement from this collaboration – but certainly not the last! – is the Double Degree contract for the new MSc in Environment and Natural Resources at the IUNR.



Ranka Junge
Head of Centre for Ecological Engineering

Cooperation in Research & Development

The first cooperation between the IUNR and a Slovenian institution started in 2005 as part of the 6th framework of the EU project ‘Play with Water: Introducing Ecological Engineering to Primary Schools to Increase Interest and Understanding of Natural Sciences’ (www.zhaw.ch/iunr/play-with-water). The IUNR coordinated this project with partners from Denmark, Norway, Sweden, Germany and Slovenia. This project was also the start of cooperation with Prof. Dr. Tjasa G. Bulc, the co-founder of one of the partners, the SME LIMNOS Company for Applied Ecology. The cooperation continued when Prof. Bulc transferred from the private sector to the University of Ljubljana (UL).

The University of Ljubljana was established in 1919. It consists of 23 faculties and 3 academies. Although I studied biology, ecology and environmental science from 1973 to 1981 in Ljubljana, for many years I had no professional contact with my alma

mater. However, after 2005 this changed significantly.

After the first contact, the research interests of the Centre for Ecological Engineering (IUNR) and both the Department of Sanitary Engineering (Faculty of Health Sciences, UL) and the Department of Environmental Civil Engineering (Faculty of Civil and Geodetic Engineering, UL) proved to be very much aligned. In the following years we applied for several research projects together, mostly in the EU, and in some cases our endeavours were crowned with success! The table below lists all past and current projects between the IUNR and the University of Ljubljana.

Teaching Cooperation and Mobility (Bachelor’s & Master’s)

International focus weeks in Slovenia

The curriculum of BSc classes UI05 to UI09 included an international focus week during the 6th semester. From 2008–2012 two focus weeks were organ-

When	Title	Funding instrument	Partners
2012–2013	Rhizosphere training – engineering of advantageous biofilms on the surfaces of roots	Schweizer National Fonds (SNF) SCIE X Post Doc	The Agricultural Institute of Slovenia IUNR, Research Group for Phytomedicine
2012–2013	Transfer of good practice and co-operation Slovenia–Switzerland: In the mountain village Strojna: tourism development and architectural renewal	Bilateral Project Slovenia–Switzerland (Swiss Contribution)	Faculty of Architecture, UL IUNR, Research Group for Regional development and 3 others
2012–2014	AQUA-VET: Introducing Aquaponic in VET: Tools, Teaching Units, and Teacher Training	EU Leonardo da Vinci	UL, Faculty of Health Sciences IUNR, Centre for Ecological Engineering and 3 others
2014–2018	The EU Aquaponics Hub – Realising Sustainable Integrated Fish and Vegetable Production for the EU	COST Action FA1305	UL, Faculty of Health Sciences IUNR, Centre for Ecological Engineering and many others
2016–2019	Designing Food Value Chains to Foster the UN Sustainable Development Goals	Mercator Stiftung, Switzerland	IUNR, Research Group for Geography of Food UL, Biotechnical Faculty and 2 others
2017–2020	AQU@TEACH: Innovative educational tools to promote learning among European students using aquaponics	ERASMUS + KA2 – Strategic Partnerships for higher education	IUNR, Research Group for Ecotechnology UL, Biotechnical Faculty and 3 others
2018–2022	Implementing nature based solutions for creating a resourceful circular city	COST Action CA17133	IUNR, Research Group for Ecotechnology; UL, Faculty of Civil and Geodesic Engineering

Joint research projects with the University of Ljubljana.



View from Ljubljana Castle to Ljubljana (towards the northwest).

Photo: Iztok Amersek

ised, each taking place five times with 25 students. One programme took place at the National Institute of Biology, Marine Biology Station Piran, its focus being ‘The Slovenian coast: a region in the field of conflicts between different uses’, while the other investigated ‘Contribution of a large protected area to the regional development and environmental education in rural areas’ in the Triglav National Park. During these focus weeks, the participating students used the insights and knowledge gained during the study to investigate environmental problems in a different country. The programme comprised excursions and group work, with lectures and excursions with Slovenian scientists.

Student and staff exchange

The first ERASMUS contract between the ZHAW and the University of Ljubljana was signed in 2012. This bilateral contract was renewed in 2014 in accordance with new regulations, as Switzerland is not part of the new ERASMUS+. During this time, four students from the IUNR spent one semester (or wrote their Bachelor’s thesis) at the University of Ljubljana, and 7 students from the University of Ljubljana spent an entire or half a semester in Wädenswil. One of them was Zala Schmautz, who performed the experimental work for her Master’s thesis (Mass balance and nutrient recycling in aquaponic systems) at the IUNR, jointly supervised by Tjasa G. Bulc and Ranka Junge. She won the award for the best thesis of the Sanitary Engineering Department for the year 2014/2015 at the Faculty of Health Sciences. Zala is currently working on her PhD thesis, jointly supervised by the

ETH and the ZHAW/IUNR. In addition to the student exchanges, there was a continual exchange of staff, with 5 outgoing and 3 incoming guest lecturers.

Double Degree in MSc in Environment and Natural Resources

All these activities led to the idea of furthering the already close cooperation between the IUNR and the University of Ljubljana. International cooperation is one of the main pillars of the new MSc in Environment and Natural Resources (ENR), and cooperation with the University of Ljubljana was included in the planning from the very beginning. The goal was to establish a Double Degree: a mutual acknowledgement and acceptance of courses and qualifications. As the IUNR Master’s programme consists of only 90 ECTS credits and the Master’s at the University of Ljubljana has 120, students from Wädenswil who wish to obtain the Double Degree need to study in Ljubljana for a whole semester and do a Master’s thesis that is supervised jointly by both universities, either in Switzerland or in Slovenia. The first Double Degree contract was signed with the Faculty of Civil and Geodetic Engineering, but this is definitely not the final step in our collaboration with the University of Ljubljana. We are striving to reach equivalent agreements with the Faculty of Health Sciences and the Biotechnical Faculty. Within the framework of the ENR Master’s programme, we are planning two summer schools in 2019, each with 4 ECTS credits. And we are looking forward to many more joint research projects!

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The Master's programme for future sustainability experts

The aim of the Master's programme in Environment and Natural Resources is to train future experts in sustainability. Upon completion of their studies, graduates use their expertise and methodological knowledge to contribute to solving current and future challenges, both global and regional.



Angela Martucci Siefert
Programme director, MSc ENR

All societies are confronted with pressing issues relating to food and agriculture, climate change, energy and access to resources, both on a global and a regional scale. To meet these challenges, we need professionals from the environmental sector who are able to handle ecological and socio-economic complexity in practice, who think and act in a solution- and research-oriented manner, and who are also open to interdisciplinary approaches to problems. The Master's programme (MSc ENR) was developed at the Institute of Natural Resource Sciences against the background of these ecological, social and economic challenges. The three thematic foci are reflected in the following Master's Research Units (MRU): Agrofood Systems, Biodiversity & Ecosystems, and Ecological Engineering. The nationally and internationally networked research groups of the IUNR are involved in one or more of these Research Units. The degree programme is aimed at students with scientific expertise acquired at university level. Can-

didates from other fields of study can also be accepted into the study programme if they have the specialist knowledge required and pass the additional exams. The course is structured in such a way that part-time students can easily combine their studies and work.

