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Magazine of the Institute of Natural Resource Sciences in Waedenswil



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BY AIR MAIL
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“Why do you want to offer classes in English? – As if we didn't have enough to do. Even without English, the curriculum is overcrowded enough”. These are the most common criticisms

teachers involved in the Institute of Natural Resource Sciences (IUNR) English-medium instruction project hear, when discussing the subject of teaching in English.

The remarks are of course not outlandish. We really need to ask ourselves what else can be packed into the undergraduate course. Last year we added additional learning objectives to the modules for learning techniques and sustainability. Tools such as statistics, GIS and CAD should be focused on in more depth. Discussions about the amount of mathematics and physics are long running.

Now, even English in the 2nd academic year is under discussion. However, no matter how we twist and turn on this issue, English will continue to permeate our lives. Since the arrival of the Monday supplement of articles from the New York Times, the non-English speaking readership can't even read all of the Swiss institution that is the Tagesanzeiger!

Professional and scholarly articles, user instruction manuals and software programmes are all increasingly only in English. The same goes for meetings and conventions. I mean, we have no choice but to simply extend our language capabilities, without this we would fall silent in the greater university environment. We are planning now for people who will have to survive in the globalised working environment of tomorrow. In addition to language skills, intercultural skills are also in demand. In our institute alone, there are people from 10 different countries.

Against this background, Danièle Lagnaz has developed the concept of “Internationalisation of the BSc in Natural Resource Sciences” in collaboration with the Head of the International Affairs Unit at the ZHAW, Frank Wittmann.

This is a concept that complements existing skills and shows practical ways to implement “internationalisation” in day-to-day life. Details of this concept can be found in this issue. Patrick Studer, Professor for Language Competence and Knowledge Development of the School of Applied Linguistics at the ZHAW has provided scientific support for our EMI project. In his article, Life science meets language, you will learn of his vision for specialist environmental engineering instruction in English. Contributions from Diana Haller on Erasmus, Bettina Hendry on IZA and a number of international student internship experiences show the way from the conceptual to the practical and the tangible. Many thanks to all the authors for their contributions.

A handwritten signature in black ink, reading 'J. Bächtiger'. The signature is written in a cursive, flowing style.

Prof. Jean-Bernard Bächtiger
Director of Institute of Natural Resource Sciences

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Introduction

No Added Value without Additional Effort



Legislation is rarely ahead of reality. Laws tend to mirror what is or what should be. Let's

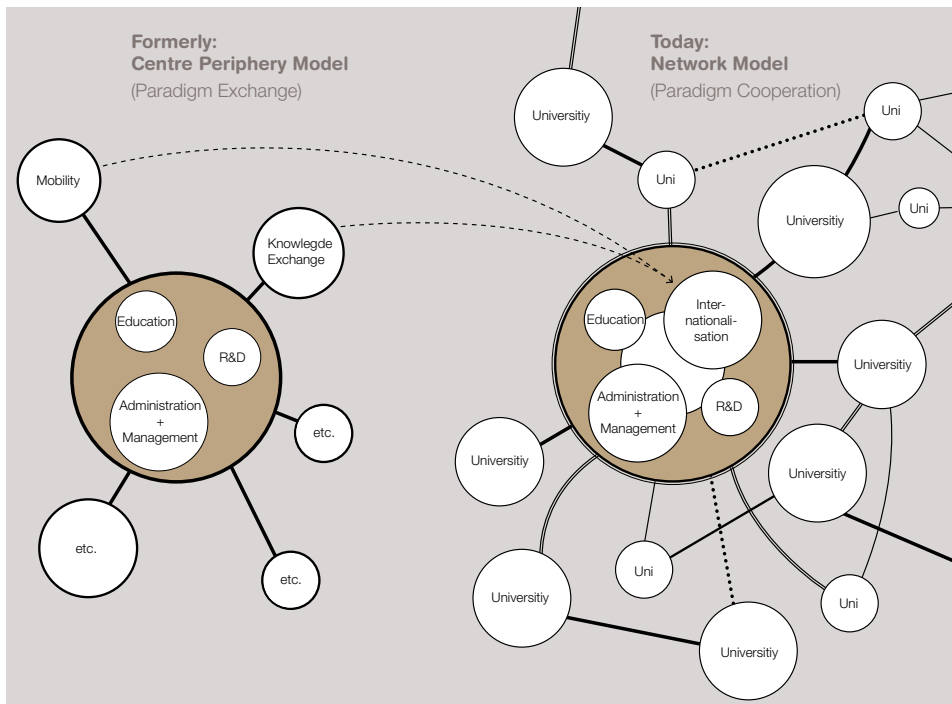
consider the higher education bill (HFKG) and the message from the Federal Council to promote education, research and innovation – from this we can conclude that the internationalisation of Swiss Universities of Applied Sciences has become a reality and no longer something that would be nice to have, as was the case some years ago.

Frank Wittmann ZHAW, Head of International Affairs Unit
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The increase in international activities in all core areas of the ZHAW can be seen. The Institute of Natural Resource Sciences (IUNR) serves as a good illustration: the network of partnerships is continually developing, student and staff mobility is becoming more common, a project to teach in English is being launched, and planning for the tri-national summer school "Geography of Food" is in full swing. A look at the curriculum shows that environmental science discourse is contextualised globally.

However, what exactly is the added value of international cooperation activities? It consists of knowledge sharing, acquisition of new skills, and sharing of resources. But this is only half the story, because achieving added value always leads to additional expenditure. In the case of international cooperation, this implies readiness to continuously maintain partnerships by assisting foreign guests and guaranteeing funding. In fact, a list of the implications of international cooperation could be extended almost indefinitely. The ZHAW International Affairs Unit is pleased that in recent years the IUNR has, despite the additional effort and expense, continued to support the internationalisation process. Many personal encounters in Waedenswil have shown that the extra effort has often been viewed as a motivating challenge. This best practice may inspire more ZHAW Institutes.

The ZHAW International Affairs Unit is responsible for coordinating and supporting the international activities of our organisation. As part



Until recently, international activities were seen as something outside the core of education and R&D. The graph visualises that this situation has changed significantly in the course of the past decade. Universities in Switzerland and abroad build networks in which education and R&D cooperations are fundamental. The ZHAW is increasingly joining such networks in order to generate added values. (Graphic by Frank Wittmann)

of this framework, the international policy is a crucial instrument. It provides direction for the entire organisation on how to further develop exchange and cooperation activities with partner universities. This policy was developed in 2009 by the international commission and approved by the ZHAW executive board. It identifies the objectives and outlines possible measures for achieving these goals. Beyond this strategic framework, however, it is even more important for the International Affairs Unit that the policy contributes to an expansion of internationally connected activities in education, and research and development in our various ZHAW schools. Therefore, we are pleased that in recent years the IUNR has, despite the additional effort and expense, continued to support the internationalisation process. ●

BSc in Natural Resource Sciences goes international ...

Concept of internationalisation



10 years ago internationalisation was hardly an issue, today it is an essential tool for profiling and positioning universities at national and international levels. The importance of international activities has also risen sharply for Bachelor's courses and has become part of the competency profile for graduates.

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Danièle Lagnaz IUNR, BSc Programme Director
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What objectives are being targeted?

With the concept of internationalisation in our BSc in Natural Resource Sciences (UI), the IUNR would like to:

- open up additional possibilities in future careers for its BSc graduates.
- position the BSc in Natural Resource Sciences and the IUNR in an international environment.
- increase the number of partner institutions in English-speaking countries and increase the attractiveness of the degree programme for non-German teaching, partner universities.
- increase the proportion of guest students and outgoing students.
- develop student, faculty and staff language skills.

The proposition for students and employees

The BSc in Natural Resource Sciences internationalisation concept is based on two main components: internationalisation at home and the creation of opportunities for short-and long-term stays abroad. The measures affect both students and teachers.

Internationalisation at home: If the mountain will not come to Muhammad, Muhammad must go to the mountain

Someone who does not like travelling, or simply does not have the opportunities to do so should not have to forego the possibility of being "international": the BSc course is attractive for foreign experts, scholars and exchange students, as a result of its exciting research fields and the provi-

Internationalisation at home

(see pages 6–7)

English-medium Instruction (EMI)

Training employees
(Language skills)

Language courses in the curriculum

Visiting students / guest lecturers

Exchange opportunities, short and long term stays

(see pages 8–33)

SA / BSc thesis abroad

Student mobility

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

Employee mobility

International project weeks /
Summer Schools

Overview of international development measures for the BSc in Natural Resource Sciences.

sion of teaching in English. A series of measures are designed to support this:

- EMI Project: English as an integral component in teaching, starting in 2012 (see article by Patrick Studer, page 6). By spring semester 2014, Bachelor's modules, totalling 30 ECTS credits, will be offered in English.
- English courses especially for employees.
- English courses for undergraduate students (1st to 4th semester, 2 ECTS each), as well as additional courses in Spanish, French and Italian, and German for visiting students.
- Dual classes (presence of an English lecturer in lessons).
- Writing Clinic (personal advice when writing reports and presentations) for teachers and students.

Exchange opportunities; short and long term stays

In addition to long-term Erasmus stays and internships in the field of International Development & Cooperation (IZA), short-term mobility complements the spectrum of the student mobility programme. The programme, which is used by many students, consists of regular exchanges in the form of summer schools, project and study trips and semester and Bache-

lor theses. For employees, short and long-term stays are available in the form of training abroad, teaching at partner universities and attending international meetings.

Do I have to? Can I? Should I?

As part of the internationalisation concept in our BSc course, opportunities are being created for students and employees. Access to extended language acquisition is facilitated, barriers to staying abroad are removed, but no one is forced. The opportunities available in the respective specialities are also different. Check with your academic advisors and/or Diana Halter, who will also be happy to provide employees with information. ●

English-medium Instruction (EMI)

Life sciences meets language: English as a medium of instruction in environmental science



In recent years Bachelor programmes in Europe have increasingly been offered through the medium of English. Using a foreign language in the classroom, however, presents a serious challenge to both lecturers and students. The Language Competence Centre at the ZHAW explores ways to overcome this challenge.

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English-medium Instruction, or EMI, encompasses a variety of teaching situations in higher education in which the social actors in the classroom speak English as a lingua franca. While the use of a lingua franca is long established in the research community and postgraduate education, it is a matter of intense debate at Bachelor level. Undergraduate education is largely based on a conventional contact lecture model where students are considered to be less independent learners than in postgraduate education. Relationship building, communication and interaction, therefore, form an integral part of undergraduate teaching. English-medium instruction at undergraduate level always entails the question of how much communication and language can be formally built into the curriculum.

The IUNR in Waedenswil is taking the lead within the ZHAW in the introduction of English-medium modules at undergraduate level. The Language Competence Centre of the university has been invited to monitor the progress of the implementation of EMI modules between 2012 and 2014, to collect empirical research data and to offer further training to the staff of the institute.

This data collection process began during the spring semester of 2012 with the recording and transcribing of lectures, lecturer and student focus groups, and the distribution of questionnaires. One outcome of this work was a Master's Thesis on 'Gesture in EMI' by Isabelle Thalmann, and further Bachelor's and Master's theses on important aspects of this field are planned.

In July, Patrick Studer and Paul Kelly presented some results, conclusions and plans at a conference on 'Supporting internationalisation

through languages and culture' at the University of Central Lancashire in Preston. This conference helped us to refine our methodology and focus our ideas on key aspects of the further training of EMI lecturers and the development of an approach to EMI didactics. In addition to the research helping us understand the details of what goes on in EMI lectures and how these events differ from mother tongue lectures, it is an important aim of the project to feed this information, as well as knowledge gained from other research we have done in this area over the last number of years, into support mechanisms for those lecturers who will be giving their lectures in English in the spring semester of 2013. To this end, introductory sessions have been arranged during the autumn semester to present some theoretical background information about EMI as well as some of the practical changes the lecturers may have to make to their teaching to accommodate this new situation. In addition, self-evaluation methods will be presented, as well as a range of options for individual support in the planning and delivery of lectures. Individual meetings will be held with each lecturer in which they can discuss their needs and wishes, and an individual programme to satisfy these needs and wishes will be created. Thus, the lecturers can receive support both before and during their course.

