



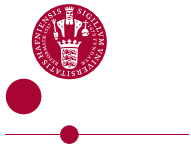
Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Program and Abstract Book

An isometric, colorful illustration of a futuristic city. The buildings are multi-story with various colors (blue, orange, green) and features like rooftop gardens, solar panels, and green walls. There are cars, buses, and people visible on the streets. The overall style is clean and modern.

FUTURE CITIES FUTURE LIFE

Scientific Student Conference 2012



FACULTY OF SCIENCE
UNIVERSITY OF COPENHAGEN



Acknowledgements

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The Scientific Committee at SLU

The IRO (International Relations Officer) group

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Scientific Student Conference 2012
Euroleague for Life Sciences
Future Cities – Future Life (Sciences)
9 – 10 November 2012
Alnarp
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Editors: Emma Capandegui, Malin Larsson
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Euroleague for Life Sciences (ELLS) Welcomes You to its Fourth Scientific Student Conference



Welcome to the Fourth Scientific Student Conference (SSC). On behalf of the ELLS network I would like to say that we are very happy to see that there is a growing interest in the SSC among the students from the ELLS member universities. It was with great pleasure that we at the Faculty of Science (SCIENCE), University of Copenhagen hosted the SSC two years ago and I would like to thank The Swedish University of Agricultural Sciences (SLU) for hosting this year's conference.

The SSC is one of many ELLS activities, but it is one which the ELLS network is particularly proud of because it has provided the network with a forum where we can work more closely with the ELSA students – as well as a forum in which the students from ELLS member universities can participate actively and experience a closer connection to the network.

As Chairman of the ELLS network I would like to seize this opportunity to thank ELSA for their hard work and the commitment they have shown the network and the SSC over the years. ELSA is a great and valued asset to the network.

We look forward to sharing the Fourth SSC with you all.

Enjoy the conference and thank you all for coming.



John Renner Hansen
Best wishes,
John Renner Hansen

ELLS CHAIR
DEAN OF THE FACULTY OF SCIENCE (SCIENCE),
UNIVERSITY OF COPENHAGEN

Future Cities – Future Lives; from the students' perspectives



This year we are very happy to host the fourth ELLS Student Scientific Conference at the southern campus of SLU, the Swedish University of Agricultural Sciences. The conference is a great opportunity for students from all ELLS universities to experience an important aspect of research, i.e. to present and communicate their scientific work, to discuss and learn from others and to build professional and social networks.

The theme of this year's conference is "Future Cities – Future Lives" which fits very well to the education and research of the Faculty of Landscape Planning, Horticulture and Agricultural Sciences that is located in Alnarp, within the vibrant urban region between Lund and Malmö. We hope that you will enjoy the conference and that you will have some time to look around at the campus and its park with thousands of trees, bushes and flowers, together with landscape and horticultural laboratories, the rehabilitation garden and a range of beautiful buildings. SLU Alnarp celebrates its 150 years anniversary this year, but it has a strong focus on the challenges of our future!

Warmly welcome to SLU Alnarp, and we hope you will find the conference and your visit here both inspiring and stimulating.



A handwritten signature in blue ink, which appears to read "Lisa Sennerby Forsse".

Lisa Sennerby Forsse

VICE CHANCELLOR
SWEDISH UNIVERSITY OF
AGRICULTURAL SCIENCES

Keynote speaker Prof. Lisa Diedrich, *Water in Future Landscapes*

Lisa studied architecture and urbanism in Paris, Marseille and Stuttgart, science journalism in Berlin, and became a specialist for contemporary European landscape architecture. From 1993 to 2000 she was an editor of *Topos European Landscape Magazine*. From 2000 to 2006 she worked as a consultant to Munich's chief architect at the city's public construction department. Since 2007 she has been dedicating her career to academia, right now starting her job as a professor for landscape architecture at the Swedish University of Agricultural Sciences in Alnarp/ Malmö. Since 2006, she has also been running her own consultancy, working inter alia as the editor-in-chief of the book series *Landscape Architecture Europe (Fieldwork 2006/ On Site 2009/ In Touch 2012)* and of *'scape the international magazine for landscape architecture and urbanism*.



Since 2007 she has been dedicating her career to academia, right now starting her job as a professor for landscape architecture at the Swedish University of Agricultural Sciences in Alnarp/ Malmö. Since 2006, she has also been running her own consultancy, working inter alia as the editor-in-chief of the book series *Landscape Architecture Europe (Fieldwork 2006/ On Site 2009/ In Touch 2012)* and of *'scape the international magazine for landscape architecture and urbanism*.

Fieldwork

Landscape architecture is a design discipline, on the crossroads of natural sciences and the arts. It looks back to a long tradition of professional practice and an outstanding built oeuvre, from the Persian paradise garden to André Le Nôtre's Versailles to C. Th. Sorensen's finger plan for Copenhagen to nowadays' eco-districts like Augustenborg and public spaces like West Harbour's Sundspromenaden – let us call it fieldwork altogether and be aware that Europe continues to be an extremely fertile field for cultivating works of design on the one hand and the respective scientific research to generate knowledge from it on the other. This lecture starts from the observation that in Europe there is a forward-looking generation of landscape architects who design the city in a fieldwork mode, with respect and curiosity for particular sites and in an attempt to cultivate these sites over time. They work in and with the field, be it by valuating what is there instead of designing everything from scratch, be it by designing and negotiating on site instead of on paper and in conference rooms, be it by understanding the city as an urban field in the largest possible sense instead of perpetuating the questionable dichotomy between the rural and the urban – contemporary projects illustrate how. Beyond fieldwork as a design practice this lecture also posits fieldwork as a methodological framework for qualitative research. Overlooked old and emerging new thinkers will be addressed in this lecture to sketch out how landscape architectural theory and methodology can help overcome epistemological problems in order to generate action-oriented knowledge that will be much needed to shape the future of our cities and their urban life world under the precarious conditions of 21st century Europe.

Keynote speaker Prof. Tina Hofbauer, *Man and Dog - a relationship with many questions*

Studied veterinary medicine at the University of Veterinary Medicine in Vienna and did one year postgraduate training for Behaviour-Therapy for small animals and horses at the Academy for Continuing Education for Veterinary Medicine in Gießen, Germany. She worked in private veterinarian practice and at the Clinic for small animals at the University of Veterinary Medicine, Vienna and held a research position in microbiology at Novartis Research Institute, Vienna before she had a practice for Behaviour-Therapy for small animals and horses and was owner of a dog-school in Wiener Neustadt, Austria

Since 2008 she works as Veterinarian in the Veterinary Clinic Kaufungen, Germany

Her special interest are animal behavior, interspecies communication, dermatology and internal medicine.

Title of the lecture: **Man and Dog - a relationship with many questions**

Content of the lecture: A short overview about the life of dogs among human beings. Information about Domestication, communication between individuals and common misunderstandings between the two species.

Keynote speaker Prof. Erik Hunter, *Generating cleaner consumer demand in food retailing: A look at the challenges and opportunities facing European food retailers*

In 2010 Dr. Erik Hunter joined the Swedish University of Agricultural Sciences (SLU) as an Assistant Professor in the Department of Work Science, Business Economics and Environmental Psychology. At SLU, Dr. Hunter's main research is tied to the project "Climate Labeled Supermarkets" where the team he is part of is looking into efforts by supermarkets around Europe to communicate the benefits of climate friendly foods to consumers and the extent to which, and explanation for, how it influences consumer behavior. Erik was awarded his PhD in 2009 (from Queensland University of Technology and Jönköping International Business School) in the field of marketing communications and consumer behavior. His research has appeared in several international peer reviewed journals including the International Small Business Journal, International Entrepreneurship and Management Journal, and European Journal of Horticultural Science. His research has been presented at renowned conferences such as the Babson College Entrepreneurship Research Conference and the European Marketing Academy Conference. Before joining academia, Erik worked for the manufacturing division of Bertelsmann Music Group as a Vice President of Marketing and Business Development (2000-2003) where he was responsible for the world-wide launch of the (no longer in production) flexible CD.

One of the main contributors to climate change is the food system (Neff et al. 2008). According to a report by the European Commission *Environmental Impact of Products* (2006) food and drink (from farm to fork) cause 20-30 per cent of the many environmental impacts of private consumption, and to more than half of the eutrophication. Cleaner production methods and other downstream technical solutions have been suggested in the past to reduce this problem, however as Garnett (2011) explains they alone are not sufficient. Shifts in consumption patterns are also necessary; in particular those that move away from GHG offending diets (Weber and Matthews 2008).