Research-relevant

During the enrolment process, students apply to a research group within one of the three MRUs and are interviewed by the head of the particular research group. During this interview, it is determined whether the candidate has the necessary skills for the topics and projects of the research group and whether they can be accepted into their chosen group. This step is essential for successful completion of the programme. Students work closely with the research group for almost half of their studies (Project Work in Research Units 1 and 2, and the Master's Thesis). This gives them an insight into and initial involvement in the group's current projects.



Students interview producers in the greenhouses of Ortoloco during the Summer School in 2017, one of the opportunities for international exchange at the IUNR.

Photo: Research Group for Geography of Food

Module overview MSc 2018

Master of Science in Environment and Natural Resources

Compulsory module
 Elective module
 Optional

4 th semester	Double Degree University of Ljubljana Slovenia									ECTS 30	
3 rd semester	Master's thesis									30	Advanced Spatial Analysis Uni ZH 3
2 nd semester	Decentralised Sanitation Summer School 4	Geography of Food Summer School 4	Remote Sensing for Ecology 3	Natural Resource Management in Urban Areas 3	Natural Resource Management in Emerging Economies 3	Advanced Life Cycle Assessment and Ecodesign 3	Environmental Mediation 3	Behavioural Change 3	Patterns and Trends in Environmental Data 3		
	Project Work in Research Unit 2 6	Biodiversity Monitoring Summer School 4	Natural Resource Management in Mountain Areas 3	Aquaculture Systems 3	Agriculture for the Future 3	CO ₂ Management in Companies and Local Authorities 3	Environmental Ethics 3	Environmental Economics 3	Geovisualisation Uni ZH 3		
1 st semester	Project Work in Research Unit 1 6		Ecosystems and Biodiversity 6	Ecological Engineering 6	Agrofood-systems and Chains 6		Sustainability Science 3		Research Methods 15		

Source: IUNR / ZHAW

Individual professional specialization

In the modules 'Project Work in Research Units 1 and 2', students learn to write project proposals independently and /or take responsibility for subtasks within project submissions or project assignments. This means that right from the start of their studies, students come into contact with relevant networks and potential future employers. The modules characterize the individual learning paths of the students, and thus their future subject specializations. The individual learning path includes a further specialization: in the methodological training, students choose either the natural scientific or socio-economic profile. In addition to the individual inputs on each topic, students work on a case study related to their own MRU and directly apply the acquired methodological skills. This didactic setting emphasizes the practical relevance of the Master's course and its connection to applied research. A wide range of elective modules can be chosen in the spring semester. These electives further develop professional and /or methodological aspects, and are designed for students in the three specialisations. The courses are given in English, and therefore the spring semester is ideal for incoming students who want to benefit from the practical orientation of a university of applied sciences.

Versatile opportunities for international exchange

IUNR students also have the opportunity to spend a semester at one of the partner universities abroad. To do so, they select courses of study that suit their subject. In addition to the semester abroad, students can acquire a double degree. Thanks to many years of cooperation between the University of Ljubljana and the IUNR (see also article on page 6), students at both universities have the opportunity to spend an additional semester at the partner university, to take modules, and thereby to obtain a diploma from the host university. Thesis supervision is undertaken at both institutions. The Summer Schools organized by the individual MRUs, to which students from the IUNR Master's programme are admitted, enable exchanges with other universities and students from abroad. During these Summer Schools (lasting from several days to several weeks), students develop both their interdisciplinary and intercultural competencies, and have the opportunity to exchange and network with students from other countries and continents.

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New minor: International Profile

15 years ago, internationalization was hardly an issue, but today it is essential for profiling and positioning universities both nationally and internationally. The importance of international activities has also increased for Bachelor's courses and has become part of the competency profile for graduates.



Yvonne Christ
International coordinator IUNR

New International Profile certificate

For some time now, there have been several teaching elements with an international focus in the BSc in Natural Resource Sciences. Since 2017, students can apply for an 'International Profile' minor at the end of the course of study, for which a certificate is issued. This gives students the opportunity to transparently present their study activities abroad in later application procedures.

The prerequisite for obtaining the certificate is proof of at least 44 ECTS credits with an international orientation. The main part is made up of two of the following three parts: Bachelor's thesis abroad (14 ECTS credits), IZA module (14 ECTS credits; see next 3 articles) and / or a semester abroad (up to 30 ECTS credits). The completion of a second language certificate (level C1) is mandatory and summer / winter schools can also be attended abroad. At Wädenswil, students may attend language courses (specialized English / Spanish), subject-specific modules taught in English in the 4th semester, and intercultural competence training (2 ECTS credits). Personal study counselling helps students to choose the right courses.

Exchange opportunities

Whether they are aware of it or not, students who spend a semester abroad become ambassadors of their own cultural background. What makes 'Swissness' so special? Where is 'Swissness' a hindrance and where is it a help in everyday student life? Such questions frequently arise for those who dare to take the plunge into the unknown! During study visits abroad, private and professional insights become intermingled and often bear unexpected fruit.

Individualization is the key

The wide range of study options encourages students to get to know their personal strengths and preferences, and to pursue and develop them further. In this minor, the programme directors explicitly dispense with rigid requirements regarding language selection or subject content. Furthermore, the often multicultural origins of young people and simplicity of today's travel opportunities lead to a broadening of horizons at early stages. Social and self-competence are further developed and reflected upon, both abroad and back at home, as the experience of being different makes its mark. This process goes on and on, even though the world is becoming a village in the digital age and children who have grown up in a multilingual environment move between different cultures and ethnic groups with ease.

The diversity of today's intercultural debate is also profoundly changing career prospects. In the International Profile, each student's individual path and vision of their professional future serves as a guiding star for the design of the learning content of the BSc study programme in Natural Resource Sciences: this qualification is designed to open up additional career opportunities for BSc graduates.

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Fruit transport by a small business in South Africa.

Photo: Yvonne Christ



The IZA-Internship module

Internships in the field of International Development & Cooperation (IZA)

Testing drinking water in Madagascar, environmental education with teenagers in Uruguay, working in erosion control and water harvesting projects in Kenya, promoting renewable energies in Chile, assisting the international launch of 'kNOw Plastics' by developing a social impact monitoring system ... – all these are options in IZA-internships.

Since 2005, over 100 of our students have taken the opportunity to do an internship in international development and cooperation all over the world. The internship is integrated into our BSc in Natural Resource Sciences as an elective module (14 ECTS) in the 5th and 6th semester. The module contains a preparation phase and the internship abroad, followed by written documentation and an oral presentation once the student has returned home. The duration of the internship varies between 3–5 months on site in an Asian, African, Eastern European, South or Central American country, and involves working on a specific development-oriented project, preferably in the area of the student's specialisation.

A challenge with learning potential

Immersion in other cultures and exposure to other ways of thinking and working are fundamental aspects of the work experience. The aim is to provide initial practical experience during their studies for students who are interested in combining international development and cooperation with environmental topics.

The students apply for the module one year in advance. Interviews are conducted by the person responsible for the module so that they can learn about the students, their motivation, interests and experience. Good language skills (English or Spanish), interest in other cultures, flexibility, willingness to live in modest circumstances as well as physical and psychological resilience are all required. Some of the above mentioned skills are already tested when the student is looking for an internship. They are (solely) responsible for finding an appropriate internship, supported by a platform which provides tips and links.