Further data will be gathered during the spring semester of 2013 and this will be used as the basis for evaluation sessions which will contribute to the cycle of development and improvement in the coming years. There are also plans to produce a handbook to introduce this topic to other institutions inside and outside the ZHAW. A great deal of credit must go to Danièle Lagnaz, BSc Programme Director in Natural Resource Sciences for the detailed and professional approach she has taken to the introduction of EMI in her institute. ●

For further information please visit:

www.linguistik.zhaw.ch/linguistik/lcc/forschung-entwicklung/sprachkompetenz-und-wissensvermittlung.html

English-medium Instruction (EMI)

Lecturing in English: Change the channel!



My sabbatical in Australia two years ago was (see article page 26) dedicated to studying abroad on a Master of Sustainable Agriculture programme, which has left noticeable marks on my professional and language skills. It happened just at the moment when the IUNR decided to promote modules taught in English. I knew it was 'now or never'! Since then, the Molecular Biology and Plant Biotechnology module has been available in English.

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Media-Preparation in "Molecular biology and plant biotechnology". (Picture by Hans-Rudolf Keller)

It was, of course, a pilot project in English for the new curriculum as a whole and for me as a lecturer. To be honest, I found it challenging, but also somewhat strange. Challenging, because the topic of the module didn't yet seem to be a core subject in the curriculum for an environmental engineer, and teaching the whole module completely in English to German-speaking students appeared to be a little strange. Would anyone ever enrol in this exotic module? They did – so many that we had to form two groups because of limited laboratory facilities for the practical work.

The general conditions to start teaching the module in English were almost perfect. Most scientific literature on these subjects is available in English. Furthermore, Petra Bättig, who teaches Molecular Biology, is a practised English speaker from her experiences in the US in her field of expertise, and Elena Rios, who is doing a CAS in Higher Education Didactics, welcomed the opportunity to tackle one or two units of the module (cryopreservation, orchid propagation) in English. Being quite familiar with the remaining Plant Biotechnology topic, I decided not only to transfer the content into English but also to try out new forms of teaching. Existing internet resources relating to the topic were used instead of translating long scripts. All the content was rearranged, reduced or extended, because the half-day units of the module allowed a good combination of theoretical input with practical laboratory work. Isabelle Thalmann and Patrick

Studer from the ZHAW School of Applied Linguistics supported the teaching of the module in English by videoing the lecturers as well as interviewing them and their students. Maggi Lussi Bell and Darren Mace from Language Services spent hours checking our English scripts and slides. Last but not least, Stella Cook's English Language Training for Lecturers was very helpful in providing speaking experience and enhancing self-confidence.

And how did it work? At the beginning of the first unit, my heart was beating even faster than usual and my adrenaline level probably shot up too. There might be young students with better English language skills than mine, and I might struggle to find the right term in English! Furthermore, isn't it simply too bizarre to communicate in English in a German-speaking environment? I needn't have worried. I found the right words, the students responded willingly in English during the lectures and, to a large extent, even communicated with each other in English during their laboratory work.

As in all modules of the Organic Farming and Horticulture specialisation, the students had to carry out a project assignment on a topic in the area of Molecular Biology and Plant Biotechnology, and either present their project in a poster presentation or a panel discussion. It was amazing to see how well-prepared most of the students were when they presented their work. Especially in the panel discussions, students demonstrated an impressive ability to consider

a scientific topic from various perspectives in English. Molecular diagnostics has now become an important field at the IUNR, and the Molecular Biology and Plant Biotechnology module has gained new significance.

What did students think of the first run of this module? In addition, to achieving new professional skills, they attested to an improvement in language skills on professional topics. Most of them were able to follow the lectures in English easily and without any extra effort, but some reported difficulties in taking notes during lectures. Overall, they were happy with the lecturers' language skills and their ability to explain their subjects in English – there were only a few moments when the lecturers had to switch to German. Oh happy day! ●

Exchange opportunities

Summer School Series “Geography of Food”



In 2013 a new Summer School initiated by the IUNR will be launched at the ZHAW in Waedenswil.

The Summer School programme is focused on sustainability in the food value chain, a broad topic summarised under the term “Geography of Food”. The main aim is to bring students from different countries and cultures together to learn about and discuss sustainability problems and solutions in agriculture & food science. In cooperation with two universities from Thailand and Italy, and supported by the Mercator Stiftung Schweiz, the Summer School will take on a new form: a series, visiting three locations over three years.

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How do we feed the growing global population? How can we make agriculture more sustainable? How can food procurement, trade and consumption be made more sustainable? These and related questions will be addressed in the IUNR's Summer School at the ZHAW. The increasing global population and consequent increasing food demands mean new concepts for agriculture and the food value chain are needed. “Geography of Food” (GoF) approaches environmental, social and economic sustainability issues in the food sector on a global level. The Summer School aims to raise the awareness and stimulate critical examination among students. Comprehension of the interconnectivity between different fields such as agriculture, consumption, policy, markets and energy is crucial. This is a chance for our young generation of students to actively participate and get involved in a major global issue. Of no lesser importance, is the intercultural dialogue that is developed between students and experts from different countries, which helps to broaden horizons.

Knowledge transfer around the globe

20–30 Bachelor students from three different universities (Switzerland, Thailand and Italy) will have the unique opportunity to participate in the

10-day educational programme during the summer holidays. The first Summer School is being hosted by the IUNR at the ZHAW in Waedenswil in July 2013. In 2014, the GoF Summer School is planned to take place at the Khon Kaen University in Thailand, and at the University of Udine in Italy in 2015 (see box below). Highly motivated 4th and 6th semester IUNR UI-students who are of advanced level in English and possess good intercultural skills are invited to apply. In addition to benefiting from the international setting, the students will receive 4 ECTS points for their participation.

The special Summer School series would not be feasible without the financial support of the Mercator Stiftung. The Mercator Stiftung Schweiz (www.stiftung-mercator.ch) will cover both the travel and accommodation costs for students participating in the Summer School.

Not only will students benefit from the GoF Summer School, it will also be an attractive platform for the universities and institutions involved. The GoF Summer School provides a chance to improve knowledge transfer between science, teaching, the private sector and policy makers. Furthermore, transdisciplinary thinking, learning and research will be enhanced by sharing knowledge between institutions from different geographical regions.

A versatile programme

The specific focus of the programme content will be adapted annually, based on the environment, culture, expertise and scientific background of the host university. The Summer School 2013 in Switzerland will focus on sustainability in agricultural land use systems. In Thailand (2014), the focus will be on sustainable business management (tourism, hospitality, restaurants). In Italy (2015), sustainability in traditional and industrial food systems will be examined.

The GoF Summer School programme contains both theoretical and practical components. After basic lectures to provide an introduction to the Geography of Food topics, the students will obtain a practical overview through excursions to operations in the food-agriculture sector. They will then apply their knowledge, working in mixed groups from different universities, to particular questions related to the specific focus of the year. Finally, a public event to present the group work is envisaged. Cultural events and vi-



sits in the host country will also contribute to a versatile schedule.

Current activities

The GoF team at the IUNR is engaged with organising the Summer School for 2013. Currently, activities are being coordinated with the two institutes from the partner universities in Thailand and Italy, such as advertising and the application and selection processes for students, who have been able to apply since October 2012. The Design of a common website for the GoF Summer School is also under way. The detailed programme will be finalised next month. ●

For further information please visit:

www.gof-summerschool.org

Anyone interested in participating in the Summer School is invited to contact:

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Khon Kaen University, Thailand

The Khon Kaen University was founded in 1964 in the vicinity of the city of Khon Kaen. The university now has 17 faculties with approx. 2000 employees. The Faculty of Management Sciences is participating in the Summer School programme, hosting the event in 2014.

www.kku.ac.th/eng/main.php

University of Udine, Italy

The University of Udine was founded in 1978 as part of the Friuli reconstruction plan after the 1976 earthquake. Its aim was to provide the Friulian community with an independent centre for advanced training in cultural and scientific studies. The university currently has 10 faculties with approx. 1500 employees. The Faculty of Agriculture is participating in the Summer School programme, hosting the event in 2015.

www.uniud.it/international-area

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

The “IZA-Internship” Module



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 the Andes, developing a tourism “edutainment tool kit” in Indonesia ...

Bettina Hendry IUNR, Mobility Coordinator IZA
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Since 2005, over 40 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 whole module contains a preparation phase, 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 the student’s specialisation. 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 students who are interested in combining international development and cooperation with environmental topics initial practical experience during their studies.

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. The host institutions normally work within the field of international cooperation and development and can, for



IZA-Internships all over the world. Africa: Cameroon, Equatorial Guinea, Ethiopia, Ghana, Kenya, Madagascar, Rwanda, Uganda // Asia: Cambodia, India, Indonesia, Kyrgyzstan, Mongolia, Nepal, Sri Lanka, Tajikistan, Thailand // South America: Argentina, Ecuador, Mexico, Peru, Uruguay // Eastern Europe: Bulgaria

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 cooperations with a few institutions. One NGO, which regularly offers internships to our students, is the Batoví Instituto Orgánico in Tacuarembó, Uruguay (see box). Other partners are the University of Chiang Mai in Thailand and the Environmental Education Centre in Puntondo, Indonesia.

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 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. Six UI10 students are currently spending their 5th

semester in Ghana, Sri Lanka, Indonesia, Cambodia, Kenya and Uruguay and will provide us with an insight into their experiences in spring 2013. The work experience, the intercultural competence and the networks the students build can often facilitate their entry into professional life. ●

For further information please visit:

www.iunr.zhaw.ch/bachelor/international

Interested host institutions are invited to contact Bettina Hendry (bettina.hendry@zhaw.ch).

Batoví Instituto Orgánico

BIO Uruguay International is aimed at the promotion of sustainable production systems which respect health and the environment. BIO Uruguay is a private organisation with an international presence, which supports feasible techniques for social and economic development in farming production.

The institute promotes capacity-building activities and research into clean energies which are adapted to the local environment, both in the Granja Ecológica Abambaé (Ecological Farm Abambaé) in its headquarters in Tacuarembó, and along a network of agricultural communities in the region.

www.biouruguay.org

Student mobility // IZA-Internship

Drinking Water in Madagascar: the tension between NGO guidelines, state laws and practical problems in the bush



The landscape is wild, the views breathtaking. Just a meter from our bush vehicle the cliffs crash into the sea. I am on the east coast of Madagascar, on the way to Mananara. This is my route to work and the good two days to my destination is also counted as work time.

Martina Binder Student BSc in Natural Resource Sciences
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We have been following this rough but adventurous route because new water wells have been dug near Mananara, whose chemical and bacteriological parameters now need to be tested. I completed my internship as part of an international cooperation project at a Madagascan organisation called Bushproof. Bushproof was originally founded by Europeans, but today, it mainly employs local people. There are fifty permanent and thirty temporary employees, including one Swiss and an American. Bushproof is the point of contact for NGOs (Non-Governmental Organisations) to discuss water supply issues. It provides the NGOs with professional advice and assists in improving the effectiveness of implementation projects, as well as working directly with local communities. The organisation is currently participating in two large USAID (United States Agency for International Development) projects, which are helping to improve the water supply to several hundred thousand people.