Food retail represents one important level where there is enormous potential to reduce anthropogenic GHG emission. As gatekeepers, they can influence food consumption habits through e.g. the products they stock, where they are placed, how they are communicated, and at which price. While there is agreement concerning the potential retailers have in influencing sustainable consumption patterns, the science surrounding how to do this is still evolving (Carlsson-Kanyama & González, 2009; Hertwich, 2005) as is the willingness by retailers to become active partners (Tjärnemo & Södahl, 2012) and governments' inability to provide clear and consistent information on the matter (Spaargaren & Mol, 2008). Erik's speech will relay some of the findings from his current project and in so doing highlight the efforts made by food retailers in Europe to clean up their supply chain through communication innovations intended to stimulate demand for cleaner products. Furthermore, explanations for why innovation on the retail side is lacking will be addressed, such as a belief that it is neither value adding nor risk appropriate. Finally, some thoughts will be shared on the opportunities available to retailers (and producers) that attempt to communicate the value added of "greener" food choices.

Practical information

Conference venue

Lectures are located to rooms in two buildings, Alnarpsgården and Agricum. Please see the detailed programme for location of your sessions.

The registration, poster exhibition, coffee breaks and lunches will take place in the foyer "Fojén" at Alnarpsgården, and at the Loft "Lofet" on the second floor in the same building. Coffee and lunch is included in the conference registration, but requires that you wear your name badge clearly visible.

Conference dinner and student party

The conference dinner is served at the Alnarp Restaurant, a short walk from the conference buildings on the SLU Campus. The dinner starts at 18:30. There will be buses back to Malmö and Ibis hotel departing after the dinner at 21:00 and after the student party at 23:00. All registered participants will receive a dinner ticket and/or a student party ticket in your registration pack. You need your ticket for entrance to the events. For the student party on Friday you will need to bring your ID/passport to verify that you are over 18 years old, which is the legal age for consumption of alcohol in Sweden.

No smoking inside the building

Smoking is prohibited in any building on the campus area. Smoking is allowed outdoors.

Safety

The buildings on the campus area are unlocked during daytime. Employees, students and visitors move freely. Please don't leave any valuables unattended.

Internet

Alnarpsgården has wi-fi, but you need log in. Please contact the conference secretariat for guest log-in. There are no public computers for visitors.

Conference buses

The ELLS conference secretariat has chartered buses according to a decided schedule. If you need to arrive or depart from the campus at other hours, please arrange your transport on your own.

Bus schedule

Friday November 9

09.00 Guided tour of Malmö, starts at Ibis Hotel Malmö and ends at Campus Alnarp at 12.00 (noon).

21.00 Campus Alnarp via Central city Malmö to Ibis Hotel Malmö

23.00 Campus Alnarp via Central city Malmö to Ibis Hotel Malmö

Saturday November 10

08.30 Ibis Hotel Malmö via Central city Malmö to Campus Alnarp

16.30 Campus Alnarp to Central city Malmö

Phone numbers to taxi

Taxi Skåne 040-330 330

Taxi Kurir 040-70 000

Taxi 020 Malmö/Lund 020-20 20 40

Address at Campus Alnarp:

Alnarpsgården, Sundsvägen 5

Regional bus (own transport outside conference bus hours)

Bus 133 from Malmö Central station to Campus Alnarp, bus stop Kungsgårdsvägen. The bus frequents the route about twice every hour from 06:00 to 22:00. You can either buy a ticket from a vending machine at Malmö central station or by credit card (with pin code) on the bus. Cash payment is not possible.

Programme Venue: Campus Alnarp

Sub-Themes:	Supply chains	Urban environment	Human – Animal interrelations
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FRIDAY 9 November 2012

08:45 – 12:00	Guided tour - Bus departs from hotel Ibis Malmö at 09:00, finishes at campus Alnarp.
12:00 – 13:30	LUNCH and Registration <i>Venue: Alnarpsgården/Loftet</i>
13:30 – 14:30	Opening of the ELLS SSC 2012 by the deputy Vice-Chancellor of the Swedish University of Agricultural Sciences, Lena Andersson-Eklund Keynote speaker: Prof. Lisa Diedrich, Water in Future Landscapes <i>Venue: Alnarpsgården/Aulan</i>
15:10 – 16:10	PARALLEL SESSION I
	1.1 Supply chains <i>Venue: Alnarpsgården/Sal 107</i>
	1.2 Urban environment <i>Venue: Agricum/Terra Nova</i>
	1.3 Human – Animal interrelations <i>Venue: Agricum/Myllan</i>
16:10 – 16:40	Coffee break <i>Venue: Alnarpsgården/Loftet</i>
16:40 – 17:40	PARALLEL SESSION II
	2.1 Supply chains <i>Venue: Alnarpsgården/Sal 107</i>
	2.2 Urban environment <i>Venue: Agricum/Terra Nova</i>
	2.3 Human – Animal interrelations <i>Venue: Agricum/Myllan</i>

Social Programme

18:30 – 21:00	ELLS SSC 2012 DINNER <i>Venue: Restaurant Alnarp</i>
21:00 – 23:00	Student Party <i>Venue: Alnarpsgården/Loftet</i>
21:00 and 23:00	Bus transportation - to hotel Ibis Malmö via Malmö city centre

SATURDAY 10 November 2012

08:30	Bus transportation from hotel Ibis Malmö to Conference venue	
09:00 – 09:45	Morning plenary KEYNOTE SPEAKERS Prof. Tina Hofbauer, Man and Dog - a relationship with many questions Prof. Erik Hunter, Generating cleaner consumer demand in food retailing: A look at the challenges and opportunities facing European food retailers <i>Venue: Alnarpsgården/Aulan</i>	
09:55 – 10:55	PARALLEL SESSION III	
	3.1 Supply chains	<i>Venue: Alnarpsgården/Sal 107</i>
	3.2 Urban environment	<i>Venue: Alnarpsgården/Aulan</i>
	3.3 Human – Animal interrelations	<i>Venue: Agricum/Terra Nova</i>
11:00 – 12:00	Poster Session 1 incl. Coffee break	<i>Venue: Alnarpsgården/Loftet and Foajén</i>
12:00 – 13:00	PARALLEL SESSION IV	
	4.1 Supply chains	<i>Venue: Alnarpsgården/Sal 107</i>
	4.2 Urban environment	<i>Venue: Alnarpsgården/Aulan</i>
	4.3 Human – Animal interrelations	<i>Venue: Agricum/Terra Nova</i>
13:00 – 14:00	Poster session 2 and LUNCH	<i>Venue: Alnarpsgården/Loftet and Foajén</i>
14:00 – 15:00	PARALLEL SESSION V	
	5.1 Supply chains	<i>Venue: Alnarpsgården/Sal 107</i>
	5.2 Urban environment	<i>Venue: Alnarpsgården/Aulan</i>
	5.3 Human – Animal interrelations	<i>Venue: Agricum/Terra Nova</i>
15:00 – 15:20	Coffee break	<i>Venue: Alnarpsgården/Loftet</i>
15:20 – 16:10	Closing of ELLS SSC 2012 - Acknowledgement of ELLS Joint Master Programme graduates Coordinator: Christian Bugge Henriksen, SCIENCE - Presentation; ELLS Video competition winners - Award Ceremony - Official closure by ELLS secretariat <i>Venue: Alnarpsgården/Aulan</i>	
16:30	Bus transportation to Malmö	