Support on site is key to success

The host institutions normally work within the field of international cooperation and development and can, for example, be one of the following: a research institute, a non-governmental organisation (NGO), a governmental institution or a private enterprise within the

field of natural resources and development. Over the years, our institute has developed close partnerships with a few institutions.

During the internship abroad, the students work on one or two specific projects the host institution is running, or get the opportunity to lead their own small-scale project. Examples of projects include:

- data collection in established trials
- setting up and evaluating short-term tests
- feasibility studies for new activities
- diagnostic surveys
- proposals for new / improved methodologies and production processes
- planning and realisation of facilities.

The students are supported by a subject-specific supervisor from our institute and also by a supervisor from the host institution on site. Each spring term the returning students present their projects. Students as well as our institute's staff are always invited to these oral presentations. Eight UI 17 students spent their 6th semesters in Tanzania, Nicaragua, Chile, Haiti, Columbia, Kyrgyzstan and Nepal. The work experience, intercultural competence and networks the students build can often facilitate their entry into professional life.

Further information

www.zhaw.ch/iunr/bachelor/en

Interested host institutions are invited to contact Yvonne Christ, International Coordinator IUNR.

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IZA-Internship in Auroville, India

Returning home for an internship in international development at WasteLess, India

I have always believed that education is the primary instrument for starting change. Therefore, it was a great pleasure to complete an internship at WasteLess, a non-profit social enterprise dedicated to educating children and inspiring the local population to produce less waste. My main objective during my internship was to help develop a social impact monitoring system for the launch of one of WasteLess' educational games.



Keya Sahana Braun
Student, BSc in Natural
Resource Sciences

India faces a massive challenge with solid waste management, but not without reason. Inland manufacturing and imports have increased exponentially since economic liberalisation took place in India in 1991. At that time, rapid economic growth started and plastic was introduced. As these events happened very quickly, there was no time to adapt the relevant legislation for the boom in non-compostable wastes, and the Indian population had no time to develop an appropriate way of responsibly disposing of the resulting waste streams.

Before the introduction of plastic, paper or leaves were used to package food, banana leaves were used as plates, and terracotta cups for disposable beverages across the country. These items could simply be thrown onto the side of the road and would decompose without adverse impact on the environment. For example, cows would eat the banana leaves used as plates, and convert this waste into milk and cow dung. Cows today can be seen eating from roadside waste dumps everywhere in India. The habit of using and throwing waste onto the street has remained, but the waste stream has changed.

My background

My parents emigrated from Switzerland and Germany over 30 years ago and met in Auroville, where I was born and raised. Auroville is an international township with the goal of realising human unity – in diversity. Today Auroville is recognised as the first and only internationally endorsed ongoing experiment in human unity and transformation of consciousness, and is also concerned with – and practically researching into – sustainable living and the future cultural, environmental, social and spiritual needs of mankind.

While I never experienced an India without plastic, I do remember the amount of plastic waste increasing during my childhood. Observing this was one of the central reasons for wanting to study environmental engineering.

Six steps towards reducing plastic

During the 6th semester of my studies, I did an internship at WasteLess, a non-profit social enterprise based in Auroville. The main objective of WasteLess is to educate children aged 6–15 to change behaviour, and to inspire the local population to generate less waste. The main target group is children, in the hope that they in turn will educate their parents and help spread the word. The goal is to create a population of educated voters who demand positive change in the world's largest democracy.

At the time my internship took place, WasteLess was working on an interactive game called kNOw Plastics. kNOw Plastics is part of the Garbology 101 curriculum, and is a game that educates children about the impact of plastic, and instructs them on positive and negative behaviour where plastic purchase and recycling are concerned. The aim is for kNOw Plastics to turn into a six-step activity: 1) playing and learning, 2) pledging and practicing, 3) teaching the family, 4) spreading the word, 5) joining local movements, and 6) changing rules and policies.

The launch of kNOw Plastics was international, targeting schools across India and the rest of the world. The participating schools (partners) give feedback over a period of one year. The data from the feedback received will be used to create a kNOw Plastics App for smartphones.

Monitoring the impact

My objectives during the practical work at WasteLess were to help with the launch of kNOw Plastics by assisting in the design of a social impact monitoring system to facilitate the collection of data. This system will help create a structured framework for feedback collection as well as simplify the identification of key aspects in the 'hardcopy' version of the game, which can be translated into a digital application for mobile phones. The data acquired will show the impact of the game on children, as well as determine whether the game changes their behaviour.



Pilot testing of the kNOw Plastics game in an Auroville school (upper picture). The kNOw Plastics game (lower picture).

Photos: Marco Saroldi for WasteLess India (IZA) / www.wastelessindia.org

A large part of my practical work was academic research on social impact monitoring systems. With information from research and brainstorming sessions with the team, I started drafting questionnaires. Feedback from the team as well as from external experts further facilitated the development of the questionnaires. They were then pretested at certain local schools: the students first played the kNOw Plastics game and then completed the questionnaire to provide feedback. The pretesting was my favourite part of the internship; some of it took place at the primary school I went to as a child, and I even got to work with some of my former teachers.

Further information

<http://wastelessindia.org>
<https://www.auroville.org>

keyabraun@gmail.com

A new perspective on my place of origin

Even though this internship was a trip back home for me, it was a whole new experience. Working at WasteLess allowed me to see my hometown from a new perspective. It was very refreshing to feel that I was part of a change. I was reminded of the great potential of work in the field of environmental engineering in India. Whether one wants to work in environmental education or in the field of renewable energies, the opportunities are endless. The internship gave me renewed motivation to learn as well as a fresh outlook on the relevance of my studies in Switzerland.

The future begins today

Using the innovations of the globalized and digitized world has become second nature to us. We are used to consuming and sharing the same products and services of global players such as IKEA, Facebook, Amazon, Google and Samsung with billions of others all over the world. We accept the rules of the supra-national conglomerates; they know our behaviour and increasingly determine our everyday lives. Digitisation and globalisation go hand in hand, which also has consequences for the IUNR's range of courses.



Danièle Lagnaz
Programme director

International interdependencies in business, agriculture, the environment, culture, communication and mobility have become profound and far-reaching. Decisions in the USA, China and in European capitals also affect us, which can be unsettling and confusing. At the same time, we observe counter-trends that may also trigger negative feelings. We see how quickly and unrestrainedly nationalist ideas are spreading in the USA and Europe. There is talk of new border walls and fortifications on both sides of the Atlantic; protectionism is being propagated instead of free trade.

How does this relate to the IUNR's internationalization strategy?

Education stands for openness and freedom of thought. A free mind knows no boundaries: it seeks inspiration in all possible fields, and is not bound to a particular country. When it comes to the IUNR's strategy for internationalization of its courses and study programmes, such cross-border thinking is the goal and is vital preparation for the future in our globalised times. Challenges such as climate change, sustainable energy supply, etc. do not stop at national borders. No country and no institute can find answers on its own. Economic and scientific areas of endeavour are becoming increasingly dependent on each other, with digitisation as the decisive driver of this development. There is no going back and there are no alternatives. However, recent political developments show that both societies and individuals are being overwhelmed by the one-sided focus on a technocratic approach in response to digital change and further globalization. Completely unpredictable movements are forming, which seriously endanger the liberal and freedom-based world order. The IUNR, however, takes a clear position with its internationalization strategy. In our teaching, we lay the foundations for networked, international cooperation and are committed to the European educational area. We consider what skills our future graduates will need to succeed in their careers, and what role internationalization and glo-

balization will play in this. We are firmly convinced that, against the background of increasing digitalization and growing complexity, international cooperation and intercultural skills need to be carefully developed and refined.