In my role as an intern, I tested the water quality in new wells for its suitability as drinking water. Only when the chemical and bacteriological levels have reached the desired values, can a permanent well be installed and opened for use. For this purpose USAID has developed a testing policy which is broadly similar to that of the WHO (World Health Organisation). Since Madagascar also has its own laws regarding water quality, in addition to carrying out the practical tests, I also researched the legal issues to find out how the various requirements could be brought into conformity. It quickly became clear to me that this task would not be as easy as it had sounded. There are many grey areas, both in regards to the legal situation, as



A Bushproof employee pumps water from a temporarily installed well. (All pictures by Martina Binder)

well as the application of the tests in the bush. The Madagascan government has a number of documents relating to drinking water, which all use different values as their basis. On several visits to the authorities, we tried to resolve these ambiguities, unfortunately with little success. Additionally, we encountered several practical problems in the bush. For example, in several wells we measured excessive concentrations of iron. Iron is not hazardous to health, on the contrary iron is very healthy. However, it can cause a bitter taste, and discolour rice and clothing. USAID has not established any guidelines concerning this issue, thus it is possible that a well with excessive iron concentrations can be approved for use. However, this water is usually not used by the people, because they perceive it to be worse than the river water. This is of course unacceptable for Bushproof, as this could damage the reputation of their organisation. However, USAID is not willing to invest the necessary time to create a good and workable solution to this problem because this quality deficiency does not appear in their catalogue of requirements.

The results from bacteriological tests posed a much greater challenge. According to USAID, results from these tests must be perfect, this means that the water must be completely free of faecal bacteria. However, this raises a question of risk assessment. Is there a greater health risk when people use well water with a small number of bacteria, or river water, which poses all manners of health risks.

On the east coast of Madagascar the groundwater level is very close to the surface. Since the soil is mainly sandy, rainwater is very well absorbed. The filtering efficiency of the soil is, however, relatively poor as a result of the rapid flow of the water. Particularly in the rainy season, the residence time of the water in the soil, before it reaches the water table, is too short. Therefore, it is possible that water from hand pump wells may register impurities.

In addition, the test methods by which the bacteria are detected is in my eyes somewhat inaccurate. The wells are not tested regularly, only prior to the fixed installation. If a test indicates that there are eight faecal bacteria per deciliter of water in the well water, the result is not definitive. In

the next test, there could be two or ten bacteria per deciliter of water. I think it would be better to classify the test results in risk groups as Jo Smet and Christine van Wijk (2002) did. In their book they state that a value of up to ten faecal bacteria per deciliter of water poses a low risk. Even the Madagascan government has acknowledged in one of its documents that ten faecal bacteria per deciliter of water is an acceptable value.

Removing this low risk from the water would either require a considerable technical effort, or mean equipping all households with drinking water filters. There are, however, insufficient numbers of trained people who could manage and maintain a complex solution. It is also questionable whether the population would use drinking water filters. Hand pumps are a good alternative. They can be dug relatively quickly and any well that tests positive for faecal bacteria can, with little effort, be moved to another location in the village. The NGOs' quality requirements lead to problems in villages where no completely clean water can be found. In these cases, either the wells must be removed, leaving the population to drink river water again, or the

small contamination is accepted and the people drink water that poses a significantly lower risk. During my internship I reflected on these complex issues. I understand that USAID must set limits, and I have also learnt the limits of what is possible and meaningful. Added to this are questions related to the legal status of NGOs in relation to the state. Madagascan state sovereignty cannot simply be undermined by NGO standards that differ from those of the state, even if this might in some ways make more sense. It was extremely interesting for me to gather direct experience of the tensions involved in foreign aid projects. It was also very exciting to be directly involved in the overseas activities of a development cooperation. I came to realise that practice does not always reflect Western expectations of how things should function, even though Madagascar has adopted Western quality standards. The tension between what is desired and what is feasible in Madagascar sometimes seems insurmountable. But, with good will and expertise, meaningful improvements for the benefit of the population can be found and implemented. ●

For further information please visit:

bushproof.biosandfilter.org

(Bushproof)

madagascar.usaid.gov/programs/health-population-and-nutrition/1156

(The Ranon'ala Project)

madagascar.usaid.gov/programs/health-population-and-nutrition/1153

(The Rano-HP Project)

www.irc.nl/page/1917

(Book download: Small Community Water Supplies: Technology, people and partnership of Jo Smith and Christine van Wijk 2002)



Water test set for bacteriological water tests.

Student mobility // Erasmus

Eventstad – The Place for Wild Hearts

After a few years of working, I decided to start a Master's degree programme. From the beginning I knew that I wanted to spend some time abroad, and I chose Norway as my destination. At Hedmark University College in Evenstad, I found what I was looking for ... and much more than I had expected!

Thomas Rempfler Student MSc in Life Sciences
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Just before Easter I headed north. When I arrived in Evenstad, the campus was empty. Everyone was on holiday, so I left some of my baggage there and extended my journey for a few more days, visiting some of the sites from the Winter Olympic Games in 1994 in and around Lillehammer. I soon recognised that Norwegians are very friendly and relaxed. They like to take their time and talk over a cup of coffee or a glass of beer. Their country is definitely worth visiting. If you like nature, you will be impressed by the mountains, huge forests and beautiful fjords!

In total, Norway only has about 5 million inhabitants. In the southern part, most of the people live in Centres like Oslo, Bergen or Trondheim.



Thomas Rempfler at the viewpoint close to the Rondane National Park. (All pictures by Thomas Rempfler)

The rest of the country is quite remote and seems to be nearly untouched, like in Evenstad and its surroundings. The campus is situated in a lovely landscape, which I couldn't stop taking pictures of – many straight from my room!

I had chosen some courses in Applied Ecology for my Master's degree programme. My first course started after Easter. In Telemetry/GIS, I learned how to study wild animals like wolves, red deer and moose using radio and GPS tra-



Black grouse at the lek.

cking. Some animals had collars with transmitters that sent their locations to scientists, mostly by text message. The combination of this data with GIS and statistics allows us to analyse an animal's behaviour, habitat use and resource selection. One day we tracked collared wolves and tried to find the carcasses of their prey. This was quite an adventure and lots of fun, since we used skis to travel around the forest!

A second course I took was also concerned with monitoring animals. Distance Sampling is a method of estimating population sizes. Instead of counting animals and not knowing how many are missing, you walk a line and measure the distances to what you see on either side of the line. A specially developed programme calculates population sizes and confidence intervals, telling you how precise the estimate is. It sounds like magic, but it actually works!

After each course we received a dataset to analyse on our own. Teachers then gave us a few weeks to hand in a detailed report, on which we were graded. The topics of both courses were very interesting, but unfortunately, it is not possible to take similar courses in Switzerland at the moment. Probably the greatest benefit of being able to take this course as part of the Erasmus programme was that I learned skills that helped me to get my present job in the Swiss National Park.

In general, the atmosphere in the school was very familiar. In the Master's class we were 10–12 students and had very experienced teachers. In contrast to the Swiss programme, I had much more time to study supplementary articles, books or programmes. This increased freedom, creating a very motivating environment, which I really liked!

My classmates were from all parts of the world: Namibia, Tanzania, Nepal, New Zealand, USA and many different European countries. About 80 out of the 200 students lived on the campus itself, the others in houses nearby. Since the closest towns in all directions were a half an hour drive away, many students spent their leisure time on campus. There were different sports activities, weekly parties and several barbecues. In the long northern evenings, we played kubb or boiled in a hot tub, before cooling down in the river Glomma. Because hunting is very popular in Norway, we sometimes went to the shooting range to prepare for the upcoming season. At

weekends, we organised fishing, canoeing, hiking or skiing trips. I am thankful that I was able to make so many good friends!

My interest in wildlife meant that I was really excited about seeing wild animals. One day I went to a black grouse lek and observed their intense courtship behaviour. On several occasions I saw beaver, moose, reindeer, musk ox, roe deer, red deer, willow ptarmigans and capercallie – unbelievable!

All in all, studying in a foreign country means much more than sitting on a bench in a classroom, listening to teachers, reading articles or writing reports. It also involves travelling, exploring, making friends and having fun – a fantastic life! Do it and you'll see. ●

Norway
Hedmark University College
Faculty of Applied Ecology and
Agricultural Sciences



We are a small and happy campus in the middle of nowhere in south-east Norway and have been a ZHAW Erasmus partner since 2007. In this time, our cooperation has been very active, with 11 exchange students from the IUNR coming to Evenstad. Most of the students have taken one of our English taught semester programmes: Ecology & Conservation (autumn) and Nordic Forestry and Wildlife Management (spring). Last year, Thomas Rempfler was the first IUNR student to attend some of our Master's classes. Additionally, Madlaina Bichsel, after having spent one semester with us, decided to join us again and study for our "Master in Applied Ecology". As a result, we are very grateful to Salome Reutimann, the very first ZHAW exchange student, who found out about us while surfing the internet and came to Evenstad in 2007!

Our cooperation has also included the organisation of a study week at Evenstad for a class of about 20 students from the ZHAW. The students gained an insight into the boreal forest ecosystem and joined excursions and discussions on the "hottest" wildlife management issues in Norway: large carnivore conflicts, moose and forestry, and grouse hunting. The study week has taken place on two occasions and in both cases it was an enriching experience for both our institutes.

Our staff have also been active, during October 2011. A guest lecturer has been in Evenstad for the GIS course and Barbara Zimmermann has given lectures at the IUNR.

We are looking forward to being able to continue our fruitful cooperation. Maybe you could be our next exchange student?!

Exchange opportunities

Erasmus in Copenhagen



These few lines here report on my recent Erasmus semester in Copenhagen. I am studying BSc in Natural Resource Sciences in Waedenswil and spent my 4th Semester on the LIFE campus of the University of Copenhagen – for sure one of the best times in my life.

Philippe Fuchs Student BSc in Natural Resource Sciences
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But why was my stay over there such a great experience for me? There are many reasons for this. Firstly, the social life was amazing. I really enjoyed attending the lectures, since all my classes were fantastic and it was just nice to see my friends there. The teachers were also very enthusiastic and highly qualified, which made the lectures very educational and interesting.

The campus is well arranged and quite similar to the one we have in Grüental in Waedenswil; just on a larger scale, meaning I got used to it very quickly. The university itself consists of a blend of historical and modern buildings, containing almost everything a student might need, from a “nap room” to a student bar.

Outside of the classes there were a lot of other social events organised by the university like bike trips, theatre visits, soccer games, an international student dinner and much more... there was never a day without something like this going on. I really appreciated the balance between studying and the other events, and I believe that neither of them suffered as a result of the other.

Besides this, I like Copenhagen very much, especially because I'm a passionate cyclist and it's very bike friendly. Because biking is the cheapest and most convenient way to get around the city, everybody cycles everywhere. Accordingly, all the students and teachers come to school by bike. Everyone even came by bike to social events. I just loved this independence.

Copenhagen itself offers many attractive sights and we often gathered with some other Erasmus friends in order to explore some of them together. My accommodation was the Österbro Kollegiet, actually a hall of residence with about 100 residents, all of them students. Living in Copenhagen is remarkably expensive, because there is an



Copenhagen is truly a bike city. (Picture by Philippe Fuchs)

acute housing shortage. It would be quite difficult to find a flat without the help of the housing department led by the university. I had a great time at my hall of residence. Somebody was always willing to do something crazy and I never felt bored.

We often had dinner together with plenty of food, but we never bought any of it. Dumpster diving provided us with all the nourishment we desired. We checked the supermarket dumpsters for food two or three times a week – and we got a lot! It's just incredible how much we found each time. We were wondered why people threw all these things away. Consequently, our fridge was always crammed full of nice food, which is actually hardly ever the case if you consider the usual student fridges :-)

During my stay, I came to appreciate so many things in Copenhagen that it was very hard to say goodbye in the end.

My bike trip from Copenhagen back home to Switzerland was the perfect finale to end this great time. I cycled for nine days in total and made

some stopovers in Germany and Poland, visiting some of my newly made friends. I'm very confident that some of them will last for longer... ●

Student mobility // Free-mover

Study abroad

I studied as a free-mover at the University of New South Wales UNSW in Sydney, Australia for one semester. I took classes there on the Renewable Energy Engineering degree programme and gained many valuable insights regarding the other side of the world.

Devi Bühler Student BSc in Natural Resource Sciences
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The campus of UNSW was huge, huger than I could ever have imagined. Even on the last day I was still tremendously impressed by its size. But let's start from the beginning. My semester as a free-mover in Australia started with the O-Week, an orientation week with lots of activities and parties. Stands of the about 200 clubs at the university were spread all over the campus looking for new members. I couldn't say no to all the friendly requests and found myself signing up for five clubs.