Parallel sessions

Sub-Themes:		Supply chains	Urban environment	Human – Animal interrelations
Date and Time	Session name	1st speaker	2nd speaker	3rd speaker
I Friday 15:10-16:10	1.1 Supply chains: Plant production - microbes	Paulina Cebula	Jacques Engel	Aurelia Gebala
	1.2 Urban environment: Climate Change	Maarten Akkerman	Jasmijn Appels	Marianne Zeyringer
	1.3 Supply chains: animal - plant interactions	Agnes Andrae	Jan Kašpar	Anna Voitenko
II Friday 16:40-17:40	2.1 Supply chains: Food safety	Jochen Kleboth	Mary A. A. Ochome	Angelina Reichel
	2.2 Urban environment: Waste and pollution	Alice Amblerová	Manuel Hilscher	Anubhav Mohiley
	2.3 Supply chains: animals	Gyöngyvér Balogh	Daneta Dzięgielewska	Christopher Münke
III Saturday 09:55-10:55	3.1 Supply chains: Natural resources management	Kristine Bogomazova	Gebeyehu M. Fetene	Zuzana Michalová
	3.2 Urban environment: Urban sustainability - planning and design	Christian Car	Maja Godlewska	Eliska Vaková
	3.3 Human animal interactions	Pedro Sousa	Britt Stikvoort	Natalia Strokowska
IV Saturday 11:00-12:00	4.1 Supply chains: Food security	Ana Cristina Eisermann	Gabriel Laeis	Simon L. Bager
	4.2 Urban environment: Governance for sustainable cities	Erik Fálth – Jens Thulin	Dhusenti Manoharan	Marlene Thelandersson et. al.
	4.3 Supply chains: animals	Ewa Gil	Miroslav Joch	Lenka Dedimova
V Saturday 14:00-15:00	5.1 Supply chains: Quality/health aspects	Niklas Holtne	Yasir Iqbal	Zdenek Košná
	5.2 Urban environment: Food production and urban development + human impact on the environment	Jonas Papenberg - Remco vd Togt	Maartje Pronk	Josefina Sková
	5.3 Supply chains: Climate change	Inez Harker-Schuch	Johanna Hemetzberger	Katja Sodtke

ORAL PRESENTATIONS

SUPPLY CHAINS: Plant production – microbes



Euroleague
FOR LIFE SCIENCES

Room 107
FRIDAY 15:10-16:10

SUPPLY CHAINS:

Plant production – microbes

Friday 15:10 – 16:10 Room 107

Makværket - Investigations on the Heavy Metal Contamination in Soil at the area of a former Ceramic and Brick Factory

Paulina Cebula, University of Copenhagen, Copenhagen, Denmark, paulina_cap@wp.pl

Abstract:

Makværket is a cultural and environmental collective occupying the buildings and grounds of the former brick and ceramic factory Teglværk. Studies have shown that emissions due to brick and ceramic production are characterized by high concentrations of heavy metals such as Cd, Ni, Pb, Zn, Ba and Zi. To evaluate the environmental impact due to heavy metal mobilization, as well as the risk to human health due to consumption of crops growing on contaminated soil, samples were taken from 4 plots within and outside the area of Makværket. The plots were selected by their utilization: crop production, recreation area and potential waste water treatment plant. In general, highest contamination on most of the plots is caused by Pb, followed by Zn, Ni and Cu. 3 plots are exceeding the European limit for Pb concentration in soil. The cropping plots are exceeding the lower EU limit for Zn. Both, immobilization and bioavailability of heavy metals are strongly affected by the soil pH. The neutral to alkaline pH at Makværket benefits immobilization of Pb. Problems with mobilization of Ni and Cd might occur if the pH is decreasing to 5-6. The planned waste water treatment plant might cause anaerobic conditions and further release of heavy metals into the soil solution and groundwater. Phytoremediation to remove Pb seems not to be effective enough, though it can be enhanced by adding metal chelates. Implementation of raised beds with clean soil for crop production may be recommended.

Keywords: heavy metals, soil contamination, immobilization, bioavailability, remediation

SUPPLY CHAINS:

Plant production – microbes

Friday 15:10 – 16:10 Room 107

Combined Use of Antagonistic Microorganisms against Fusarium Head Blight on Wheat.

Jacques Engel, Marc Lemmens

University of Natural Resources and Life Sciences Vienna, Austria

jacques.engel@gmx.net

Key words: Fusarium Head Blight, wheat, biological control

Fusarium Head Blight (FHB) is a serious disease of small grain crops such as wheat and barley. FHB is mainly caused by *F. graminearum* (perfect stage *Gibberella zeae*) and *F. culmorum*. Apart from causing severe yield losses, these fungi can also produce mycotoxins such as deoxynivalenol and zearalenone, preventing contaminated crops to be further used as food or feed. Control of FHB can be achieved through cultural practices (tillage, crop rotation), use of fungicides, resistant cultivars or biological control agents (BCAs). In the present work, three wheat genotypes were inoculated with *G. zeae* using the kernel spawn method to infect the ears in a natural way. Three different BCAs, each of which acts through a distinct control mechanism (SAR-inducing, antibiosis, competition for resources) were then sprayed onto the wheat plants at different developmental stages and in different combinations. To find out which BCA combination acted best and to which extent FHB symptoms are reduced, the disease incidence (INC) and disease severity (SEV) were scored. Wheat cultivars exerted the strongest effects on disease development. When applied alone, BCA P183 reduced the SEV AUDPC by 25% ($P < 0.05$) compared to the control, similar to the fungicide Folicur (30% reduction, $P < 0.05$). BCA combinations also decreased FHB symptoms, but to a lesser extent. Analysis of the AUDPC of disease intensity showed similar results. As even Folicur was only moderately successful in FHB control, it is assumed that disease pressure was very high. This would also explain why at the end of the season no effect on INC could be observed, which reached almost 100% for all treatments and cultivars.

SUPPLY CHAINS:

Plant production – microbes

Friday 15:10 – 16:10 Room 107

Do cover crops change the abundance and function of microbial communities?

Aurelia Gebala^{1,2*}, Jochen Brust¹, Roland Gerhards¹ & Ellen Kandeler²

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Over the last decade farmers have used different cover crops to improve soil quality and to enhance soil fertility for following crops. It is also possible that cover crops could have positive effects on abundances of soil microorganisms.

Two questions were addressed: 1) whether cover crops change abundance and function of microbial communities, and 2) whether or not possible beneficial effects of cover crops are plant and/or soil specific. A randomized block field experiment was established on three different sites in autumn 2011. Three different cover crop variations were planted: (1) *Sinapis alba*, which is known to both reduce nematodes and nitrate leaching and to suppress weeds; (2) *Avena strigosa*, which has the positive characteristic of building a very high root system for suppressing weeds; and (3) a cover crop mixture consisting of *Trifolium alexandrinum*, *Vicia sativa*, *Fagopyrum tataricum* and *Guizotia abyssinica*. Due to differences in the root systems, it was hypothesized that the mixture would have both the highest weed suppression effect and the highest stimulation of microbial abundance.

Microbial biomass carbon and enzyme activities using MUF substrates are currently being measured in soil samples which were taken before seeding, and 4, 8, 12 and 32 weeks after seeding from a depth of 15 cm (main root zone). First results from soils of one site (Ihinger Hof, Baden Württemberg, Germany) taken 12 weeks after seeding indicate that *Sinapis alba* stimulated microbial biomass to a higher extent than either *Avena strigosa* or the cover crop mixture. Statistical analyses of all samples will show the relative importance of plant, seasonal and soil effects on abundance and function of soil microorganisms.

URBAN ENVIRONMENT: Climate Change

1.2



Euroleague
FOR LIFE SCIENCES

Room Terra Nova
FRIDAY 15:10-16:10

URBAN ENVIRONMENT:

Climate Change

Friday 15:10 – 16:10 Room Terra Nova

“Climate Change Policy in Front Runner Cities”

Maarten Akkerman, Wageningen University, Wageningen, The Netherlands,
mjakkerman@gmail.com

This thesis compares the climate policies of two cities in two different countries, and aims to determine the influence of the national institutional context on the climate change governance in these cities. The following research question was answered:

- What is the influence of the institutional context on climate change governance and its organization in middle-sized cities in Europe?

Malmö in Sweden and Southampton in England have been investigated for this research because these two cities are operating in different institutional contexts: Swedish municipalities have, as opposed to their English counterparts, many financial possibilities and legal autonomy. The thesis studies how such different institutional contexts influence the resources that municipalities can dedicate to climate governance and the modes of urban climate governance, as distinguished by Bulkeley and Kern (2006), are used. Also the organization within the municipalities and their strategies were examined, to determine the adaptive capacity of the cities.

The thesis concludes that the differences between Southampton and Malmö are more ambivalent than theoretically assumed. Swedish municipalities indeed have more finances, and this is reflected in the field of transport, where Malmö is able to do more than Southampton. They have however not always more legal possibilities and in some cases, e.g. regarding energy efficiency the English municipalities have more authoritative power. Some parts of energy policy, which are arranged at the local level in Sweden, are done nationally in England.