Where are we today?

In 2003, with the creation of the IZA (International Cooperation) module, worth 14 ECTS points, the IUNR provided the opportunity to complete an internship in an emerging or developing country as part of the Bachelor's degree programme. Since then, around 100 students have taken advantage of this.

The IUNR's first internationalization concept was formulated in 2012. The basis for this was the pyramid model developed by Frank Wittmann, then Head of International Affairs. The model enabled a systematic and in-depth analysis of the current situation to be made in order to establish the progress of internationalization. This resulted in the IUNR continuing on a double track: internationalization at home on the one hand and stays abroad on the other.

As a result, a number of projects were developed, one of which was the provision of specialist modules in English (a total of 30 ECTS points). This required courageous and committed lecturers who were prepared to fundamentally rethink their teaching and give their courses in English. The project was controversial among both students and teachers, and there were conflicting opinions about its usefulness. Thanks to the support of Patrick Studer and his team in the School of Linguistics, many of the concerns of students and teaching staff have gradually been dispelled. Today, English modules in the Bachelor's and Master's programmes are a matter of course and widely accepted.

The International Profile minor (see page 10) is the second large-scale project in recent years. Students enrolled from the academic year 2017 onwards have the opportunity to have their competences accredited in an international context.

Aerial view of the IUNR campus with photovoltaic system, greenhouses and Grüntal gardens, all used for study and research.

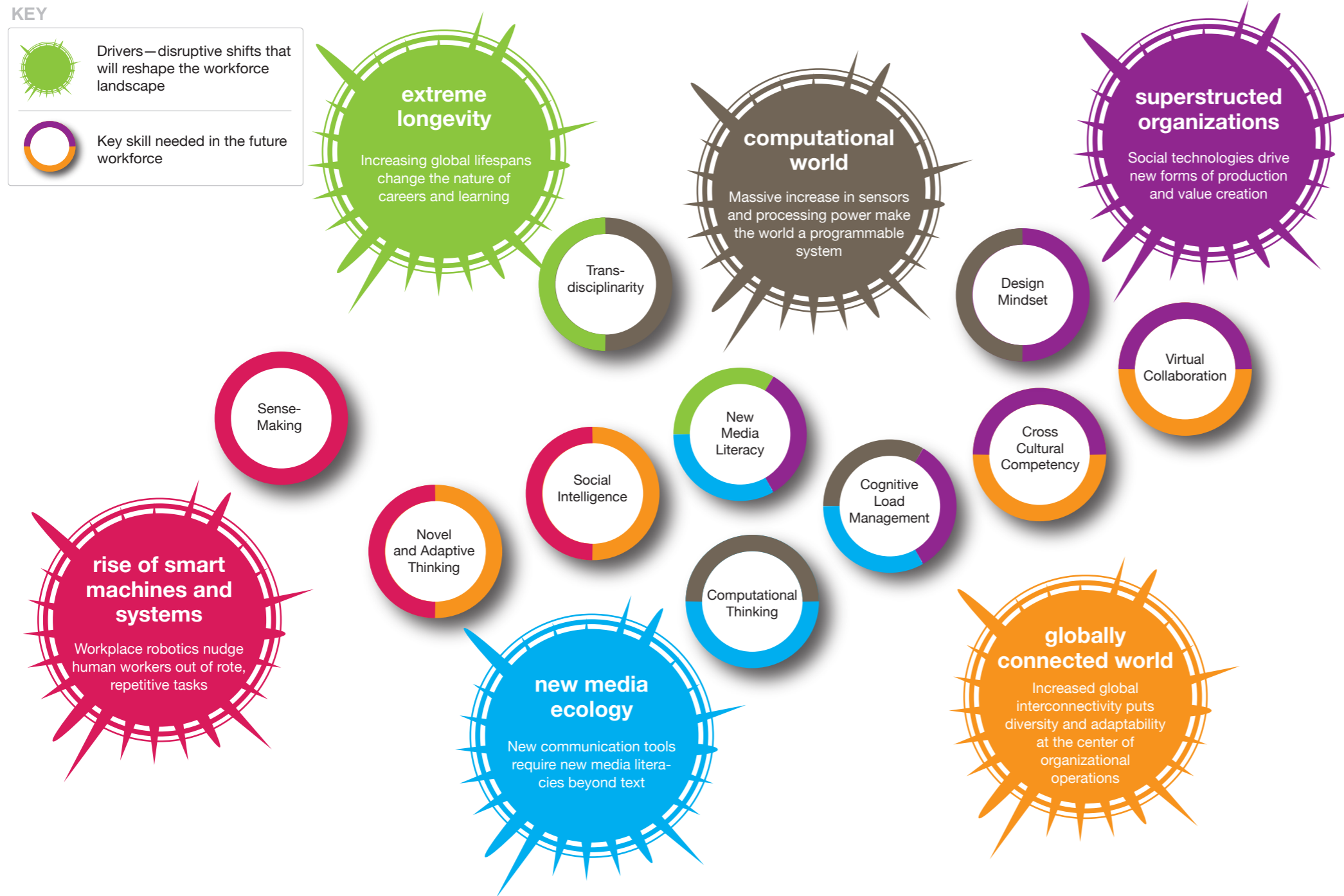
Photo: Frank Bröderli



Future Work Skills 2020

While all six drivers are important in shaping the landscape in which each skill emerges, the color-coding and placement here indicate which drivers have particular relevance to the development of each of the skills.

KEY



The double degree agreement signed in 2017 for the Master of Science in Environment and Natural Resources with the Faculty of Civil and Geodetic Engineering at the University of Ljubljana represents a significant milestone in international cooperation.

Where do we aim to go?

Although important milestones have been reached, there is still more to be done. A number of challenges still need to be addressed. The purpose of Strategy 2018 is to show the way forward and establish an action plan for both Bachelor's and Master's degrees, to take effect from 2019.

The central questions that concern us are the following: which competences in the area of international affairs will our graduates be expected to have in 2025, and what can we, as an institution, contribute to help our students achieve them?

Of course, we are not the only ones dealing with these issues. We can draw on the work of a variety of pioneers. For example, the ZHAW's Strategy 2015 provides useful guidance. The Institute for the Future (ITF, see illustration), for example, also provides exciting impulses and scenarios, and points, among other things, to the increasing importance of so-called soft skills. In the context of strategy development, our task is to extract the essential elements for our study programmes from these and similar studies, to evaluate them, and adapt them to our situation. Plenty of material is already available for extensive debates about our exciting future.

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Future Work Skills 2020: the Institute for the Future provides exciting impulses to address the increasing importance of soft skills, some of which are included in our study programmes.

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Working abroad: an IZA module in Fiji and project work in Cambodia

I completed my Bachelor of Science at the Institute of Natural Resource Sciences at the Zurich University of Applied Sciences (ZHAW) in Wädenswil in autumn 2017. During my studies I went to the Fiji Islands in order to complete an IZA (International Cooperation) module. I am now working in Cambodia for the ZHAW with Smiling Gecko Cambodia, a local NGO which I came across during my studies.