My new home was an amazing place. I lived with five other exchange students in an apartment which was part of a newly built housing complex called the Village. The Village was located directly on UNSW campus. About 1000 students lived in the Village and most of them participated in the active social life that was part of this place. However, although everything started off in such an exciting way, disillusionment was just around the corner! I had really thought this would be an easy semester with four courses and 16 hours of lectures per week. But some of the courses turned out to be really challenging with lots of texts to read and assignments, which were intense tasks to be completed in self-study mode. From week two on, the assignments took up literally all my free time. Only on weekend nights did I allow myself to experience the vibrant nightlife of Sydney, go to a student party with my friends from the Village, or see my sister who lives in Sydney. Managing to accomplish the assignments in time was one difficulty. But also the content of the lectures was challenging since all my courses were part of the Renewable Energy Engineering degree programme, which was a genuine engineering programme that dealt solely and profoundly with related problems. And so I ended up studying semiconductor physics of solar



Devi Bühler in front of the Opera House in Sydney. (Picture by Goran Iliev)

cells and thermochemistry of combustion processes for one whole semester! In the beginning it always took me a long time to work through the assignments since I completed them alone. But soon I found friends in my classes with whom I could share results and work together. That made it all a lot easier and we had some fun too. The mix of people in my classes was in any case interesting: about 70 percent were Asians, particularly Chinese, another 20 percent were exchange students, and only the remaining 10% were Australians. Anyhow, I was pleased to meet Australians in my classes, as they were always very nice, helpful and funny.

Let's go back to the UNSW campus. As I said earlier, it was simply huge and felt like a little town. It had everything: several cafés, restaurants and food stalls with sushi, burgers, kebabs, as well as Chinese and Indian food. Furthermore, there were two bars, one of which had a club, a post office, a medical Centre, a pharmacy, different types of student accommodation, a gym with a pool, an ATM, bookshops, office supply shops, a UNSW clothes store and much more. More importantly, most of the university's 66 schools had their own building on campus. I was part of the School of Photovoltaic and Renewable Energy Engineering (SPREE), which had recently finished the construction of a new building. The building featured the latest technologies in energy efficiency and clean energy generation,

which were very impressive. I also met a lot of people at SPREE who were passionately committed to renewable energy, which increased my enthusiasm for renewable energy technologies even more. Sadly, at the same time, I learnt that in the rest of Australia most people have a different attitude. Australia's strong economy is mainly based on mining, of which coal mining has a significant share. Most electricity generated comes from coal, and electricity use is highly inefficiently since it is so cheap. All that adds up to make Australia one of the countries with the highest greenhouse gas intensity in the world. In my course, Renewable Energy Policy and International Programmes, I learned a lot about politics in Australia and around the world. I realised that politicians, especially in some parts of the world, are more interested in elections, public popularity and money rather than trying to solve environmental problems, as this wouldn't always serve their main interests. In the end, the reason why the world is the way it is stems not from a lack of technical or scientific knowledge – it is simply a lack of the right policy. These insights showed me how crucial and important politics is in terms of environmental issues, and have encouraged me to do further studies in that field. To sum up, I can say that my semester in Australia was informative, challenging and probably one of the best experiences I have ever had. ●

Student mobility // Volunteer

Whale Research on the Canadian Northwest Coast



As a BSc student in Natural Resource Sciences, I am extremely interested in carnivorous

species and their role in a pristine ecosystem such as the Great Bear Rainforest in British Columbia, Canada. As a volunteer for Cetacean Lab for Cetacea Lab, I had the chance to gain a fascinating insight and a better understanding of natural processes in a temperate coastal rainforest and its adjacent marine environment. The special focus of my work was mainly on the natural behaviour of marine mammals like Orcas, Humpback and Fin Whales, but I also experienced the ecosystem as a holistic habitat for both marine and terrestrial species.



Living in a temperate rainforest. (All pictures by Philipp Schuppli)

Philipp Schuppli Student BSc in Natural Resource Sciences
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The excitement is almost unbearable – it is night, I lie awake in my tent and directly behind me in the bay, a humpback whale jumps from the ocean for the umpteenth time before falling back into the water with a deafening roar. It then slams its huge tail on the surface of the water with full force - again and again! Only slowly does this giant of the sea appear to calm down and dive under the surface. Was this the end of these acoustic fireworks? – No! An enormous trumpeting disrupts the temporary silence as the whale reappears. Seconds later he disappears under the water again. The trumpeting sounds again several times until it is only faintly audible across the glassy sea. I am now standing by my tent, staring intently at the black surface of the water – totally overwhelmed by this intense natural spectacle!

Arrival in the Great Bear Rainforest

It was the night of my arrival on Gil Island, an island in the heart of the Great Bear Rainforest, on the northwest coast of Canada. Cetacea Lab has established itself as a charitable organisation on the southern tip of the island to document and investigate the natural behaviour and communication patterns of different whale species in the waters off the coast. Every summer Janie

Wray and Hermann Meuter, the two staff of the research Centre, as well as founders of Cetacea Lab, need volunteers to support them in their work on Gil and Aristazabal Islands. Aristazabal Island is the location of an outpost and observation point overlooking the Caamano Sound, a quiet, particularly species-rich marine basin on the edge of the Pacific Ocean; a habitat and migration point for orcas (*Ocinus orca*), humpback whales (*Megaptera novaeangliae*) and fin whales (*Balaenoptera physalus*).

ORCAS

After a brief introduction to data collection techniques, involving searching the sea for signs of whales, it was time for me to leave for Ulric Point, the observation post on Aristazabal Island. Standing on steep, rocky cliffs, I was expecting a simple shelter. Observation deck, office, kitchen, living room and protection from the weather all in one, this little wooden hut became my home. I was able to set up my bedroom – a tent – in a well-protected location at the foot of a huge red cedar (*Thuja plicata*) in the dense rain forest behind the shelter. There was no lack of company. At 5 o'clock in the morning, a young bald eagle in its nest began to beg loudly for food high above my tent – for its parents, this meant the start of

a day of hard labour. The 7-clock steller sea lion (*Eumetopias jubatus*), which I christened Olaf, regularly dived for fish in the kelp forests at the foot of the rocks, and a mink couple (*Neovison vison*) took advantage of the low tide to search for food in the tidal zone. The daily routine was defined by scanning the surface of the sea with a large pair of binoculars. From 6 a.m. to 10 p.m. a scan had to be performed every 30 minutes, taking about 15 minutes to complete. Every exhalation of a baleen whale, the so-called "blow" was noted down, and any further sightings of marine mammals were recorded according to species, number, behaviour, direction of movement, distance and sighting sector. The underside of the humpback whales' flukes were, whenever possible, photographed. The images were later used as references to identify the animals using a fluke ID catalogue. The first week on Ulric Point was a little tough as far as whale sightings were concerned. The visibility was limited by fog and rain and just a few whales came close enough to the shelter to be located and identified. With the arrival of large chinook salmon (*Oncorhynchus tshawytscha*) in the second week, different groups of resident orcas arrived. The so-called clans, each consisting of a senior female, several adult males, younger females and the youngest



Humpback whale (*Megaptera novaeangliae*) tail-slapping.

offspring, passed within sight of the observation point. Thanks to the underwater microphone at Ulric point, I could hear the animals long before I could see them. I never expected to be so nervous when the sounds became more pronounced and I could finally see those first large vertical fins. Feverishly I clung to the binoculars so as not to lose the group. Slowly approaching, the elegant hunters passed the shelter to the south before ultimately disappearing.

Arrival of the Autumn Humpys

After two weeks on Ulric Point there was a change over and I returned to Gil Island. The observation activities became more interesting. Whale Channel south of Gil Island lived up to its

name. The autumn humpback whales, which often practice their famous “Bubblenet Feeding” together in large numbers, had arrived. Also present were several fin whales, which shared the hunting grounds with the humpback whales. On reconnaissance trips by boat, we were able to observe both species feeding. The huge fin whales, in particular, left a lasting impression. Seeing how fast and incredibly agile they were when hunting and how they interacted in such a confined space with the humpback whales left us speechless and awestruck on the boat. Totally fixated on the hunt, or possibly in a real feeding frenzy, the whales seemed not to perceive our presence and repeatedly surfaced close to our boat. What at first caused considerable

shock turned into a feeling of euphoria and deep gratitude at being able to observe such behaviour.

The reasons why fin whales gather in these coastal waters are currently only open to speculation. Up to now, science has assumed that the second largest mammal in the world resided exclusively in the open ocean. The possibility to observe fin whales from the shore is considered to be very special and is reason to believe that the population is slowly recovering from decades of hunting.

The salmon – a key species for an entire ecosystem

The estuary of a nearby creek offered another extraordinary natural spectacle. Nearly a dozen bald eagles (*Haliaeetus leucocephalus*), several sea lions and seals, as well as countless ravens (*Corvus corax*) took the opportunity to eat their fill of salmon. The fish pushed against the current in their thousands and collected in pools below waterfalls, waiting for their chance to jump. They were all in the final meters of a very long journey from the open Pacific Ocean to their spawning grounds in the coastal rivers. The presence of wolves (*Canis lupus*) was announced by some headless salmon lying on the gravel banks of the river. Fresh footprints, claw marks and feeding signs from black bears (*Ursus americanus*) enabled us to infer that a meal had just ended. However, I had to give up on the hope of encountering a local white kermode bear (*Ursus americanus kermodei*), due to the sustained off-shore wind entering the creek bed.

Using the example of the islands and waters in the heart of the Great Bear Rainforest, it can be seen how incredibly powerful an intact, terrestrial and adjoining maritime zone ecosystem can be, and how important it is to understand and preserve these remaining habitats. Unfortunately, an oil transport project by Enbridge Inc. threatens the existence of precisely this ecosystem. However, local conservation organisations and the First Nations from these coastal areas are currently jointly fighting against the implementation of these plans. ●

Additional links:

www.greatbearproject.blogspot.ch

www.forwhales.org

www.pacificwild.org

Student mobility

Mobility of students at the Institute of Natural Resource Sciences (Summer 2012)

Each year, the IUNR encourages students to gain valuable experience abroad through short and long term mobility opportunities. At the same time, the IUNR receives guest students from all over the world. They bring disciplinary, vocational, and cultural diversity into the Institute and take a piece of the educational culture and Switzerland back to their home countries.

The tables below show which students are currently taking part in an international programme and which guest students are here.

Outgoing Students

What	Who	Institution	Where	Subject	
BSc Thesis	Schütz Simone	University of Peradeniya	Peradeniya	Sri Lanka	Impact of selected beneficial microorganisms on early growth of tropical crops
	Muther Michel	arbi, Arbeitsgemeinschaft Bioenergie, Baar	Mivumoni	Tanzania	Development and characterization of a biogas cooking area for third world countries
	Krause Diego	Chiang Mai University Department of Environmental Engineering Faculty of Engineering	Chiang Mai	Thailand	Improvement of efficiency of constructed wetlands
	Meierhofer Dimitri		San Francisco	California	Urban greening and biodiversity in San Francisco
	Gröbly Dominik	SWISSCONTACT	Cochabamba	Bolivia	System and plant design for green waste fermentation
	Fässler Erich	University of Antioquia	Medellin	Colombia	Bioenergy in South and Central America
	Bichsel Madlaina	Hedmark University College	Evenstad	Norway	Diet of nesting eagle owls (<i>Bubo bubo</i>) on a North-Norwegian archipelago, as revealed by pellets
Erasmus (Bachelor)	Consler Katrin	University College for Agrarian and Environmental Pedagogy	Vienna	Austria	
	Heinzelmann Peter	Mid Sweden University	Sundsvall	Sweden	
	Lardon Jessica	Hedmark University College	Evenstad	Norway	
	Schlicht Jörg	Graz University of Technology	Graz	Austria	
	Stäheli Nicola	Hedmark University College	Evenstad	Norway	
	Vögeli Benjamin	Lews Castle College, UHI University of Highlands & Islands	Stornoway	Scotland	
	Wild Thomas Roland	University of La laguna	Tenerife	Spain	
Internship (ZA)	Gantenbein Sibylle	NGO Biovision	Nairobi	Kenya	
	Krummen Romana	World Fish Centre	Phnom Penh	Cambodia	Rice field fisheries enhancement project
	Meier Corina	Batoví Instituto Orgánico Uruguay International	Tacuarembó	Uruguay	Analysis of compost quality
	Neuhaus Stefanie	Environmental Education Centre PPHL Puntondo	South Sulawesi	Indonesia	Development of a concept for recreational and experience oriented landscape architecture
	Rechsteiner Christian	University of Peradeniya	Peradeniya	Sri Lanka	Overview of the water treatment programme of the greater Kandy area
	Spühler Lisa	Environmental Education Centre PPHL Puntondo	South Sulawesi	Indonesia	Development of a concept for recreational and experience oriented landscape architecture
	Berli Cédric	Delegation of German Industry and Commerce in Ghana	Accra	Ghana	Preparation and Implementation of the Energy and Environment Trade Fair

For further information please visit: www.iunr.zhaw.ch/bachelor/international
or contact Diana Haller (diana.haller@zhaw.ch).