URBAN ENVIRONMENT:

Climate Change

Friday 15:10 – 16:10 Room Terra Nova

The Effectiveness of the “Giant Sea Wall” as a Climate Change Adaptation Tool for Jakarta

By Jasmijn Appels

Coastal flooding poses severe threats to coastal areas, and due to environmental, climatic and socioeconomic changes the vulnerability of inhabitants in coastal areas will increase in the coming decades. Jakarta is situated in such a coastal area, facing the same problems. In recent decades the number and intensity of coastal floods increased in Jakarta, due to sea level rise, a higher level of precipitation and land subsidence. Predictions outline that when Jakarta does not adapt to its current situation, the city will be permanently flooded by 2025.

Currently a research started that will look at the feasibility of the “Giant Sea Wall” (GSW) project, that will protect the inhabitants of Jakarta from coastal flooding. The second goal of the project is to reclaim 28 km² land from the Java Sea, in order to increase economic activity in the region.

In this paper, a cost-benefit analysis is made which analyses the project’s costs and benefits in time. The paper assigns the costs and benefits occurring from 2010 to 2050. In order to cope with the uncertainty of several costs and benefits, sensitivity analysis is done for uncertain factors. This shows how factors such as “change in temperature” and “level of land subsidence” can have severe impacts on the outcomes and thus on the feasibility of the GSW project. Furthermore, due to the fact that costs will be made in the beginning and benefits will appear in a later stage, the GSW will begin with a huge investment phase. Therefore the only way to make the project feasible is by creating public-private partnerships, so that all costs can be covered.

Keywords: coastal flooding, adaptation, Jakarta, Giant Sea Wall, Cost-Benefit Analysis

URBAN ENVIRONMENT:

Climate Change

Friday 15:10 – 16:10 Room Terra Nova

SUSTAINABLE CITIES THROUGH BUILDING INTEGRATED RENEWABLE ENERGY SOURCES- Assessment of the maximum technical and economic potential of photovoltaic energy in the distribution grid

Marianne Zeyringer

Universität für Bodenkultur Wien

The integration of renewable energy sources in cities represents one of the actions proposed by the European Initiative on Smart Cities (European Commission, 2010). Electricity demand varies hourly, daily, seasonally and regionally and is often located far from the resource potential. Sustainable cities can address this by using the local renewable energy potential. One option of renewable energy integration in cities represents rooftop photovoltaic systems (PV). A high integration affects the net demand load; a negative load can cause challenges concerning grid frequency and transformer capacity. The actual impact depends on the local PV resource potential, the installed infrastructure and specific regional composition of consumers. There is a lack in methodologies to determine the maximum integration of PV into the distribution grid and the costs for infrastructure upgrades associated with the integration of a higher share.

I therefore propose a methodology which I apply due to data availability to cities in the Austrian region of Oberösterreich: Firstly, with a minimum spanning tree algorithm I simulate an electric grid. I therefore use GIS data on transformers, the number of households, available rooftop area and employees per sector on a 1km² grid. Secondly, with a bootstrap method I simulate solar irradiation and demand load profiles for every transformer catchment area. Data used are measured household and stochastically simulated load profiles based on standardized load profiles. Finally, for the single grid segments I conduct net flow calculations in order to determine the maximum PV integration in the distribution grid. In future research this methodology can be replicated to other regions. The results obtained will allow the realistic modelling of PV integration and support the transformation to sustainable cities.

SUPPLY CHAINS: Animal - plant interactions

1.3



Euroleague
FOR LIFE SCIENCES

Room Myllan
FRIDAY 15:10-16:10

SUPPLY CHAINS:

Animal - plant interactions

Friday 15:10 – 16:10 Room Myllan

Development of *Lymantria dispar* larvae from different populations depending on their host plant

Agnes Andrae

Universität für Bodenkultur Vienna

The gypsy moth, *Lymantria dispar*, is originally ranging from Asia to Europe. It is known as a polyphagous pest in deciduous forests, which is able to develop on more than 50 host plant species. However, there is evidence that the moth's polyphagy might be restricted due to the existence of various ecotypes which evolved developmental adaptations to specific host plants.

Therefore, we tested three gypsy moth populations from different origins which occur on different host plants: gypsy moth from Austrian, feeding on *Quercus petraea*/*Q. cerris*; from Hungaria, feeding on *Populus euramericana* cv. 'Pannonia'; and from Croatia, feeding on *Quercus ilex*.

The aim of the study was to examine if there are any differences in growth, consumption rate and digestion efficiency among the three gypsy moth populations when reared on the same host plant. Thus, from each population 50 larvae were singly-reared on only *Q. petraea* leaves until pupation.

Also genetic analyses were done.

Statistical analyses revealed significant differences for several developmental parameters supporting the hypothesis that polyphagy of gypsy moth populations is recruited from the existence of several ecotypes in this species. For example distinguished males and females significantly in their total consumption of leaves, in their pupal duration or in their total development time. Also within females parameters like their duration of the pupal stage, their pupal mass, their leaf area consumption or their maximum weight differed significantly. Males of the three populations showed e.g. significant differences concerning their pupal mass, their development time or their maximum weight.

SUPPLY CHAINS:

Animal - plant interactions

Friday 15:10 – 16:10 Room Myllan

Final cut optimization for sustainable forest management in Czech Republic

Jan Kašpar, CULS Prague

A lot of different changes, which have been in progress in the forest management since the creation of the current timber harvesting indicators, force the science society to find new methods for determination of the optimal final cut value in the forests. While determining the final cut value it's necessary to consider long-term view in order of tens of years because we have to guarantee truly continuous and permanent cutting and sustainable forest management. It's essential to plan this management intervention not only in relation to economics of operation. Forest managers have also to fulfil restrictions of legislation. In current Forest Act in Czech Republic the spatial conditions are set for a clear cut system. Those restrictions, especially maximal area and adjacency of clear cut, have to be introduced in calculation.

For this purposes, it's possible to use mathematical methods originally created for economics which belong to so called operations research. Those techniques are not widely applied in forest management of central Europe. Thanks to method of linear programming and different heuristic methods, we can find maximum of a pre-defined function and simultaneously fulfil constraint conditions. For constraints restrictions of clear cut system can be used the method of adjacency matrix, analytic algorithm and GIS.

The purpose of this student scientific work is to suggest the final cut values for 3 periods (each 10 years long) for a particular forest management area with integer linear programming and simulated annealing method. The designed model will be used for clear cut management system. The maximum value of the final cut for each of the period will be defined so, that the conditions of equanimity between periods and spatial conditions for clear cut system are satisfied.

SUPPLY CHAINS:

Animal - plant interactions

Friday 15:10 – 16:10 Room Myllan

Developing a Test System for Potentially Phytotoxic Effects of Veterinary Antibiotics (VAs) on Plants

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Keywords: veterinary antibiotics, plants, Chlortetracycline, testing chemicals

Considering the constantly growing amount of xenobiotics, originating not only from industrial sources, but also from residues of chemicals used in agricultural practices, present study focuses on veterinary antibiotics. These compounds enter into the soil with the slurry from animal husbandry and may be accumulated by plants.

The scope of the study was to apply different methodologies for testing chemicals to assess potentially toxic effects of veterinary antibiotics on plants. Investigations were based on the very common VA Chlortetracycline ($C_{22}H_{23}ClN_2O_8$).

Four different methodologies were applied.

- I. Seed Germination/ Root Elongation Toxicity Test (OPPTS 8 50.4200). In total 27 plant species were tested and results of 17 species tested have met verification criteria. Analyses of results are based on two endpoint measurements: the number of seeds germinated and the length of roots.
- II. *Lemna* sp. Growth Inhibition Test (OECD 221). *Lemna gibba* sp. was tested. Frond number and frond area were the chosen endpoints of this experiment.
- III. Terrestrial Plant Test: Vegetative Vigour Test (OECD 227).
- IV. Terrestrial Plant Test: Seedling Emergence and Seedling Growth Test (OECD 208).

Common corncockle (*Agrostemma githago*) and spring barley (*Hordeum vulgare*) were tested. Endpoints of both experiments were the number of leaves, shoot height and shoot fresh and dry weights.