Benjamin Scott
BSc in Natural Resource Sciences

During my 1st semester of studying Natural Resource Sciences, I heard about the opportunity to complete a study module abroad in the field of International Cooperation (IZA). I was immediately hooked, although I had not yet decided what subject to major in. The reason for my fascination can at least be partly explained by my background: I was born and raised in Zimbabwe, moving to Switzerland when I was 11. Looking back, I regard the chance to be educated in Switzerland as a huge privilege, and see it as my duty to pass on the vast knowledge I have gained to less fortunate people who share this world.

Practical experience

Before coming to the ZHAW, I had already gained experience in the field of aquaponics during a one-year internship at Urban Farmers in Basel. During my studies, I was able to broaden this experience while working part-time at the ZHAW's Centre for Ecological Engineering as an assistant in the Research Group for Aquaponics in Wädenswil.

Still keen to go abroad

As the 6th semester approached, I was still keen to do an 'IZA stint'. Thanks to the Small Grants Programme of the United Nations Development Programme, I came across a project at the Navuso Agriculture School on the Fiji Islands. My initial idea was to assist with their aquaculture programme and aquaponics. However, it seemed my help was required to analyse and check the quality of a supposedly up and running composting project.

Adaptability required

As forewarned by students who had already completed an IZA module, everything was different when I arrived: the compost project consisted of a 6-ton heap of rotting vegetables, which I tried to salvage by means of aeration and by adding dry grass. However, the head of the agricultural school was not keen on composting, and the project was dropped. Apart from working on the farm itself, I

was assigned to do some classroom teaching at the Navuso agricultural school and another farming school on the other side of the island. Lessons focussed on the benefits of organic agriculture, organic farming and nutrient cycles. All in all, I greatly benefited from my IZA module. I learnt to adapt quickly to different project settings and my ability to integrate culturally made it easy to assess the true needs of the community. I was pleased to see how I could make regular use of 'tools' acquired at the ZHAW, be it a quick soil sur-



Preparing milk for the calves at Navuso Agriculture School in Fiji.

Photo: Benjamin Scott



vey or carrying out an automatic Body Condition Score (BCS) on the dairy cows every morning. Admittedly, I also had a very easy introduction to working abroad as Fijians are the most welcoming and warmest people I have met. After one week of being there, I had received enough invitations to eat at someone's house for the entirety of my stay. Furthermore, living with a Peace Corps volunteer gave me the opportunity to analyse, discuss and eventually understand various intercultural situations.

Abroad again

I finished my Bachelor of Science in Natural Resource Sciences in autumn 2017 and soon found myself abroad again, this time with Smiling Gecko Cambodia (SGC), a local NGO based on the concept of 'Cambodians helping Cambodians'. SGC is a camp set up in the north of Phnom Penh, whose main goal is to alleviate poverty in the region. This is done by employing locals from the area to work on the project while gaining skills in the fields of tourism, carpentry, agriculture, and education. I was fascinated by the concept of the SGC and, since the ZHAW works with them to integrate environmentally-friendly fish breeding into the local agriculture, I had the opportunity to take part in this project. My job is to coach the two co-workers, Sreymom and Theary, to become the managers of the fish project and to start producing fish for consumption. One goal is to build and run a hatchery to



Sreymom (r) and Theary (l) cutting material to build fishing nets (upper picture). Fish project at SGC (lower picture).

Photos: Benjamin Scott

produce our own fry with the possibility of selling it for additional income. Another part of my work is assisting ZHAW students with their Bachelor's theses and IZA assignments. In this area, I can draw on my own studies at the ZHAW as well as my IZA experience in Fiji, and readily pass on the knowledge I have gained.

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Bemvindo! Welcome to chicken, soya and oranges

IUNR students participate in an international research cooperation

In summer 2018, Fabienne Vukotic and Patricia Krayer will be embarking on a long journey as part of a collaboration of research scientists from the Institute of Natural Resource Sciences (IUNR) and the Federal University of Grande Dourados in Brazil.



Isabel Jaisli
Geography of Food

The aim of this collaboration is to assess the impact of Brazilian food exports on the environment and society. The focus is on Brazil's main exports to Switzerland, such as chicken, soya and oranges. As part of the 'Transfood' project, Patricia and Fabienne are carrying out their own investigations, and making an important contribution to research. In her Bachelor's thesis, 'From chicks to nuggets', Patricia is examining the ecological and socio-economic effects of Brazilian chicken production, and is particularly interested in the controversial areas of conflict in agricultural trade. She says, 'I am looking forward to examining the pros and cons of such a huge international value chain with some concrete examples.' Fabienne intends to identify suitable indicators relating to impact assessment, which she will include in her Master's thesis. She plans to collect her data in a series of interviews with players in the Brazilian food industry.

An important part of their project is cooperation with Brazilian students. Fabienne sees this as a great advantage: 'I find it incredibly motivating to exchange

ideas with young people from other countries who are also dealing with problems in the food system and looking for solutions. In our globalised world, it is absolutely essential to be aware of the different perspectives of people all over the world, and to experience them firsthand.'

In order to make efficient use of their time on site, the two students are already carefully preparing for their trip. From discussions with Swiss importers and with the help of literature research, they have obtained a clear picture of the entire value chain and production of food in Brazil, and will be presenting their initial results in a workshop. In addition, they have been busy organising their trip: flights, accommodation and local travel all need to be arranged in good time. And then there's the language!

Further information

www.zhaw.ch/no_cache/de/forschung/forschungsdatenbank/projektid/projektid/2030

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In the research cooperation 'Transfood', the effects of agricultural trade on the environment and society as a whole are investigated.

Graph: Lorenz Rieger

Soybean is cultivated in Brazil in vast monocultures.

Photo: Isabel Jaisli



A visit to India

In November 2017 I took the opportunity to visit the Organic World Congress (OWC) in Delhi, India. The stay was funded by the swissnex programme, which promotes international activities by connecting the dots between education, research and innovation. Over two weeks the trip brought me to the international scene of the organic movement, to biodynamic farmers in the Himalayan foothills, and to the University of Agricultural Science in Bangalore, Southern India.



Hans-Rudolf Keller
Organic Agriculture

Have you ever read Rudyard Kipling's short story 'The miracle of Purn Bhagat'? If so, you'll understand why I was very much looking forward to my trip to India, the desire to see the Himalayas, to breathe the dust of the Indian country roads, and to get in touch with the colourful people in crowded cities as well as in the countryside. Let me tell you, I got all this and more during my two-week stay on this gorgeous subcontinent!

Challenging the Green Revolution

The main goal of my trip to India was to attend the OWC in Delhi. This event takes place every three years in different places all over the world (in 2020 it will be in Rennes, France). The programme looked very promising for a visitor involved in organic agriculture! The congress was structured into four main tracks: a farmer's track, a scientific track, a main track and a marketing track. Simultaneously, the exhibition Biofach India and the India Organic Trade Fair took place at the same location, the India Expo Centre in Noida, Delhi.

There was a huge range of events on offer, but I particularly attended lectures on the farmer's track.

Speakers from every continent shared their experiences of organic agriculture with the audience. I learnt that biodynamics and permaculture approaches are making a huge contribution to the organic movement, particularly in developing or emerging countries, and that aspects of Community Supported Agriculture are gaining in importance, especially in Asian megacities. An evolving organic agriculture is starting to provide an important counterpart to the Green Revolution that has shaped India's agriculture in recent decades, causing severe damage to the environment. Topics such as seed-banks as well as conservation of local and native crop varieties were demonstrated on posters and in many presentations. The Seed Festival at the entrance to the Expo Centre revealed the abundance of Indian crops. In India the organic movement has grown four-fold in the last three years alone, and the state of Sikkim is on the way to becoming completely organic. Amazing!