Visiting International Students

What	Who	Institution	Where		
Erasmus (Bachelor)	Egill Björn	Thorstensen Háskólinn	The University of Akureyri	Akureyri	Island
	Etzlstorfer	Lydia	University College for Agrarian and Environmental Pedagogy	Vienna	Austria
	Sánchez Jiménez	Ingrid Janet	Bremerhaven University of Applied Sciences	Bremerhaven	Germany
	Mizerakis	Vangelis Loukas	University of the Aegean	Lesvos	Greece
Erasmus (Master)	Bauerová	Petra	Czech University of Life Sciences	Prague	Czech Republic
	Kottová	Iveta	Czech University of Life Sciences	Prague	Czech Republic
Erasmus Training*	Moysiadou	Ouraina	University of the Aegean	Lesvos	Greece

*Office for Tourism and Sustainable Development

Graduates abroad

Short profiles of graduates in BSc in Natural Resource Sciences abroad

After their BSc-studies, graduates will find that they can choose from a wide range of job offers looking for exactly their kind of experience – and not only in Switzerland.

We asked some of them to give an insight into their current activities abroad, their motivation and what they identify as important skills for working in other cultural contexts.

On the next page you will find an interview with a graduate student, Marco Birchler who talks about his job as a project leader for an NGO in Bolivia.

Ralf Trylla



- Graduated in 2006 with a specialisation in Environmental Education (today called Landscape, Education and Tourism)
- Has worked as an environmental engineer in the district of Ísafjarðarbær (Westfjords) Iceland since 2008

We wanted to know

How did you find your current job?

“As I was fascinated by Iceland, I went there. The town advertised this job at the same time and I was lucky enough to get it!”

What are important skills required for your work abroad?

“It is most important to be flexible and open to a new language, culture and how things work.”

Martina Lippuner



- Graduated in 2008 with a specialisation in Environmental Education (today called Landscape, Education and Tourism)
- Gained work experience abroad during her IZA-internship with WWF Madagascar in north-east Madagascar
- Has been working as a communications manager for WWF Madagascar since 2009

We wanted to know

What has been one of your most noteworthy experiences in your current job?

“There have been countless noteworthy experiences during my time here in Madagascar... It's always magical when you feel you have really contributed in a concrete way, which is not always the case. One thing I will never forget is when we organised a trade fair during Earthhour last March. The goal was to promote energy-saving stoves as deforestation is Madagascar's main environmental problem. These stoves can reduce charcoal and fuel wood consumption by 60% and therefore help to save Mada's unique forests! My colleagues and I in communications started a huge campaign and 2 hours after the trade fair started we ran out of stoves! People wanted them so badly, we could have sold thousands more... It felt great to be part of that buzz!”

In your opinion, what are valuable competences for working in another cultural context?

“First of all openness and willingness to think outside the box. Things work very differently to Switzerland and you have to adapt quickly without judging different approaches. Second: lots of energy! Working for an international NGO requires endless extra hours and trips to the field under harsh conditions, far away from civilization. You have to love it! And third: languages! Language is the key to the people in your host country and you should make the effort to learn the local language. Given you work in an international environment, it's essential to be able to get by in a couple of languages.”

Niklaus Gerber



- Graduated in 2007 with a specialisation in Environmental Education (today called Landscape, Education and Tourism)
- Is working as an environmental engineer in the International Development and Cooperation in the Philippines. His job for a non-governmental organisation (NGO) includes consultation and support for local initiatives with a focus on sustainable agroforestry, organic farming, ecotourism and environmental education.

We wanted to know

What motivated you to look for a job outside Switzerland?

“I was eager to work in an intercultural context and broaden my perspectives to become aware of the situation in a developing country, as well as to show respect and solidarity to the people living there.”

What would you call your most noteworthy experience in your current job?

“I have found that there are cultures and ways of thinking beyond western European ideals, such as a simple standard of living without luxury, which focus on essential needs, spirituality and satisfaction.”

Giulietta Toschini



- Graduated in 2008 with a specialisation in Nature Management
- Gained some experience abroad during her Bachelor's thesis in Tenerife, where she focused on the restoration of Juniperus spp. Forests
- Is now working as a project manager in an agribusiness company in South Brazil. The management of a small lodge working with eco and agro tourism, the afforestation of the forestless areas of the company's land and the sustainable improvement of the company are part of her work.

We wanted to know

What are the most important skills required for your work abroad?

“I would say positive thinking, perseverance, patience, tolerance and respect. And my work needs a lot of flexibility because it depends on the climate, the weather, Brazilian law (which changes frequently), other people etc. One mistake can create a domino effect, which may lead to a lot more mistakes. So making decisions is often difficult, because you never know what's going to happen next...”

Graduates abroad

Interview with Marco Birchler, BSc graduate in Natural Resource Sciences (2008)

After taking your university entrance exam you decided to study geography at the University of Zurich. What were your reasons?

My motivation for choosing this degree programme was my fascination for geography in general and, in particular, for the way geography connects to other areas. Geography is the science that examines virtually all aspects of the earth with regard to specific local differences. It also describes and explains the impact of geographical areas and processes taking place on the surface of the earth on humans, and vice versa. Furthermore, this degree programme was the only way I found to be taught directly about development cooperation.

You then transferred to the ZHAW and started your studies in the 3rd semester.

As part of the geography course I chose environmental sciences as my major elective and economics as my minor elective. After failing the economics exam twice, I had to stop my geography studies for regulatory reasons. BSc in Natural Resource Sciences seemed to be a good solution to enable me to pursue some of my interests. I soon realised, however, that the approach at the ZHAW, was much more practical, and that theory is related to practice much more than at a traditional university.

I chose to major in Environmental Education, because this is a very interesting area in connection with tourism and development cooperation, and has great potential.

What do you think about Bachelor's study programme in Natural Resource Sciences in retrospect?

The lecturers at the ZHAW provide a strong connection to the world of work and real-life practical examples were always included in the classes, which was rarely the case at the University of Zurich. The same applies to the semester and diploma thesis topics. Another very interesting and rewarding factor was the diverse backgrounds of individual fellow students, because many of them had a great deal of experience from other fields and came up with a range of different solutions to the problems we looked at.

Did you have a specific plan for what you wanted to do after your studies?

Even before my studies started, my goal was to work in the field of development cooperation one



Marco Birchler

Name	Marco Birchler
Age	Just under 40
Profession / Career	University entrance exam, insurance specialist, geography degree programme, University of Applied Sciences Waedenswil, project leader for an NGO in Bolivia
Pre-study internships	<i>Where?</i> Brigada Parlamentaria de Chuquisaca Sucre, Bolivia <i>What?</i> Pollution of the Pilcomayo River by mining companies in Bolivia <i>Duration?</i> 3 months
Bachelor's study programme in Natural Resource Sciences	2005/08 Bachelor of Science ZFH in Natural Resource Sciences
Start of work for Fundesubo in Bolivia	2009
Function	Project leader for Fundesubo, director of 'Casa de Turismo' and commercial manager of the virtual magazine 'Epoca Ecológica'
Level of employment	100%

day, ideally in Bolivia. My wife is from Bolivia, and not only did I fall in love with her, but also with the natural wonders of this country. Tourism is still in its infancy in Bolivia, although there is enormous potential for travel in terms of culture, nature and landscapes.

You've been living in Bolivia for four years now. What are you doing professionally?

I'm one of the project leaders in the NGO Fundesubo. Our project 'Casa de Turismo' has been up and running for 2 years and is a kind of tourist shopping Centre in the heart of the city of Sucre. It involves 21 different private businesses and service providers including a travel agency, an Internet

cafe, a money exchange office, a souvenir shop and a textile business, which together cover nearly all a tourist needs. The idea is that they pay cheaper rent as a group and also advertise jointly under the name 'Casa de Turismo'. I am director of the 'Casa de Turismo' and am also responsible for the tourist information office. Another project is the Fundesubo virtual newspaper 'Epoca Ecológica', which is published monthly and reports on topics related to ecology and development. I support the newspaper with my own photos, help to find suitable articles, and try to attract advertising partners.

What are the difficulties that you encounter in your present job?



There are many difficulties, but I have a good mentor as a business partner who shows me how to do business the Bolivian way and how to get things started, and in return I show him what American or European tourists expect from a service or product.

And what is easier compared to Switzerland?

I am often amazed at what you can get done in Bolivia so quickly, easily and cheaply, and at other times I can hardly believe that other things can be so complicated or even impossible. In any case, it takes a lot less money here to get something going, but it can cost a lot of nerves before it is finally working. I always tell myself "It'll work out" and usually at some point a new approach pops up that one

could never have imagined before, but somehow works in Bolivia. I learn something new almost every day, and that makes it really exciting.

How have you benefited from your studies in your current work?

It's hard to say because the study programme was very diverse, and my current job is too. I have certainly benefited from the programme in many areas, but I always knew that you have to define your role and sell yourself after a natural resource sciences study programme (as is the case with a geography study programme) because you're not trained for a specific activity like an architect, a dentist or an accountant.

Would you recommend the Bachelor's study programme in Natural Resource Sciences to other people?

Yes, definitely, because you get a very broad and varied education with a whole range of components, and this can't be found anywhere else. ●

The interview with Marco Birchler was conducted by Diana Haller (diana.haller@zhaw.ch).