Statistical analyses of the data collected in the experiment have not been finalized yet but some preliminary results may be reported at the moment. Clear dose-response relationships were found and responses showed species-specific differences. Effective concentrations, benchmark doses, hazardous concentrations of Chlortetracycline and species sensitivity distributions will compose the final outcome of the study.

SUPPLY CHAINS: Food safety

2.1



Euroleague
FOR LIFE SCIENCES

Room 107
FRIDAY 16:40-17:40

SUPPLY CHAINS:

Food safety

Friday 16:40 – 17:40 Room 107

Certification of Food Safety Management Systems – An Attempt to Extract a Harmonized Food Safety System from IFS Food, BRC Global Standard for Food Safety and FSSC 22000

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Keywords: Food, Safety, BRC, IFS, FSSC 22000

With higher consumer awareness of the rising trend in food borne diseases and food borne outbreaks in the last decades, food-producing companies are facing challenging times when it comes to food safety. To satisfy the ever-rising demands of consumers, food safety management systems and certifications are needed on a large scale. Retailers developed specific product standards like IFS Food or BRC Food for their suppliers. Food system standards like FSSC 22000 have become more important to guarantee international trade and comparability. These demands from consumers and retailers, together with a more and more complex legal situation, are an enormous challenge especially for small and medium sized companies (SMEs) in the EU. The result is inflexibility and unwanted dependence for SMEs, since they do not have the resources for multi-certification.

The basic concepts and principles used in all these schemes and systems are very much alike. Good hygiene practice (GHP), and the concept of hazard analysis and control points (HACCP) together with management requirements - just to name a few - have to be considered in all these schemes.

The master thesis investigated the basic equality of the food safety standards FSSC 22000, IFS Food and BRC Global Standard for Food Safety, to extract a harmonized food safety system. Furthermore, the specific differences and focus points are pointed out to give deeper insights to the standards.

An empiric study with 13 companies (expert interviews with a content analysis according to Mayring) shows the equality, strengths and weaknesses of the systems from a practical point of view regarding implementation, maintenance and auditing.

SUPPLY CHAINS:

Food safety

Friday 16:40 – 17:40 Room 107

Typing and Identification of Indigenous Lactic Acid Bacteria Isolated from Montenegrin Artisan Cheeses

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Lactic Acid Bacteria (LAB) are an inherent part of the milk microflora which plays important roles in fermented dairy products. They do not only contribute to the lactic acid necessary for the fermentation process, they also contribute to the uniqueness in texture, moisture content, and flavour attributes of the various cheeses, like Mozzarella and Feta. Increase in the consumer demand for artisan dairy products, whose characteristics not only preserve history but also present the uniqueness in sensory values and their culinary contributions have led to a growing interest in identification of the responsible indigenous LAB in milk in the recent time.

The aim of this work was to carry out molecular identification and typing of 295 isolates, preliminarily identified as LAB by the University of Montenegro, Faculty of Biotechnology. All isolates were subjected to RAPD-PCR typing method with M13 and RAPD 13 primers. The typing data were then analysed using Bionumerics software. For specific identification of the isolates, a selection of representative samples from the generated Bionumeric clusters was done. Moreover, the samples were sequenced using 16S rRNA, chaperonin 60 (Cpn60), or rpo gene targeting PCRs. Finally, species specific PCRs were used to confirm the sequencing and typing results.

The results showed that *Enterococcus* genus was dominating with 83.39 %. The researchers also identified 40 *Lactococcus lactics*, 2 *Leuconostoc mesenteroides*, 1 *Streptococcus thermophilus*, and 1 *Lactobacillus paracasei*.

This study makes an important contribution towards future research by using the isolates from the different identified genera, such as *Lactococcus*, *Leuconostoc*, *Streptococcus* and *Lactobacillus* for their potential use as starter cultures in the industrial production of the desired characteristic Montenegrin cheeses.

Keywords:

Lactic Acid Bacteria
Artisan cheese
RAPD PCR

SUPPLY CHAINS:

Food safety

Friday 16:40 – 17:40 Room 107

Detection of *L. monocytogenes* in Different Food Types Using Alternative Detection Principles

Angelina Reichel¹, Petra Neudl, Marija Zunabovic, Ulrike Zitz, Konrad J. Domig, Wolfgang Kneifel

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Keywords: *L. monocytogenes*, alternative methods, food

Listeria monocytogenes is ubiquitous in environment and can be present in food, soil and processing facilities. Infections, namely listeriosis, caused by this microorganism are considered emerging due to the role of food as important vehicle. The food industry needs methodologies to detect *L. monocytogenes* in a short timeframe in order to ensure the delivery of safe products to the market. The reference method according to ISO 11290 obtains presumptive positive results within a week. In order to obtain faster results, two automated alternative detection principles based on an enzyme-linked fluorescent immunoassay (monoclonal antibodies and phage proteins) were tested.

One protocol allows the simultaneous detection of *L. monocytogenes* and other *Listeria* species and the results of the second alternative protocol indicate the presence of *Listeria* species.

Different food samples available in the Austrian market, including fish, cheese, meat and sausage, were analysed and compared to the reference method. Presumptive positive results were confirmed according to ISO 11290-1 and were further phenotypically characterized. In addition, potential influences of other *Listeria* species on the detectability of *L. monocytogenes* were examined with inoculation trials.

Results of the study show that alternative detection methods for *L. monocytogenes* in food products provide faster results in comparable specificity and selectivity to the reference method.

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URBAN ENVIRONMENT: Waste and pollution

2.2



Euroleague
FOR LIFE SCIENCES

Room Terra Nova
FRIDAY 16:40-17:40

URBAN ENVIRONMENT:

Waste and pollution

Friday 16:40 – 17:40 Room Terra Nova

Urban Waste Sorting - Innovation Without Compliance

Alice Amblerová, CULS Prague

The life in a city has its specifics. Since the density of population is high, a suitable management and urban planning is necessary to ensure a pleasant way of life for the citizens. One of aspects which plays an important role is a waste management. However, nowadays not only communal waste collection is to be ensured, waste sorting has become a part of 2/3 of Czech Republic's citizens and the average volume of sorted waste is increasing from year to year.

A common look of the sorting spots usually consists of three containers placed on the street. Recently, some cities in the Czech Republic have adopted a new method and means of waste sorting: the underground containers. These are supposed not only to fulfill its function, but are also expected to be more suitable for the historical parts of Prague enabling waste separation in a more decent and aesthetic way. However simply by walking through the city, one could say that the aesthetics is not always improved.

This research focuses on the compliance of the citizens with this new approach to waste sorting in the capital city, Prague. The issue will be studied by cost-benefit analysis in order to compare the current waste collection method opposed to the new one, the underground containers. As long as the nature of some factors cannot be directly monetarily evaluated, also a nonmarket valuation method will be used to assess the benefits of the investment. The expected results are that not all the factors which are expected to be better are actually improved. The hypothesis is that the aesthetics and also the volume of sorted waste might be the same or sometimes worse than the current situation.

URBAN ENVIRONMENT:

Waste and pollution

Friday 16:40 – 17:40 Room Terra Nova

Urban Agriculture for Sustainable City Development – Analysis on Land Potential, Stakeholders, and Promotion Strategies of Urban Agriculture in Stuttgart, Germany

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Keywords: Urban agriculture, sustainable city development, stakeholder analysis, land inventory, food production,

In 2008 for the first time in history worldwide more than half of human population was living in cities depicting an in future even increasing ongoing process of rapid urbanization. Cities with their linear metabolism draw huge amounts of resources such as food, water, and energy mostly from rural areas which influences the city's ecological footprint.

Literature has shown that urban agriculture can diminish a city's ecological footprint as it provides positive ecological, economical, and social impacts. Also in Germany more and more urban citizens realize the potential of urban agriculture which led to an increase of corresponding projects. However city officials of some cities still lack clear strategies and measures to support the implementation of urban agriculture.

This study examines in the case of the city of Stuttgart how such an implementation process can be promoted. The study focus lies on the identification of prevalent forms of urban agriculture and of stakeholders influential in the promotion of urban agriculture. Furthermore the city's vacant land potential is analyzed to create a land inventory for potential urban agriculture projects. Finally the stakeholders' perspective on the role of urban agriculture for a sustainable city development is assessed and best practice examples from other German cities are reviewed in order to come up with an urban agriculture promotion strategy for the city of Stuttgart.