Fascinating scenic contrasts

I joined a post-conference tour bringing us to the Himalayan foothills after the congress. A 13-hour night ride crammed into a crowded bus brought us to Ramgarh in Uttarakhand. This was a dramatic change in scenery, from foggy, dirty and noisy Delhi to the clear air of the mountain valley. Wonderful terraced slopes, scattered biodynamic farms, a well-situated biodynamic training centre, and school infrastructure for the farmers' children with the white snowy peaks of the Himalayas glowing on the horizon; organic/biodynamic as opposed to rural depopulation, industrial agriculture and growing megacities. We spent an inspiring day and night on a farm, enjoying genuine local meals and the lavish hospitality of the farmer's family, while exploring the crops cultivated on the terraces.

Modern plant breeding and agroforestry

Afterwards, I travelled to Southern India. Bangalore is a hotspot for the IT industry, hosts the oldest and still largest agricultural university in India, and is also



Agricultural landscape in Karnataka, South India: terrace cultivation of rice and sugar cane with coconut palms in between.

Photo: Hans-Rudolf Keller

one of the swissnex locations. When I visited the University of Agricultural Science (UAS), the agricultural Krishi Mela fair was taking place. This is an event on the UAS campus which attracts a million visitors in three days. Among other activities, the UAS is very involved in plant breeding programmes which meet the challenges of climate change. One focus is on millet, a crop said to be resistant to drought and heat. As a European visitor I discovered many crops I had not known much or anything about beforehand. Have you any idea how silk production works? How to grow and eat beans that are longer than one metre? And there were many other unnamed and unknown crop plants I came across too.

Lessons learnt

Although most Indian agriculturists still seem to believe in the wonders of the Green Revolution, I had the opportunity to visit an agroforestry farm near Bangalore. Under a shady tree I listened to the teaching of Narayan Reddy, the 83-year old owner of the 4-acre family farm (1.6 hectares), growing 50 plant species in an agroforestry system without using any pesticides – not even organic preps! He spoke mainly Kannada, the language of Karnataka, interspersed with some English sentences for my benefit as I stood between white-clothed Indian scholars: 'Humus in the soil is the end of the prob-

lems.' – 'Healthy soil is the basis of farm and crop health.' He also talked about the benefits of trees, exploiting the third dimension of the farm, and supplying many ecosystem services. 'Humus content in Indian soils,' Narayan said, 'was above 4% before the Green Revolution. Now it has decreased to 0.3%.' On his own property the humus content is 4.5%! A tour of the place demonstrated that his lectures are not just words and theory, but also applied here in practice.

There is not enough space to write about all the wonderful people I met on my trip, the chaotic experiences I had (all with a happy end), the horrible smog I was exposed to in Delhi, and for a European eye, the incomprehensible poverty of so many people I saw. But the rich culture and impressive nature of incredible India is something I will never forget!

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'Humus in the soil is the end of the problems.' (Narayan Reddy, organic and agroforestry farmer in Southern India).

Photo: Hans-Rudolf Keller



Next trends from San Francisco in the Grüental gardens

What does science communication in San Francisco look like? And which trends are also likely to interest us here in Switzerland? With these questions – and many more – in mind, I travelled to San Francisco for two months in the summer of 2017. Here you can read about the trends I identified and how these can now be found in the Grüental gardens.



Rahel Meier
Sustainability and
Environmental Communication

Ideas factory of the West Coast

The Bay Area with San Francisco and Silicon Valley is known worldwide as a breeding ground for new technologies and forms of communication. I had the unique opportunity to be one of the first fellows of the Pier 17 Science Studio at swissnex San Francisco to immerse myself in this world. What have I brought home from these two months? A backpack crammed full of experiences and inspirations from this rather different world! During the course of many interesting meetings with museum and communication experts, artists as well as staff at universities and (botanical) gardens, I was able to discover one or two 'next trends'.

Scientainment in (un)expected places

Science combined with entertainment, the so-called scientainment, is now part and parcel of San Francisco. I was able to experience this for myself in many places; for instance, the city's major science museums are open just for adults every Thursday evening. It's wonderful to explore the museum with a drink from the specially erected bar and background music from the in-house DJ. Cheers! On one museum evening I attended an event where everything revolved around 'hot sauces'. A cook revealed his favourite recipes and a scientist explained

why we perceive these sauces as so hot, with plenty of tasting to round off the evening. It became clear that behind such everyday processes there is a scientific phenomenon that can be explained in an entertaining way.

We also tried out the same format in the Grüental gardens. At the Midsummer Superfoods Science Snack Event on 21 June 2018, visitors were able to sample entertaining science snacks with short tours of the gardens and input from various experts. For example, a farmer told us about the cultivation of ginger and a nutritionist explained why the blueberry is blue and so healthful. Of course, following the example from San Francisco, various superfood snacks could be tasted during each input session. At the bar, visitors were able to try delicious drinks with superfoods, as the music of DJane bathed the gardens in unfamiliar tones. Science with a difference!

Captivating storytelling and very personal exhibitions

In San Francisco I noticed that scientific content is packaged in very emotional and captivating stories, and also visited some personalized exhibitions. The idea behind this is that the visitor experiences science firsthand, thereby gaining a much more direct access to it. In one museum, I received a chip at the

cash desk that I could hold out at various posts around the museum. My answers or activities at each post were recorded and at the end I received my very own museum card, showing what I had done and learned, and where.

Mis Läbe (My life) in the Grüental pavilion

An exhibition with this kind of personalised character is also being created in the gardens in Grüental. The exhibition # Mis Läbe in the wooden pavilion will open at the end of August 2018. The aim is for visitors to receive their own personal 'home story' when they reach the end of the exhibition and to find out what environmental type they are. It works like this: the exhibition is structured like a small apartment with an entry area, kitchen, living room and toilet. At the entrance, the visitor learns that a reporter wants to see their home and write a 'home story' about them. The visitor then opens a web app on their mobile phone. There the reporter appears again and again, and asks a lot of questions, such as how big the apartment is, how many people live there, how much meat they eat, and how they travel to work. However, it is not only about behaviour; the visitor should also spend some time reflecting on and answering questions about their values and their attitude towards life.

At the end, each visitor receives their 'home story' with a photo and a scientific evaluation of their an-

swers. In addition, tailored to their life values, three tips are given to help them lead a more environmentally-friendly life. Science packaged in an everyday story in which the visitor plays the leading role is how a little San Francisco comes into the wooden pavilion in the Grüental gardens.

Thirsty for more next trends?