Employee mobility

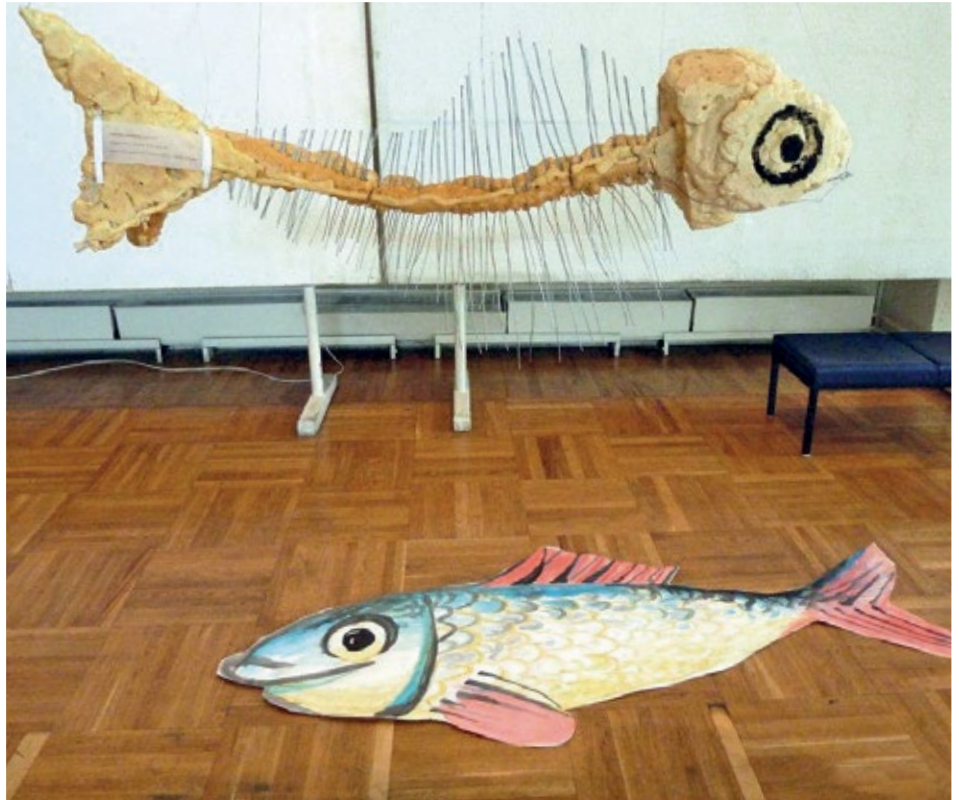
IUNR in Kyrgyzstan: International Exchange on Bio-cultural Heritage and Contemporary Art



The national museum of fine arts in Bishkek, the capital of Kyrgyzstan, hosted a symposium,

organised by the Centre for Contemporary Art B'art¹, in collaboration with Moving Culture². The subject of the symposium, from 30th June to 1st July 2012, was "The Significance of Identity and the Bio-Cultural Heritage of Mountain Landscapes in Contemporary Times". This international symposium provided a unique opportunity to profile ideas of cultural heritage and biological diversity. Experts, artists, cultural anthropologists, philosophers, political scientists and curators from Kazakhstan, Kyrgyzstan, Tajikistan, France, Turkey and Switzerland exchanged ideas relating to the bio-cultural heritage of mountain landscapes, contemporary art and the relationships between these two subjects.

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The installation was created in the Nomadic Art Camp at Lake Issyk-Kul in Kyrgyzstan and exposed in the Museum of Fine Arts in Bishkek (Capital of Kyrgyzstan). (Picture by Hanspeter Maag)

The Office for Tourism and Sustainable Development, a part of the IUNR, was also invited to the symposium to present tourism concepts and projects that are based on local nature and culture. The Office for Tourism and Sustainable Development itself is part of a tourism project called Centre da Capricorns, which aims to contribute to the sustainable development of a peripheral region in the Swiss Alps. The Centre da Capricorns is located in Wergenstein (Grisons) and, in addition to the Office for Tourism and Sustainable Development, includes a hotel, a restaurant and the administration of the Beverin Nature Park.

¹ B'Art, Bishkek Art Centre's mission is to promote innovative collaborations between established and emerging artists who work in the fields of traditional and contemporary art. Its aim is developing by artistic and cultural activities to cultivate a creative space which cultivates open dialogue between local and international artists as well as other creative stakeholders and the local community (bishkekartCentre.kloop.kg/about).

² Moving Culture is a Society for Cooperation with Central Asian Arts and Culture, Switzerland

On the occasion of this international symposium in Bishkek, the Office for Tourism and Sustainable Development was asked to present its contemporary interpretation of cultural and natural heritage in mountain regions. The Office for Tourism and Sustainable Development's view is that tourism offers should be developed by or with the local population. Value created by tourism activities should also contribute to the regional economy. In order to maximize added value in a region, the supply chain for a tourism activity should, as far as possible, be created within the region concerned. This means all products and services that are part of a tourism attraction should come from within the region. These kinds of tourism offerings are based and capitalise on local natural and cultural values, allowing visitors to experience these values. A precondition for the integration of local nature and culture into a tourism offering is that the local population needs to recognise and develop their own natural and cultural heritage. It is possible for local culture to be reinterpreted by locals through the development of tourism. Face to face interaction

between locals and visitors can generate new networks and new ideas for both sides. When tourism activities based on local nature and culture are implemented, potential ecological impacts also need to be considered, so that the tourism contributes to the ecological and social improvement of the region.

Subsequent to the symposium, an international art camp was organized from 2nd to 9th July 2012 on the stunning Lake Issyk-Kul, one of the most important tourist attractions in Kyrgyzstan. I, as a representative of the Office for Tourism and Sustainable Development, was also invited to participate in this camp. The camp's main aim was to make local people aware of the importance of preserving their natural and cultural heritage, since this harmonious relationship between man and nature is an important resource for future generations. The core idea of the project was to explore the connection between humans and nature. In order to foster a new relationship between urban and rural dwellers. The language of contemporary art was used to express ideas about diverse forms of relationships

between nature and culture. Different artists from Kyrgyzstan and other Central Asian countries, as well as from Turkey and France developed their ideas and work over a period of two weeks, before presenting them in the village on Lake Issy-Kul where the camp was taking place. Afterwards, the impressive exhibits developed in the camp were moved to the Museum of Fine Arts in Bishkek, where they were displayed in a well frequented exhibition.

The intention of the art camp and the symposium was to develop long-term relationships between Kyrgyzstan and other countries. Since tourism and contemporary art is a very interesting field, with potential in both Kyrgyzstan and Switzerland, subsequent collaboration could be very fruitful for the Centre for Contemporary Art, Moving Culture as well as the Office for Tourism and Sustainable Development. Another, more general, factor that would make Kyrgyzstan and Switzerland a good match for such an exchange is that both countries are comprised of large mountainous regions, where the cultures

are strongly influenced by their mountain landscapes. This similarity would provide the potential for collaboration on different experiences relating to mountain tourism. In the light of the very interesting, and warm-hearted exchange at the last Symposium and Art Camp, I truly believe ideas for future collaboration should be developed further. ●

For further information:

www.lsfm.zhaw.ch/de/science/iunr-lbt/tne.html
bishkekartCentre.kloop.kg/about



Participants of the Nomadic Art Camp and local people produced felt carpets using traditional methods of Kyrgyz Nomads. (Picture by Sonja Trachsel)

Employee mobility

Studying abroad: a therapy for lecturers!

Heading for new horizons? After a life in flower production, business, teaching and being a student advisor, doing something different in another world? What a great experience to sit on the other side of a teacher's desk for a couple of months. Studying instead of teaching, living, learning and thinking in a foreign language, getting acquainted with another way of life and education system, with new topics, in a very different environment? I still wonder if it really happened, this sabbatical two years ago, at the age of 55. It did – in Australia!

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Hans-Rudolf Keller during sheep shearing at the farm of Charles Stuart University (All pictures by Hans-Rudolf Keller)

Dreams come true – sometimes. When transferring the former 'Horticulture' specialisation to the new curriculum for 'Organic Farming and Horticulture' at the IUNR in Waedenswil, the idea was born to do a course in sustainable agriculture in a foreign country. If a farm changes from conventional to organic agriculture, a process is required to achieve the necessary qualifications. Similarly, a process was also necessary to transform the 'Horticulture' specialisation, physically and particularly in the minds of the teaching staff. With the idea of such a transition in mind, I started to look for suitable opportunities. Where should I go? For how long? What would it all cost? Could I cope with studies at a high level in a foreign language?

While searching on the internet I came across



Growth tracking in the vineyard of the University.

the Charles Stuart University (CSU) in New South Wales, Australia. It seemed to be the perfect study programme for my purposes: a Master's programme in Sustainable Agriculture at the School of Wine Sciences and Agriculture, with amazing subjects such as managing agroecosystems, alternative agriculture, managing rural change, and managing sustainable development. Actually, getting there turned out to be rather complicated: visa application, proof of my (very old) English skills, the bureaucracy of CSU, and my outdated certificates (1979) were not easy to transmit. In addition, I had to find someone to take over my duties at the ZHAW for almost half a year (my lectures had to go on during my absence).

Finally, at the end of June, I took the plane down under, arriving in Sydney on the coldest morning for the last 60 years (and my luggage with warmer clothes was still in London!). I started off my Australian life by buying a warm sweater and a car, tried to drive on the left side of the road and eventually found the route to the West, through the Blue Mountains. I found the CSU campus in Orange in the deep Australian winter at an altitude of 1000 m on the edge of the great Western planes, that is, the Blue Mountains. This was not how I had imagined Australia to be! Studies soon started in a way I had to get used to. One subject, soil science, which I had to take at Bachelor's level, was taught by video conference from Wagga Wagga, some 300 km

away from Orange. The lecturer and his slides could be seen on the screen, and cameras and microphones installed in the classroom allowed students to communicate with him. The lecturer used frontal teaching and there were four exams per semester, closed book, of course, and partly multiple choice. There was also laboratory work and learning at home from animated CDs. In contrast, all my other subjects were at Master's level where I had tutorials with the lecturer for some 2 hours a week, no class, no lectures, and no PowerPoint presentations to watch. Instead, students usually had to prepare a selected topic to present to the group during the session. The rest of the week we either went on study trips or worked on several assignments which had to be submitted during the course of the semester. What about the students? Arriving at Orange I met the two of them who were physically present, Janeth from Tanzania and Elisabeth from Kenya. We became best friends through studying and travelling together. But we never saw all our other colleagues as they did their studies by distance education. Spread over a few million square miles, they work on their assignments and submit them to the university while often working on a job, running a farm, and caring for their families. Starting another career is something many Australians choose to do in a later stage of life.

The study concept is based on self-directed learning. A huge number of structures are availa-

ble at the CSU where the student and study support office offers a whole range of opportunities for students: a well-organised library with helpful staff, language advisors to discuss your own writing with, small meeting rooms in the library to work in small groups, a rich IT-environment including the CSU Interact, a platform where you communicate, contribute to forums, pay your bills, submit assignments, make use of the library's database and much more.

I didn't take a sabbatical hoping to find everything the same as at home. Coming from outside I gained an interesting view of a university which carries out its mission in a very different way to what we are used to at the ZHAW. I appreciated the high amount of support and supervision lecturers gave their students. Because lectures and classes are very few, the teaching staff finds more time to do their own research and to supervise student work. Self-directed learning is a demanding way of study but very sustainable as well as deep and effective. It requires a high level of self-motivation. The contrast between the Bachelor's level course in soil science and the Master's level courses was dramatic. In the first, I had a subject with frontal teaching requiring an accumulation of facts and figures in my brain

to be poured out in exams: in the second the Master's subjects were without classes, lectures and exams but tutorials, self-directed learning, one's own research and writing project assignments. I have profited greatly from the latter.

The most stressful experience in that first study semester abroad was the writing. It's one thing to communicate orally in English (listening, speaking), which I became used to very quickly – what a blessing it was to be down under without a single German-speaking person around me! The next level was the reading. It wasn't that I didn't understand scientific papers, which is just a matter of quantity and speed, but in most subjects I was simply flooded with reading resources. And the writing! Australian universities are very concerned about academic writing and formal matters. In the Master's level courses I did a lot of writing, two or three written assignments for each topic. At the beginning it took me hours to write a page of good prose, that is, until I discovered the language adviser on the campus. David Ross and I spent intense and amazing afternoons screening my writing. I have never improved my English skills as much as in these sessions with a dedicated language adviser. And he picked up some subject content too!

What about the lecturer's therapy? It worked well. It is certainly beneficial to step back for a while and take a sabbatical, to see a university from another side in a different environment, to take on the role of my students, and to change my own perspective in the classroom. I also came back with a different point of view regarding my own field of expertise. Organic Farming and Horticulture is more than just another way to produce food and fibre. It is a way of life, a holistic view of an issue which is important for this planet and for humanity. And I came back with confidence – I can do it! ●

For further information please visit:

www.ranke-heinemann.de

(Student office for Universities of Australia and New Zealand in Europe)

www.csu.edu.au/courses/postgraduate/sustainable_agriculture/course-overview

(Master's programme in Sustainable Agriculture)



Canolafield in the New South Wales.

Employee mobility

Exploring the Nature of Education of the Greater Yellowstone Ecosystem



As a mobility coordinator at the IUNR, it is my job to promote international competence. Each semester I encourage students to participate in exchange semesters abroad. The goal is for the individuals concerned to further their skills and develop personally. Clearly, I can only credibly convey the benefits of this experience to students by participating in the programme myself. I decided to use my summer holidays to gain vital international experience and improve my English by exploring a truly incredible landscape.