Results show that especially allotment gardens are the prevalent urban agriculture form. From newer forms of gardening such as community gardens, intercultural or self-harvest gardens only very few exist but their number is growing. City officials seem to have the most influence to promote urban agriculture. Vacant land is scarce in the city center however available and suitable for urban agricultural projects.

With the city's support a working unit consisting out of city officials and civil organizations could help to procure land to interested people, provide knowledge and financial means for the promotion of urban agriculture in the city of Stuttgart.

URBAN ENVIRONMENT:

Waste and pollution

Friday 16:40 – 17:40 Room Terra Nova

Potential phytotoxic effects of aircraft deicers and runoff containing these compounds

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One of the major problems of airport operation is the impact of pollution caused by runoff waters. Runoff waters at an airport may contain relatively high concentrations of different contaminants resulting from various aspects of its operation.

High quantities of deicing/anti-icing fluids are used annually at airports worldwide and most of these airports have no system for capturing and reclaiming the material. Aircraft deicers and anti-icers may have negative environmental impacts, but their effects on aquatic higher plants are virtually unknown. In order to address this issue, four types of aircraft deicing fluids and sediment samples were obtained from a regional airport from batch and continuous reactors. The samples are presently analyzed for phytotoxicity to the aquatic higher plant duckweed (*Lemna gibba*, *Lemna minor*). A seven day static-renewal test for duckweed is presently conducted following the OECD guideline 221. Plants are treated with five different concentrations with three replicates of deicers and sediments containing growth media and a control group with six replicates. Phytotoxicity is assessed using multiple growth and biochemical endpoints (*frond number*, *frond area*, *chlorophyll content*). Effective concentration (EC) 50, EC25, and EC10 values will be determined and statistical tests for significant differences between treatments and controls (lowest-observed-effect concentration (LOECs) and no-observed-effect concentration (NOEC)) will be conducted.

Key words: *Lemna*, *OECD test*, *effective concentration*, *anti-freeze chemicals*.

SUPPLY CHAINS: Animals

2.3



Euroleague
FOR LIFE SCIENCES

Room Myllan
FRIDAY 16:40-17:40

SUPPLY CHAINS:

Animals

Friday 16:40 – 17:40 Room Myllan

Mobility and Space Use of Moose in Relation to Spatial and Temporal Exposure to Wolves

Gyöngyvér Balogh

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ABSTRACT

In a predator-prey system, prey species may adapt to the presence of predators with behavioral changes such as increased vigilance, shifting habitats or changes in their mobility. Across North America, moose (*Alces alces*) have shown to adapt to their re-colonizing predators, the wolves (*Canis lupus*) but such anti-predator behavioral responses have not yet been found in Scandinavian moose. The more than a century long absence of wolves in Scandinavia and the current re-colonization since the 1080s provide unique conditions to further detail our knowledge of their effect on moose. I analyzed travel speed, linearity of movement and seasonal home range size of GPS collared female moose within the same moose population but with spatial (inside- / outside wolf territories) and temporal (before- /after the re-establishment of wolves) differences in the exposure to wolves. Differences in seasonal home range size of female moose in the study area correlated with exposure to wolves, as home ranges tended to be larger in areas of the wolf territory with a higher presence of wolves. Travel speed and linearity of movement was mostly affected by seasonal changes and differences in reproductive status. Travel speed was highest during the *calving* (May – July) and *post-calving* (Aug. – Oct.) seasons, and was generally lower for females with calves than females without calves in all seasons. Related to presence of wolves, a generally suppressed travel speed was observed inside the wolf territory compared to outside of it, but an elevated mobility was seen in certain, more intensively used areas of the territory. The linearity of movement was mostly affected by reproduction, as more concentrated movement was observed at females with calves at heel, during the calving season. Overall, the results supported that mobility of female moose was more strongly influenced by external factors and their reproductive status, than the return of their long absent natural predators, which can be due to a combination of several factors including lower wolf densities, higher moose:wolf ratios and more intensive hunting harvest of the moose population than observed in North America.

Independent Project in Environmental Science (Advanced Level E, 30 ECTS), Master's Thesis

2012:6

Grimsö 2011

SUPPLY CHAINS:

Animals

Friday 16:40 – 17:40 Room Myllan

Opportunities resulting from the breeding of Indian peacocks (*Pavo cristatus*)

Żaneta Dziegelewska

Warsaw University of Life Sciences, Warsaw, Poland

Indian Peacock (*Pavo cristatus*) is a representative family of pheasants in the wild living in the South-East Asia and Sri Lanka. This species was domesticated about 4000 years ago, regarded as a symbol of beauty, wealth and vanity. Also believed that his flesh heals people bitten by a cobra and eaten languages enhance the ability to speak. It was grown for culinary, as well as ornamental feathers. In recent years, these birds are coming back, kept commercially in agritourism centers, zoos, parks, private gardens as a hobby.

Based on 10 years of farming without tethers were observed for development of accurate methods of breeding. Affecting the proper diverse forms of natural behavior. For the proper conduct of mating and reproduction, social behavior of individuals in the group. The current state of knowledge has enabled the development of methods for early gender differentiation and how the economic rearing of many individuals combined with the behavior of welfare. Ensuring proper maintenance sanitary conditions and guarantees high gains of individuals, and consequently, greater profitability. The meat of the peacock can provide variety of the diet. This gives the possibility to develop a new segment of the organic production of meat and eggs. As well as the overall potential of these animals in the creation of works of art, fashion trends and jewelery industry. Currently, peacocks are not only the landscape of all urban zoos, but also a new field of suburban and rural production, so it is important to understand their requirements and behavior.

Keywords: peacock, welfare, breeding

SUPPLY CHAINS:

Animals

Friday 16:40 – 17:40 Room Myllan

The Informal Market Economy of Edible Crickets and Tarantulas in Cambodia. Potential Development of a Traditional Food Source.

Christopher Münke

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Key Words: Cambodia, Entomophagy, Livelihood strategies, Value chain analysis, Alternative food source

Eating insects as part of the diet (Entomophagy) is common among rural and urban people in South East Asia, Africa and South America. Until recently entomophagy has only received infrequent attention by international organizations and research institutions. However over the last years this topic has seen more consideration as a future source for human consumption and animal feed especially in developing countries but also in developed countries.

The authors work presents findings from his field research from Cambodia from January – May 2012. The findings show that the market for crickets & spider contributes to rural and urban livelihoods both for additional income and as a dietary supplement.

A market assessment was conducted in 6 provinces, including the capital Phnom Penh, as well as a review of the current institutional framework regarding policies and responsible stakeholders. Both qualitative and quantitative research methods were applied, including questionnaire surveys, focus group discussions and key stakeholder interviews.

The findings show that crickets have the potential for an expanded domestic market, as well as export possibilities to the neighbouring countries of Cambodia, through domestication and upscaled collection practices. On the contrary, edible tarantulas are facing the challenge of overexploitation due to increased market demand, which puts pressure on the natural population of the tarantulas and consequently, the livelihoods of collectors.

Among the national government and international agencies the awareness of the potentials and constraints of the edible insect sector in Cambodia is yet limited.

The utilization of edible insects is touching a wide range of academic disciplines and institutional sectors. It is yet seen as niche market even though it has been practiced by humans for centuries. In order to be sustainably utilized entomophagy has to find its place across academic disciplines and natural resource governance structures.

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SUPPLY CHAINS: Natural resources management

3.1



Euroleague
FOR LIFE SCIENCES

Room 107
SATURDAY 09:55-10:55

SUPPLY CHAINS:

Natural resources management

Saturday 09:55 – 10:55 Room 107

Ecology of the Lichen *Cladonia botrytes* in Sweden

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Abstract:

Rapid changes in the forest structure due to logging can strongly affect lichen vegetation presenting a clearly different environment: with increased solar radiation and amplified moisture and temperature fluctuations. These conditions can exceed tolerance of many organisms while being beneficial to others. *Cladonia botrytes* is a circumboreal species of coniferous forests confined to rotten and decaying wood with few documented localities on the soil. This study aims to discover ecological factors that make it possible to predict the presence of this lichen. Localities on stumps and soil were compared in 10-12 year old pine clear-cuts along the South-North gradient in Sweden. Data is still undergoing statistical analysis, but field observations indicate definite presence of *C. botrytes* on the soil, differentiating between the humus layer on the ground and boulders. There is a strong indication of increasing appearance of the lichen on the humus layer from South to North gradient. Data also suggests that the lichen benefits from the modern forestry practice and out-competes other species. Change in the description of the ecology of *C. botrytes* is recommended and will be provided.