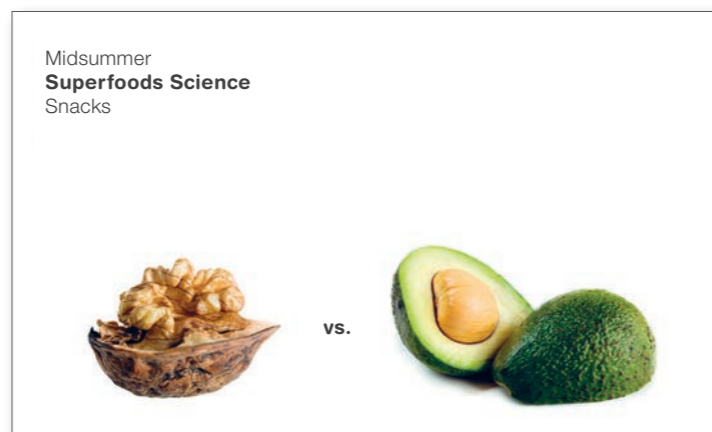
I presented these and many other trends at Science-Comm'17, the conference for science communication in Switzerland, together with another swissnex fellow, Tanja Coray. I am now looking forward to promoting these 'next trends' at the ZHAW and on the Grüental campus even further.

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Evening at Dolores Park in San Francisco.

Photo: Rahel Meier



Event announcement for the Superfoods Science Snack Event on Campus Grüental on 21st June 2018, which, among other things, explored the question of whether local superfoods can compete with exotic products.

Design: Erich Stutz

Ex oriente lux: Learning and research along the Silk Road

Chances and opportunities for IUNR research and teaching in Central Asia

The sustainability of rural areas is closely linked to natural resources and cultural potential. This applies not only to Switzerland, but also to the rest of the world. Students in the Natural Resource Sciences Bachelor's programme and in the Environment and Natural Resources Master's programme at the ZHAW have the opportunity to expand and deepen their skills in the Central Asian countries of Kazakhstan, Kyrgyzstan and Tajikistan. To this end, the IUNR is actively establishing opportunities for cooperation with universities and NGOs in Central Asia.



Peter Marty
Regional Development

From a European perspective, Central Asia lies in a no man's land between the old Western order and the emerging countries of East Asia. Historically, however, the countries of northern India, through Afghanistan, Iran and the actual centre of Asia have been the hub of a dense network for the exchange of goods and knowledge along the Silk Road. This network is taking on a new meaning since the world is becoming ever smaller, and due to China's 'One Belt, One Road' initiative. The five central Asian countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan are once again in the spotlight as the link between East and West. Their

natural environment, history, culture and tradition are ideal examples of how the Institute of Natural Resource Sciences can expand its thematic areas beyond the national framework.

Exciting opportunities for students

In 2017, Kazakhstan adopted the aspirational mindset of central Asia and organized a world exhibition, the 'Future Energy' EXPO. Four Swiss universities of applied sciences, including the ZHAW with two representatives from the IUNR, held a conference with Kazakh partners at the EXPO on the subject of 'Towards Smart Sustainable Cities – Integrated Approaches'. The conference provided a fruitful opportunity to identify topics of common interest, and to develop and expand further opportunities for cooperation in research and teaching. My subsequent visit to Kyrgyzstan resulted in a collaboration with the Mountain Societies Research Institute (MSRI) at the University of Central Asia (UCA). In summer 2017, a student wrote her Bachelor's thesis on decentralised energy supply in rural areas with the MSRI and the Central Asian community network AGOCA (a sister organisation of the Alpine-wide community network 'Alliance in the Alps'). From November 2017 to January 2018, another two students took the opportunity to do an IZA (International Cooperation) internship at Camp Alatau, a leading Kyrgyz non-governmental and non-profit organization dedicated to sustainable development in the mountain regions of Central Asia. Camp Alatau is the successor organisation to the Central Asian Mountain Partnership (CAMP), which was founded by the Swiss Agency for Development and Cooperation (SDC). The IZA internship resulted in a Bachelor's thesis for one of the participants on the topic of 'Effects of tourism development on natural resources in Karakol', Kyrgyzstan's largest tourism destination. Each active exchange strengthens the network and opportunities for cooperation. Mirjam Marty was the fourth student to complete an exchange semester at the American University of Central Asia (AUCA) in Bishkek in spring 2018 (see article 'Gold moves



The facade of the Swiss Pavilion at EXPO 2017 'Future Energy' in Astana, Kazakhstan.

Photo: Peter Marty



Pavilion 'Nur Alem' – the symbol of the EXPO 2017 in Astana, Kazakhstan.

Photo: Peter Marty

mountains' on page 28). The circle is complete because the exchange semester gives Ms Marty the opportunity to write her Bachelor's thesis supervised by the UCA's MSRI.

Research opportunities

Cooperation opportunities and exchange, however, are not limited to teaching. In the field of research collaboration, the IUNR Research Group for Environmental Genomics and Systems Biology launched a four-year National Science Foundation funded project on fire blight in the apple groves of Kazakhstan, together with Kyrgyzstan and an English NGO. The Research Group for Ecohydrology is involved in an exchange with the German-Kazakh University in Almaty, Kazakhstan, which holds the 'UNESCO chair on water resources management in Central Asia'.

In it together

The journey is not over yet. In 2017, the UCA opened a new campus in Khorog, Tajikistan. The Bachelor's programme 'Earth and Environmental Sciences' is currently being offered there under the leadership of the MSRI. This means that right in the heart of the Pamir Mountains there is now a hotspot for IUNR topics related to rural development, natural dynamics and social coherence (according to the MSRI: '... research for development

with the goal of improving the well-being of mountain societies in Central Asia'). Once in Central Asia, it becomes clear that the area is not on the periphery, but right in the middle of it. Thus, Tajikistan belongs to the Persian culture. Afghanistan and Iran are close, given the openness and willingness of partners in Iran. The International Office of the IUNR is working on creating platforms and framework conditions. I myself travel to these countries and have an ongoing exchange with our local partners. The cooperation is gaining substance and dynamism through the interest and commitment of our students and researchers in the IUNR's various subject areas. We are happy to support all interested parties with the opportunities that are available.

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Gold moves mountains

Visit to Kumtor – one of the largest gold mines in Central Asia

Where do Swiss gold bars come from? Hardly anyone is concerned about how the shiny metal is mined as it is produced in a faraway location. During my semester abroad in Kyrgyzstan, I had the opportunity to visit such a place. It was impressive to see how greed for gold can literally move whole mountains.



Mirjam Marty
Student, BSc in Natural
Resource Sciences

There are many reasons for spending a semester abroad. Above all, I wanted to discover things I couldn't see at home and this was how I ended up in Kyrgyzstan at the American University of Central Asia (AUCA). As part of the Environmental & Socio-Economic Impacts of Mining course, we visited the Kumtor gold mine, where intensive mining already took place during Soviet times. Kumtor has become the most important source of income since independence and now contributes almost 10% to Kyrgyzstan's total GDP.

A day in Kumtor

The mining site is located at over 4000 metres above sea level in the Tien-Shan Massif. This creates a number of challenges, also for visitors. We were required to undergo a medical check in advance: our pulse was measured, we did thirty squats, and then our pulse was measured again. If the difference between the two measurements was too high, we were not allowed to go in. The results were not so positive: out of 20 students, only eight passed!

Kumtor open-cast gold mine, 500 metres deep; in the background the remains of the Davidov Glacier.