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Four years ago, I visited the area of the Greater Yellowstone Ecosystem for the first time. I was so fascinated that I decided I would return one day – and not just as a tourist. I have now been lucky enough to be able to realise this goal by taking on different roles at two American environment school Centres.

Yellowstone Association Institute

At the beginning of my stay I participated in a four-day field seminar on the bison of Yellowstone at the nonprofit Yellowstone Association Institute, which funds and provides educational products and services for the Yellowstone National Park. I stayed at the historic Buffalo Ranch, located in Yellowstone's famous and scenic Lamar Valley, the Serengeti of the North Americas. This was a peaceful and spectacular place where I could see gray wolves, elk, moose, brown bears,



A classic enduring symbol of Old West. (All pictures by Diana Haller)

badgers, pronghorns and observe thousands of bison on the move (and really close). Under the guidance of two world expert teachers, Jim Garry, a naturalist and folklorist, and Harold Picton, emeritus professor of wildlife at Montana State University, I explored the biology and natural history of the bison, their role in native cultures and explored the current political turmoil around bison management and the definition of the Yellowstone ecosystem. A perfect combination of fun field excursions and classroom presentations allowed me to examine specific aspects of the park ecosystem. It was an excellent place to experience and learn about the Yellowstone National Park and the American bison.

Teton Science Schools

Next, I moved to the Teton Science Schools at Kelly Campus, which is located inside the Grand Teton National Park near Jackson Hole. This school has been teaching about the natural world and the Greater Yellowstone Ecosystem since 1967 and has enjoyed a reputation as an innovative environmental education Centre, with programmes that serve as models the world over. Seven innovative programmes (Journeys School, Teacher Learning Centre, Conservation Research Centre, Graduate Programme and Wildlife Expe-

dition) are on offer to students, school groups and families around the world. I was especially interested in their Graduate Programme. This Master's level mentored teaching programme develops leaders in place-based teaching, field ecology and experiential education, integrating academic course work with intensive mentored teaching practice.

In order to build up a picture of the organisation, the school offered me the opportunity to work as a volunteer with a small group of students from Los Angeles on the "Spirit of the Rockies: Songbirds, Mountain Lions, and More" expedition, sponsored by Earthwatch¹. The students on this expedition were funded by the LA-Student Challenge Award Programme (LA-SCAP)².

The project monitors indicator species to understand the cause of population changes and how they relate to urban development. I helped with the field research project, conducting bird nest searches and vegetation surveys.

A fantastic collection of North American wildlife, including large mammals, an array of forest songbirds, waterfowl, raptors and trumpeter swans live in the Jackson Hole area. Studies have shown that the numbers of both resident and migratory songbirds in the Jackson Hole area have been declining over the past 30 years.

¹ Earthwatch (www.earthwatch.org), the world's largest environmental nonprofit volunteer organization, is based in the Boston metropolitan area. Its mission is to engage people worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment.

² Student Challenge Awards Programme and is our premier student fellowship programme. SCAP is supported by one of our most generous and long standing donors. SCAP is a competitive fellowship programme for students who excel in the arts and humanities, and has been rewarding creative thinkers and risk takers for more than 20 years

Declining population trends must be identified and reversed locally to create positive global change. The research team from the Teton Science Schools Conservation Research Centre is mist-netting, color banding, and counting songbirds in several locations in the Greater Yellowstone Ecosystem. They hope to be able to better estimate songbird populations, understand how both migratory and resident songbirds use various habitats, and establish what is causing the declines in populations.

Our small team supported this ecological conservation research project. Birds were the main focus of our fieldwork. We spent each day searching for active nests in riparian habitats and measuring vegetation near bird nests. GPS devices were used to pinpoint the locations of nests found, allowing future observations to be made. We spent one morning at the bird banding

station, observing how birds are banded and recorded and learning about monitoring avian productivity and survivorship. We also participated in setting up field cameras to track the mountain lion population and an American pika (*Ochotona princeps*) research project.

After 10 days in the field, collecting data, the students presented their research results at the Teton Science Schools, where their data will be used for further research. I was impressed by how hard these young students worked and how interested they were in scientific work.

I was excited that I had chosen to help with this research and to experience the wonders of the Greater Yellowstone Ecosystem as a student. Through studying and experiencing nature, I met many great people, who I will surely cooperate with at some point in the future. I gained an insight into working and studying in the United

States of America and, in addition to improving my English, I realised that international experiences enrich your professional and personal life, inspiring me to undertake future adventures in one of the largest intact temperate-zone ecosystem left on Earth. ●



Teton Science Schools has educated tens of thousands of students through field-based natural exploration.

Employee mobility

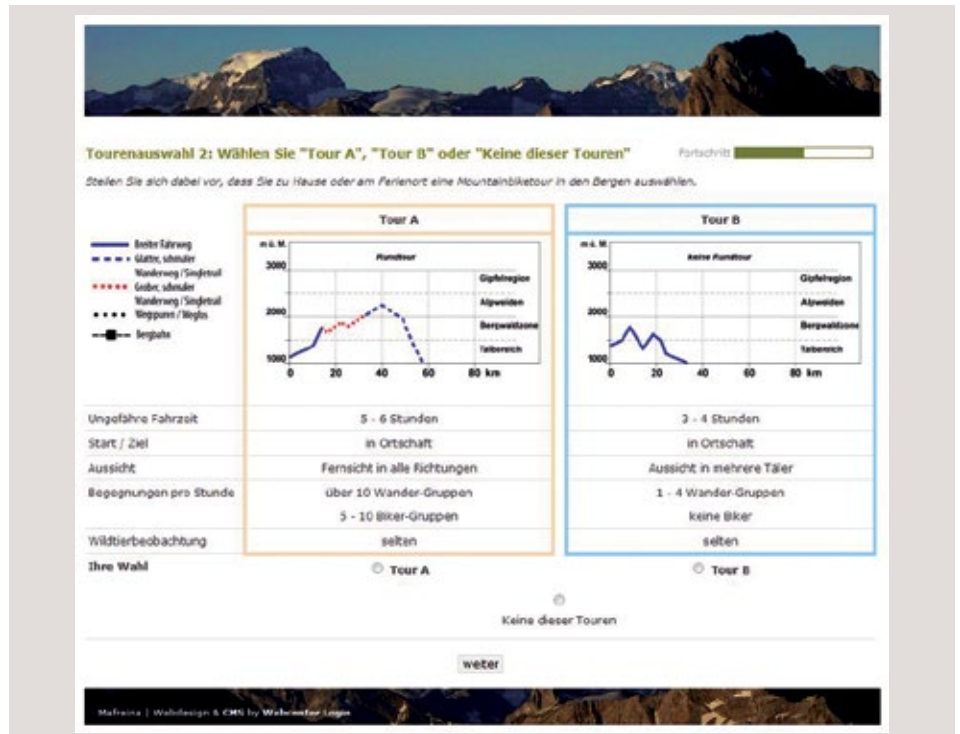
Developing parameters for agent-based models using choice experiments

6th International Conference on Monitoring and Management of Visitors in Recreational and Protected Areas, Stockholm, Sweden, 21-24 August 2012



Outdoor activities are increasing as a balance to a stressful business life and urban habitation. Especially in sensitive areas in the Alps, the resulting pressure on nature and wildlife is increasing.

To avoid serious damage to nature and wildlife, new planning instruments are needed. Agent-based models (ABM) are regarded as one such planning tool, to simulate the behavior of artificial recreationists or wildlife on a platform of infrastructures such as topography, land cover, trail network, etc. Such recreationists and wildlife are programmed as self-acting agents who behave according to certain rules. Thus ABMs serve as tools to study spatial behavior of recreationists and to estimate changes in recreation-wildlife-systems in anticipated future scenarios. The challenge of “how to detect parameters for human agents” remains. This article is based on a case study of mountain bikers.



www.mafreina.ch (Printscreen): Choice experiment for a mountain biking tour – respondents had to choose “Tour A”, “Tour B” or “None of those tours”. The presented attributes described the tour as profile, roundtrip or not, its estimated duration, start/end in a village, view, encounters per hour (hiking groups and mountain biking groups) and chance to watch wildlife.

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Framework mafreina

In the summer framework of the mafreina project – management-toolkit recreation and wildlife – the focus is on hiking and mountain biking in mountainous regions in the Swiss Alps. Skov-Petersen (2005) suggests developing rules for human agents based on a combination of revealed preference data (e.g. GPS-tracking) and stated preference data (e.g. choice experiments). Choice experiments (CE) are based on a theory of human behavior (i.e. random utility theory). In a CE at least two situations are provided to respondents who must choose the preferred one (see Figure). Hunt et al. (2007) applied an ABM based on a choice model of revealed preference data. With the integration of animal agents in the mafreina framework, shortcomings of Hunts model could be improved.

Developing rules for mountain biker agents

In general, mountain biking agents need two

different sets of rules, first about the selection of geographic entry points into the system and suitable routes, and second about the agents behavior on their trips.

During a GPS-tracking campaign among 159 mountain bikers 247 different trips were recorded. The analysis with a geographical information system (GIS) of the tracking data delivered diverse information about trips: distance, duration, altitude, start and end positions, etc. That information constituted the main source of information for defining the range of attribute levels for the CE of tours (see Figure) as well as the “Trail choice at a junction”.

The first choice experiment was designed to present tour choices to the respondents. Because the duration of the actually tracked mountain bike trips showed a bimodal distribution (peak 1 at 1 to 2 hours and peak 2 at 4 to 5 hours), the decision was made to develop two different tour choice experiments for short and long trips. From the mountain biking literature and interviews with experts, a total of 14 attributes for mountain bikers were integrated in the choice

experiment which presented a challenge for succinct presentation; therefore nine variables were visualized in a route profile. With the additional five attributes (excluding “estimated time”, which was calculated as a function of distance and altitude) the response task was feasible and quite enjoyable. The second choice experiment dealt with the situation at a trail junction, once biking along the route. Here, for each hypothetical situation the respondent had to choose between two hypothetical trail sections, which were characterized with eight attributes, such as trail surface, slope, forest cover or crowding.

Together with the answers to the other survey questions, e.g. about their habits, trip planning, and environmental interests, the results of the two choice experiments allowed the definition of the different agent types of mountain bikers. Each CE was based on an orthogonal fractional factorial designs with 64 choice sets. In the visualisation process of the tour choice experiment, few corrections were needed. Consequently, the statistical design of the two tour choice experiments had to be adapted slightly and the analy-

Employee mobility

sis of short and long tour choice had to be done separately.

After data cleaning 126 short tour bikers and 191 long tour bikers remained for analysis. For the simple analysis we assumed that beside trip distance, time and altitude, the overall interests of the short and long tour bikers are quite similar. The crowding issue seems to be a major concern, especially the encounters with hiking groups. More tolerance is shown to other bikers. Another attribute of great importance is a good view, and the bikers like to be in higher altitude. But cable cars are refused by most bikers.

So far in general no differences between short and long tour bikers could be detected in their stated behavior at a junction. Significant trail attributes for bikers (Latent Gold, Wald-Test, $\alpha^{\circ}=0.05$) were:

- Trail type (highest ratings: single trails)
- steepness (highest ratings: moderate)
- Numbers of hiking groups
- Rest infrastructure (highest ratings: hut selling alp products)
- Trail signalization (as good as possible)
- Closed trails

No significance occurred for time difference (little bit longer or shorter), proportion of forest and number of other mountain bike groups.

Conclusion

So far the first experiences and findings with the process of GPS-tracking and GIS-analysis as a basis for the CE are positive. It has guided the design of the CE in the right direction, and will provide a suitable rule set for the ABM. Further analysis will lead to the identification of additional subgroups and agents which will be the next steps in the project mafreina.