Keywords: forestry, lichens, ecology

SUPPLY CHAINS:

Natural resources management

Saturday 09:55 – 10:55 Room 107

Transferability of Temporal Benefit Transfer from Open-Ended Contingent Valuation Survey: Empirical Study Based on Seawater Risk of Flood Perception in Jutland, Denmark

By:

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Abstract

Benefit transfer is becoming important method of valuation since conducting primary study is sometimes costly. Benefit transfer (BT) is the transfer of primary study results from a site(s) to another site in where there is limited data. BT has advantage of saving resources used to conduct primary study. However, it usually involves transfer error (TE). Therefore it is important to assess whether BT is welfare improving. The objective of this study was to assess transferability of temporal BT from open-ended contingent valuation survey. In addition, transferability differences were assessed between men and women, and different degrees of risk of flood exposures. Two Open-ended format contingent valuation surveys aimed to assess seawater risk of flood perception in Jutland, Denmark conducted by Dubgaard et al. (2005, 2010) were used to accomplish the study objectives. Respondents were asked their willingness to pay for the proposed project of reducing risk of flood from the current once in 100 years to once in 200 or 500 years. Statistical test results revealed that unadjusted and income adjusted unit values were temporally transferable, but not benefit function, with respective average TE of 15%, 17% and 23%. Statistical test results showed that there is no transferability difference between men and women. Moreover, temporal benefit transferability decreased with degrees of risk of flood exposure. Unfortunately, benefit function transferability depended on the type of tests used. The overall conclusion reached in this study is that unit values from open-ended contingent valuation survey are temporally transferable controlling the site and respondents, at least for the data used in this study.

SUPPLY CHAINS:

Natural resources management

Saturday 09:55 – 10:55 Room 107

Comparison of two management approaches after stand-replacing disturbance from the viewpoint of natural regeneration in a mountain coniferous forest, case study from High Tatra National Park (Slovakia)

Zuzana Michalová, CULS Prague

In November 2004, a large-scale windbreak caused the die-back of large belt of the coniferous forest along the main range of High Tatra Mts. After that, the most of wooden biomass was extracted from the forest and only few stands were left without human intervention. During the seasons 2010 and 2011, in two representatively chosen localities, the number and species of tree-seedlings (up to 2m height) was recorded. Although no significant difference between numbers of seedlings per hectare was proved, when comparing clear-cutting with non-intervention management, but the species composition differed significantly. Plots, where salvage-logging was provided, were inhabited by Norway spruce (61%), European larch (18%), Silver birch (8%), Goat willow (6%) and less by European rowan (3%) and Silver pine (3%). Plots left exclusively for natural regeneration accommodated predominantly seedlings of Norway spruce (90%) and sparsely European rowan (4%) and Silver birch (1%). Hence, clear-cutting promotes rather pioneer-species occurrence, while non-intervention leads to the regeneration of original tree composition and so follows a small-scale disturbance dynamics of forest regeneration. Moreover, number of trees per hectare was 5 000 individuals/ha, in compare to 9 200 individuals/ha present on non-managed plots, what practically is a two-fold amount. This can be interpreted as the direct consequence of management applied, since lower number of seedlings on clear-cutting plots was probably caused by die-ups' during logging operations. Retention of deadwood contributed positively to soil-humidity increment, what influenced significantly the plant composition - towards to the presence of more competitive vegetation on the plots, where wood biomass was extracted. In accordance with previously mentioned results, the best recommendable management for promotion of natural regeneration in mountain coniferous forests is at least partial retention of deadwood biomass and mitigation of the clear-cutting-approach in forestry management.

URBAN ENVIRONMENT:
Urban sustainability – planning and design

3.2



Euroleague
FOR LIFE SCIENCES

Room Aulan
SATURDAY 09:55-10:55

URBAN ENVIRONMENT:

Urban sustainability – planning and design

Saturday 09:55 – 10:55 Room Aulan

Guabuliga – Landscape Architecture as Mediation within cultural conflicts

Christian Car, chrichrichri@gmx.at, ILA-BOKU Wien

Key words: African village, deforestation, subsistence economy, parametric landscape-architecture, participation, Ghana, Mamprusi, Guabuliga, Greenbelt

In traditional villages on the African continent most needs of everyday life are covered with the supply of the local environment. Mobile phones, television and other industrialized products arise the illusion of a better life somewhere else and make people wish to live in the city. Alienation of space, the question of the own identity and dense informal settlements in cities without the hoped better life are results of taking over alien values without reflection and underrating the advantages of their own passed on way of life. This happens especially in a country like Ghana, where import-export-economy rapidly replaces the old way of supporting oneself in small local production circuits. At the same time deforestation causes degrading of the land and living conditions.

This work analysis types of lived open space in the traditional village of Northern Ghana, the change of the importance of these open spaces within a change from subsistent economy towards market economy and landscape architectonic ways to work against desertification and to create sustainable villages.

Method for this work is research of literature and a field research: spatial and structural analysis of open spaces, open interviews and informal talks in the village of Guabuliga, basis for this work is also a growth proposal for this village worked out with a group of 5 other students.¹

Establishing vegetation-based open spaces for the requirements of contemporary life within the traditional village creates attractive villages and not the wish to move to a city. Establishing big trees as status-symbol and introduce them as integral part of their local building tradition is a way to work against desertification.

Result of this work is the start of the realization of a 'Greenbelt' (September 2012) in cooperation with the NGO Brave Aurora. Per house a tree is planted with the families themselves, who have to look after their trees afterwards – these trees provide additional supply and in come through their fruits and medical usage, these trees structure the growth of the village and form a new community-area, they are an attempt to introduce a sense for responsibility for their own village.

¹With Joana Petkova, Josef Hofmarcher, Jürgen Strohmayer, Stefanie Theuretzbacher, Theresa Theuretzbacher - Lab [applied] Foreign Affairs, University of Applied Arts Vienna, Mag. Baerbel Mueller

URBAN ENVIRONMENT:

Urban sustainability – planning and design

Saturday 09:55 – 10:55 Room Aulan

BiodiverCity Improvement

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Biodiversity is a term used to describe biological multiplicity. It is used for three different variety levels: ecosystem diversity, species diversity and genetic diversity. The assumption can be made that city is an ecosystem and that there is a possibility to manipulate with species heterogeneity. With new concerns about mass extinction of species and fast decrease in biodiversity arising, an effort to maintain and even increase variety levels in both the cities and in other areas that are under consideration should be stressed. The popular way of thinking about biological diversity failure is: rescue and preserve (i.e. tropical forests, endangered species) but that is not the only way of conserving it. Urbanization is an action that puts a lot of negative effects on biodiversity, species variety in cities decreases very quickly and we can maintain or increase diversity levels trying to control and improve even just that.

The first step is to measure city's current condition. A lot of information can be obtained from many useful indicators and index's, for instance most often used Herbarium or Margalef's Index, carbon measurement can also be an applicable indicator. Initial results can be compared with post-change condition.

The key to the city biodiversity are the green areas. They can be designed as parks, zoos, squares, green lanes in the middle of motorways and alongside roads or other green terrains. When there are no green spaces or there are not enough of them, green walls and green roofs are a very decorative and useful option. The other important thing is species selection. It should be much differentiated for both species and cultivars assortment. Plants that attract insects and animals are very helpful in building species variety. Interactions between flora and fauna should always be remembered as they are a main key to natural improvement of biodiversity.

URBAN ENVIRONMENT:

Urban sustainability – planning and design

Saturday 09:55 – 10:55 Room Aulan

Civic engagement and spatial planning in the rural community

Eliška Vaňková CULS Prague

The bachelor thesis evaluates the opinions about direct citizen participation in the public space in the case of the development in rural areas. For this reason the plan of public involvement in a community project PROMĚŇ MĚŇANY (note: Change Měňany – in Czech the name of village Měňany means change) as elaborated. As a part of this project the questionnaire survey “5min pro Měňany” (5 minutes for Měňany) was conducted. Also community planning event “Setkání obyvatel obce Měňany – Vesnice k světu” (meeting of the dwellers of municipality of Měňay – Vibrant village) and a collaborative design event “Tvůrčí setkání” (creative meeting) were the part of the activities which are investigated. In case of community planning in the countryside it was found out to be the most important a need for clear, thorough and comprehensible explanation of the planning intentions and citizen role in the community planning. In connection with a process of collaborative public space design the thesis deals with a question of suitable level of public involvement and a quality of final design. As the finally the thesis considers level of details in which citizens supposed to design in the plan. An important role plays a character of specialist (architect) that must have a sufficient authority among participants and an excellent ability of argumentation, together with an independent attitude.