Photo: Mirjam Marty



Two days later, we were off. The first and most impressive stop was the large excavation pit. Kumtor is an open-cast mine, this being cheaper than underground mining. The effects are dramatic; where 15 years ago there was a mountain, today there is a 500-metre deep hole. In addition, an entire glacier was removed and the remains deposited elsewhere, which, due to an exception in Kyrgyz law, has been legal since last year. The total area that has been changed by the mine is approximately 10 km². We then went to the large machine park for a photo shoot with a mine vehicle. These 'monsters' consume three tons of diesel every 24 hours. In Kumtor there are 80 of them, which are in operation around the clock. Because work is carried out all year round, it is hardly possible to imagine the total consumption... Afterwards, we saw the mill where the gold is extracted from the ore, which is done with the help of highly toxic cyanide. In Kumtor, around three grams of gold can be extracted per tonne of ore. Approximately 50kg gold is produced per day, and the amount of processed rock is correspondingly high. Our visit finished at the tailings pond, where the liquid waste from the mill is deposited. This pond was, like everything else, huge in scale.

Connection to Switzerland

Although here in Switzerland we are quite a distance from Kumtor, we are not uninvolved. According to the Observatory of Economic Complexity (OEC), Switzerland is the number one export country for Kyrgyzstan, accounting for 46% of the total export volume. The fact that gold mining is not sustainable is something that I have seen with my own eyes. It would clearly be advantageous if we could find an alternative currency reserve to gold.

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Remediation of contaminated sites in Huningue, France

Remediation of a former Lindane production site

As a part-time Master's student, I worked as a project engineer at Marti Infra AG and was involved in the preparation and implementation of a remediation concept for a contaminated site in France. The disposal of materials with different levels of contamination requires considerable knowledge and good planning. What I had learnt during my studies in Natural Resource Sciences was of great benefit to me.

The ARA Steih contaminated site is located in Huningue, France, on the banks of the Rhine and on the Swiss border. From 1947 to 1974, lindane, a substance then used as an insecticide, was produced on this site. The waste created during lindane production was temporarily stored on the site and later covered by the construction of the ARA Steih. After decommissioning the site, it was decided to rehabilitate it, and to completely excavate and remove the contaminated material.

Careful handling of pollutants

To prevent emissions during excavation and processing of the material, the remediation work is carried out in halls. Two exhaust air cleaning systems create a constant negative pressure in the halls, which prevents the release of dust and gases. Since the area to be remediated is on the banks of the Rhine, two groundwater wells have been used to lower the groundwater level and stop pollutants from escaping into the river. The groundwater pumped out of the wells is purified in a wastewater treatment plant, as is all of the rain water.

In order to recycle and dispose of the material as efficiently as possible, the entire area was divided into 10m x 10m x 1m cuboids. Information from ground samples was used to produce load maps for each layer, which made the remediation work easier. Each excavated cuboid is sampled and, depending on the results, further processed.



Disposal dependent on level of pollution

Lightly contaminated material is washed and processed in a semi-mobile Marti recycling centre. Once washed, the pollutant levels of the material are within the acceptable limits and can be used for backfilling after further sampling. Material with low to medium pollution levels is transported by ship to a thermal soil treatment plant, a specially-designed loading device being used to load the ship. The material is transported above the Rhine to the discharge point via a completely sealed conveyor belt. The end of the conveyor is equipped with a telescopic snout, which can be directly coupled to the loading hatches of the ship. Material with medium pollution levels is loaded into Marti containers, then cleaned in a sluice and transported by truck and rail to hazardous waste incinerators. Highly contaminated material is put into drums and then transported by truck to a recycling plant, where chlorine is subsequently produced.

A total of approximately 600,000 tons of excavated material will be cleaned in this way. The remediation process has been running successfully in accordance with the concept described above since 2014 and, based on current estimates, should be completed by the end of 2018.

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Semi-mobile Marti recycling centre (including process water treatment) for the washing of contaminated excavated material on site (left). View of the remediation site with halls used for ship loading; a transport ship is currently being loaded (right).

Photo: Matthias Schwestermann

Beirut – cedars, conflict and cycling

Life in a cosmopolitan city of contrasts

I spent a semester on a breath-taking campus tracking bees and exploring the complex geopolitical power flows of water in the Middle East. In Beirut, I explored countless contrasts, met refugees and elites, saw modernity and tradition, and experienced openness and conservatism. In the heart of the city there is a Sunni mosque right next to a Maronite cathedral, an Orthodox church, and a Shiite mosque. The capital of Lebanon was long regarded as the Paris of the Middle East, and is surrounded by both legends and tragedy.



Vera Gautschi
Student, BSc in Natural
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When my friend Raphael told me about the American University in Beirut (AUB) at the project week farewell dinner last September, I was immediately captivated. I couldn't let go of the idea of spending half a year in Beirut, a city whose sounds inspire me to dream and which I associate with the music of Feiruz, poetic films, and good food. As if by a miracle and thanks to the good will of the ZHAW international team, within a few months a partner contract was negotiated between the two universities. I am very grateful to all those involved!

Discussions instead of traditional style lectures

Astonished by the welcoming and yet completely unobtrusive greeting, I arrived in Lebanon, whose area is a quarter of that of Switzerland, and in which 18 recognised religious communities live together. After an introductory week, I became familiar with the colourful, park-like campus. Down by the sea, I studied bee science with a weekly honeybee lab and a field study in rural agro-economy. My favourite course, 'political ecology of water', took place on the upper, old part of the campus, as did my Arabic language lessons, which I attended three times a week in a windowless room. My classes never started before 12, so I usually spent the mornings reading for university as well as writing weekly reviews and papers that provided the basis for discussions in the very interactively designed classes. My largest class had about 30 students in it, and we were on first name terms with the professors, who knew us all individually. Towards the end of the semester, I had to prepare presentations for each course, sometimes alone and sometimes in small groups. There was not a single traditional style lecture: instead, the lessons took the form of discussions in which we were directly addressed and asked for our own opinions. Sometimes I wished I could have just listened and absorbed knowledge, so I started to sit in on the Islamic philosophy course and greatly enjoyed the opportunity simply to listen to exciting ideological concepts.

Exploring Beirut by bicycle

In the second week, I bought a bicycle. It gave me great pleasure to overtake cars stuck in traffic jams, to explore hidden neighbourhoods, and to ride along the beach promenade. The drivers were not at all alert to the potential presence of a cyclist and usually reacted with astonishment, but often smiled encouragingly at me. I lived in a shared flat with four other women in the east of the city, and each day crossed the former green line which separated the Muslim West from the Christian East during the 15-year civil war (1975–90).

Meeting the people

It was incredibly easy to talk to people, network and have fun together, whether snowboarding with a view of the sea, hiking through cedar forests, climbing, playing music, eating delicious food, surfing or dancing in the evening. Not only was it easy to forget the recent war, thanks to new glass palaces and an eerily empty but elegant new city centre, it was also easy to ignore cultural differences as many Lebanese speak fluent French and English in addition to Arabic. Influenced by the Phoenicians, Arabs and French, the people of Beirut often seemed to suffer from deep personal and social disorientation; some of my new friends have to struggle with severe depression and a lack of perspective in this country that is dominated by corruption.

Summer in Lebanon

After my exams, I will spend a further week in Beirut and say goodbye to friends from Syria, Palestine and Pakistan. I will then be working for two weeks on a small organic agroforestry farm before starting an internship with the International Center for Agricultural Research in the Dry Areas (ICARDA) in the Beqa'a plain, right at the foot of the Anti-Lebanon mountain range that forms the Syrian-Lebanese border.

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Impressions of Lebanon:
Tripoli (upper picture) and
Tannourine (lower picture).

Photos: Vera Gautschi



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