Acknowledgements

We would like to thank the international research partners Ulrike Pröbstl, BOKU Vienna, Hans Skov-Petersen, Univ. of Copenhagen, Wolfgang Haider, Simon Fraser University Vancouver, and all the Swiss project partners for their collaboration and financial support: Canton Grison, Biosfera Val Müstair, Swiss National Park, Rapp Trans AG, Impuls AG and Art of Technology. The project is mainly funded through the Swiss commission for technology and innovation CTI. ●

Industrial hemp as an environmentally friendly supplement and alternative to cotton



Textiles made from hemp are currently only niche products. A rediscovery could provide the textile market with new impetus and make the textile industry more sustainable. Therefore the project collaborates with different institutions and machine manufactures as well with other universities all over the world to guarantee broad support and exchange of knowledge.

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Once queen of the crops

Hemp (*Cannabis sativa*) is today more associated with the use of the flower buds as an intoxicant or for medical use, rather than with the harvesting of natural stalk fibres for the production of textiles.

Hemp is one of the oldest cultivated plants, with great historical significance, and once played a key role in industrial processing in Europe (Bócsa et al., 2000). Hingst and Mackwitz (1996) speak of hemp as having a significance comparable to petrochemicals, before fossil fuels were mined on a commercial scale in Europe, thus enabling the introduction of bulk commodities such as cotton, jute, sisal and ramie from overseas.

Hemp fibre ropes were already being produced in 2800 BC. Later, these natural fibres were also

used in paper production. Thanks to the weather resistance and tensile strength of the fibres, ropes, sails and uniforms were all made of hemp in the heyday of sailing, leading to hemp being grown on a large scale.

Until the 18th century, hemp fibres, together with flax, nettle and wool, supplied the raw materials for the European textile industry. The breakthrough of mechanised cotton mills in the same century and the development of new markets in Asia, with cheaper labour, led to the decline of European hemp textiles. The once traditional natural fibres were replaced more and more by cotton and synthetic fibres. The restrictive drug policies in countries like U.S., Canada and Australia also resulted in a general ban on the cultivation of hemp. However, during the two world wars, as a result of being shielded from the outside world, it was again used to a greater extent in Europe.

Hemp, the sustainable alternative

Today, in comparison to cotton, the production of hemp fibres is not economically viable. However, as a result of the ever-growing demand for textile fibres, which is expected to double by 2050, alternatives are essential. Cotton production is limited to the so-called cotton belt and cannot be expanded much further. In addition, cotton production is increasingly threatening food agriculture in these areas. Compared to other agricultural products, the cultivation of cotton requires the use of a very large amount of chemicals and also has an extremely high water demand. This can



Hemp crop in 2012 Tänikon (TG), the source material for further tests. (All pictures by Roman Meyer)

Employee mobility



Left to right: Decorticated dried bast, bast for spinning, spun yarn.

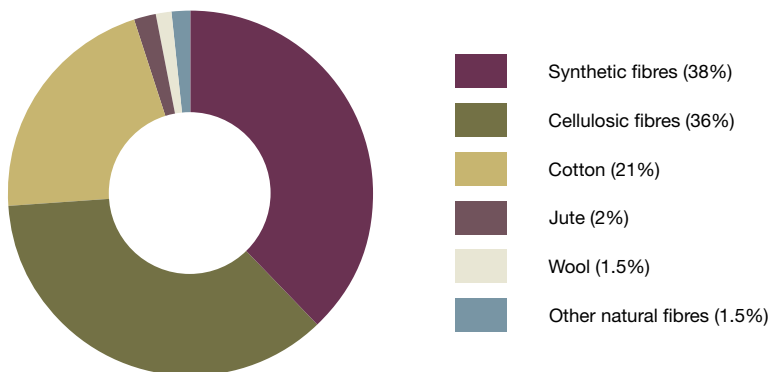
cause significant environmental damage and even lead to social unrest. The disappearance of the Aral Sea, for example, is directly related to the cultivation of cotton in the area. The cultivation of hemp is considered to require significantly fewer resources and does not require pesticides or herbicides. Thanks to its geographic spread, hemp could complement the production of cotton very well.

At the Centre for Ecological Engineering, research is being done under the direction of Marianne Leupin on the future use of hemp fibres. The aim is to achieve new quality standards and make processing more economical. To this end, the ZHAW is investigating new approaches for the entire process from cultivation to the production of raw fibres for further processing in a

textile mill. For example, the necessary extraction of the bast fibres from the bast will be optimised.

Conclusion

The aim of this research is to establish hemp fibre as a competitive product for the textile industry. In addition to optimising the manufacturing costs, consumer behaviour is also likely to play an important role. Despite the obvious tendency towards cheap clothing and short-term fashion trends, an increasing return to high-quality and environmentally friendly products can be observed. The behaviour of each individual consumer can thus contribute to the more sustainable production of textiles. ●



Proportional share of world textile fibre production in 2011. (Estimated based on Wikipedia and www.ivc-ev.de)

Staff Mobility – Teaching in the Framework of the Erasmus Programme



In addition to facilitating student exchanges, the European Erasmus programme provides additional opportunities for employee mobility.

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Since I began working as a lecturer at the IUNR in 2005, each year I have delivered guest presentations at Erasmus partner institutions. Examples of such universities are the University of Natural Resources and Life Sciences Vienna (“BOKU”), the University of Giessen and the University of Krakow. Last year, at the Justus Liebig University Giessen, I delivered a one-day introduction on material and substance flow analysis for Bachelor and Master’s students, including subsequent practical exercises. A further example, also from last year, is the Jagiellonian University in Krakow, where, over two days, topics such as raw material availability and demand were discussed for chosen examples as part of a methodological introduction. This event was also attended by doctoral students. Interest is thankfully still strong.

Conversely, a professor colleague from BOKU supported me on my Resource Management module during the last academic year. He lectured on the topic of “Information Management as an example of Resource Management – empirical social research methods – relating to renewable resources”. Students learnt how to develop a questionnaire and perform the related survey independently. A further professor colleague from the Justus Liebig University Giessen lectured in the same module on the topic of “Resource Management – ways out of the resource trap”. Since he is also the founder of a number of businesses active in this technical field, the lecture was strongly linked to practice. The advantages of such faculty mobility are obvious: students as well as faculty gain insights into new or related technical content, teaching concepts and approaches from international experts. At the same time, contacts can be established, which in my case resulted in new opportunities for students to attend semesters and internships abroad, as well as extending the

choice of topics available for semester papers and Master’s theses. An additional advantage of such a mobility concept is that the guest speaker also acts as representative for his university. Furthermore, this international cooperation and the resulting interdisciplinary dialogue provides an interesting insight into the workings, methods and concepts of other institutions and organisations, including university, institute, professor, and especially student activities.

As previously mentioned, an existing active Erasmus cooperation agreement between two universities is a condition for the implementation of such activities. Establishing such contracts plays a central role. My experience shows that the realisation and thus the success of such contracts is crucially dependent on the guest speaker involved having already visited the institution in question. Contracts are, in my opinion, generally not concluded over the phone or in person, contradicting the underlying principles of communication that underpin the Erasmus concept. It is advantageous if someone already has contact with the university in question and can be invited there to meet in person. An ideal basis for this are international scientific conferences, where, in addition to scientific discourse and the possibility to present the institute and its work to an international audience, it is also possible to establish a dialogue with representatives of other universities. Participating in such conferences and in particular delivering lectures is always a very interesting and exciting challenge for me. It provides the audience and potential Erasmus partner universities with an overview of my activities and those of our university. As a next step, provided the potential partner university is in agreement, a PV (“Preparatory Visit”) to the university can be organised.

It can be said that these forms of Erasmus activities provide all stakeholders, i.e. the universities, the faculty and especially the students with advantages at various levels. In conjunction with an international scientific conference this success factor can be multiplied even further. ●

Teach and research at a partner university

Staff at the IUNR can work at a partner university for a defined period. Foreign lecturers and visiting professors are also invited to teach and conduct research in Waedenswil.

An exchange within the Erasmus programme is available at all colleges and universities with which the IUNR has signed a “bilateral agreement”. See next page for a list of partner universities.

Appendix

40 Erasmus partner universities in 17 countries

University	Country	Town	Webpage
Graz University of Technology	Austria	Graz	http://portal.tugraz.at/portal/page/portal/TU_Graz
University of Natural Resources and Life Sciences Vienna	Austria	Vienna	www.boku.ac.at
University College for Agrarian and Environmental Pedagogy Vienna	Austria	Vienna	www.agrarhochschule.at/cm2/index.php
Management Centre Innsbruck (MCI)	Austria	Innsbruck	www.mci.edu
College of Horticulture and secondary school of Horticulture	Czech Republic	Melnik	www.zas-me.cz
Mendel University of Agriculture and Forestry	Czech Republic	Brno	www.mendelu.cz/en
Czech University of Life Sciences Prague	Czech Republic	Prague	www.czu.cz/en/?r=4875
University of Aarhus	Dänemark	Aarhus	www.au.dk
Agrocampus Ouest	France	Rennes/ Angers	www.agrocampus-ouest.fr/infoglueDeliverLive
Ecole des Ingénieurs de la Ville de Paris	France	Paris	www.eivp-paris.fr
Beuth University of Applied Sciences Berlin	Germany	Berlin	www.beuth-hochschule.de
Humboldt University of Berlin	Germany	Berlin	www.agrar.hu-berlin.de
Bremerhaven University of Applied Sciences	Germany	Bremerhaven	www.hs-bremerhaven.de
University of Applied Sciences Erfurt	Germany	Erfurt	www.fh-erfurt.de/fhe
Weihenstephan-Triesdorf University of Applied Sciences	Germany	Freising	www.hswt.de
Justus Liebig University Giessen	Germany	Giessen	www.uni-giessen.de
Hamburg University of Technology	Germany	Hamburg	www.tu-harburg.de
University of Kassel	Germany	Kassel	www.uni-kassel.de
University of Applied Forest Sciences Rottenburg	Germany	Rottenburg	www.hs-rottenburg.net/1.html
University of Applied Sciences	Germany	Osnabrück	www.fh-osnabrueck.de
Technical University of Crete	Greece	Kreta	http://en.tuc.gr
University of the Aegean	Greece	Mytilene (Lesvos)	www3.aegean.gr/aegean/en/intro_en.htm
Van Hall Larenstein University	Holland	Different campuses	www.vanhall-larenstein.de
Saxion University of Applied Sciences	Holland	Deventer/Enschede	http://de.saxion.edu
Széchenyi István University	Hungary	Győr	http://uni.sze.hu/de_DE/startseite
University of Akureyri	Island	Akureyri	http://english.unak.is
Università degli studi di udine	Italy	Udine	www.uniud.it
Norwegian University of Life Sciences	Norway	Aas	www.umb.no
NTNU, Norwegian University of Science and Technology	Norway	Trondheim	www.ntnu.no
Hedmark University College	Norway	Elverum	www.hihm.no
Jagiellonian University in Krakow	Poland	Krakow	www.eko.uj.edu.pl/index.php?&lang=en
University of the Highlands and Islands Lews Castle College	Scotland	Stornoway Isle of Lewis	www.lews.uhi.ac.uk
University of Ljubljana	Slovenia	Ljubljana	www.uni-lj.si/en/mobility_programmes/incoming_students.aspx
University of Barcelona	Spain	Barcelona	www.ub.edu/biologia
Universidad Autónoma de Madrid	Spain	Madrid	www.uam.es/ss/Satellite/es/home
University of Huelva	Spain	Huelva	www.uhu.es/english/index.htm
The University of La Laguna Canary Islands	Spain	Tenerifa	www.ull.es
Mid Sweden University	Sweden	Sundsvall	www.miun.se/Mittuniversitetet-In-English/Home/
Çukurova University	Turkey	Adana	www.cu.edu.tr/Content/Asp/English
Canakkale Onsekiz Mart University	Turkey	Canakkale	www.comu.edu.tr/english

The use of such abbreviations

BSc	Bachelor of Science
EMI	English-medium of Instruction
GoF	Geography of Food
IUNR	Institute of Natural Resource Sciences
IZA	Internships in the field of International Development and Cooperation
MSc	Master of Science
UI	Bachelor of Science in Natural Resource Sciences
ZHAW	Zurich University of Applied Sciences

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