Human animal interactions

3.3



Euroleague
FOR LIFE SCIENCES

Room Terra Nova
SATURDAY 09:55-10:55

Human animal interactions

Saturday 09:55 – 10:55

Room Terra Nova

The Influence of Dogs on Physical Activity in Humans in Urban Environments

Sousa, Pedro

Master in Animal Breeding and Genetics

BOKU - VIENNA

Abstract

Physical inactivity is a major public health problem and may play a substantial role in the etiology of obesity and type II diabetes. Dog ownership has been positively associated with health-related factors among middle-aged and older adults, including physical activity, weight, and mental health.

Dog-owners are likely to be more physically active than non-owners; however, dogs have also been shown to inhibit physical activity for non-owners, under some circumstances.

I am conducting a scoping review to identify studies pertaining to the influence of dogs on physical activity for both dog-owners and non-owners, and adopted a critical realist orientation to draw inferences about the positive and negative impact of dogs via their affect on physical and social environments.

Twenty nine studies from disparate literatures were already identified for review. So far, these studies confirm that dog and owner behaviors affect shared physical and social environments in ways that may influence physical activity patterns, not only among dog-owners but also among non-owners. The direction of influence appears to be most positive in neighborhoods exhibiting high levels of social cohesion, socioeconomic status, perceived safety, dominant culture, or all of these. In disadvantaged neighborhoods, the health of women as well as older adults may be disproportionately affected by dog and owner behavior.

While dogs have the potential to increase physical activity for both dog-owners and non-owners, the presence or absence of dogs will not have a standard effect across the physical and social environments of all neighborhoods. Dogs' contributions to shared environments in ways that support physical activity for all must be leveraged. Thus, specific contextual factors must be considered in relation to dogs when planning neighborhood level interventions designed to support physical activity.

Human animal interactions

Saturday 09:55 – 10:55

Room Terra Nova

Risk Perception and Risk Acceptance concerning wildlife in the Netherlands

Author: Britt Tamar Stikvoort

Supervisors: Dr. M. Poortvliet (supervisor and 1st examiner), Dr. B. Elands (2nd supervisor)

Wageningen University - Department of Communication Science

ABSTRACT

Wolves might enter the Netherlands in the near future and lawfully they cannot be barred. Moreover, they can be seen as threats for Dutch citizens, whom possibly overestimate these risks. On the other hand, wild boars, already prevalent in the Netherlands, induce risks that are underestimated by Dutch citizens. Nature managers will have to communicate with the public about nature policy, and for effective communication they will need to know about the public's risk perception and acceptance. This study aims to provide such insights, focusing on risks concerning wolves and wild boars. The study investigates – with two questionnaires ($N = 1024$ & $N = 214$) – if risk dimensions from previous research can be applied, and what the effects of objective and subjective vicinity, urbanity, and prior experience are on risk perceptions and acceptance. The results showed that many factors influencing risk perception can be combined into two higher-level dimensions. Also, there was a trend towards a connection between objective vicinity and perceptions of wild boar risks. Subjective vicinity was related to acceptance of wild boar risks, but this was mediated by people's prior experience. The value judgment of prior experiences was related to risk perception and acceptance of both wild boars and wolves, more positive experiences were linked to lower risk perceptions and higher acceptance. Finally, the impact that experiences had on people was only weakly connected to risk acceptance concerning wild boars, but not to risk perception or acceptance concerning wolves. The insights of this study could be useful for nature managers' communication activities with citizens concerning wildlife-risks. Most applicable are the values people ascribe to wildlife experiences, and the link this has with risk perception and acceptance.

Human animal interactions

Saturday 09:55 – 10:55

Room Terra Nova

Wild animals in urban areas - the role of veterinarian in combating threats. own practice in India, Kenya and South Africa

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For thousands of years man lived among the animals, not only domesticating them, but also competing about the environment. Nowadays, because of the increasingly rapid expansion of human settlements more often it happens that the wild animals come into to the cities, creating a threat not only for humans but also for themselves.

While veterinary practices followed in India, Kenya and South Africa I often had to deal with wild animals living or coming into the cities. Not only from birds of prey and monkeys in India, but also with lions, rhinoceroses, elephants, and many others in Africa.

It should be emphasized the important role of a veterinarian working in rehabilitation centers for wild animals and the foundations for the animals living on the streets. In my work I would like to describe the potential risks that result from the presence of wild animals in urban areas and virtual solutions, with whom I met during my practice. It has a particular importance e.g. the fight against infectious diseases transmit from animals to humans and the protection of endangered species.

One organization taking care of wild animals, not only in national parks is Kenya Wildlife Service. Through the education of the citizens, active combat with poachers, as well as cooperation with farmers and local people, they are trying to keep harmony between the world of animals and people and alleviate the perennial conflict of interest. One of the many tasks of the organization is to protect human settlements from animals coming from the nearby nature reserves and national parks, fight against the damage they do, care for them and translocate if needed.

Key words:

Human-animal conflict

Wild animals in cities

Endangered species

Zoonoses

SUPPLY CHAINS: Food security

4.1



Euroleague
FOR LIFE SCIENCES

Room 107
SATURDAY 12:00-13:00

SUPPLY CHAINS:

Food security

Saturday 11:00 – 12:00 Room 107

Women's Agricultural Cooperatives in the Western Cape, South Africa: a Strategy to Achieve Food Security and Promote Women's Empowerment?

Ana C. Eisermann¹, Stefanie Lemke¹, Anne C. Bellows¹

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Abstract

Women who live and/or work on farms are among the most vulnerable groups in South Africa. Their access to housing and jobs is often tied to men's employment and accommodation, and they are increasingly being employed as seasonal workers, limiting their income options even further. This study aimed to assess the empowerment process of women on farms in the Western Cape Province through their participation in agricultural cooperatives, and further to explore whether the cooperatives can provide future livelihood strategies for these women. A qualitative research approach was used, applying participatory action research, observation and interviews, and also integrating quantitative data. Research was carried out in collaboration with two agricultural cooperatives that focused on the production of mushrooms and organic vegetables. Results demonstrate that participation in the cooperatives was enhancing the empowerment process of members by providing them with access to various livelihood assets, i.a. land, training, and financial funds. This resulted in positive livelihood outcomes such as, a certain degree of ownership and control over land, increased self-esteem, acquisition of new skills, and increased awareness of rights. On the other hand, various power relations hampered women's empowerment process, such as high dependency on farm owners, power struggles within households, communities and cooperatives, and reliance on the NGO. At the time of this research, none of the cooperatives were generating an income and it remains to be seen whether the cooperatives will constitute a sustainable livelihood strategy for these women in the future. Major challenges are unequal power relations, high dependency on farm owners and the NGO, and a lack of governmental institutions and wider support structures. Still, the cooperatives stimulate an awareness of possibilities, visions and ownership among these women that they might apply in this or other sectors and that can have a medium- or long-term effect.

Key Words: agricultural cooperatives, vicious cycle of dependency, sustainable livelihoods, participatory action research, women's empowerment

SUPPLY CHAINS:

Food security

Saturday 11:00 – 12:00 Room 107

Title: Local Food Systems and Responsible Tourism: A Strategy to Strengthen Sustainable Livelihoods? A Case Study from South Africa

Authors: Gabriel Laeis¹*; Stefanie Lemke¹

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Key Words: Local Food Systems, Sustainable Livelihoods, Responsible Tourism, Rural Development, South Africa

ABSTRACT

Background: After the end of apartheid the Republic of South Africa has seen a smooth political transformation and has since emerged as an economic power in sub-Saharan Africa. Yet, high levels of food insecurity among the black and colored population coupled with high levels of income inequality threaten livelihoods and social stability.

Objectives: This research aims to investigate, if an organic farming and life skills training program in cooperation with an eco-tourism lodge can provide an option to establish a local food system and whether this can contribute to ecological, economic, and social sustainability of this initiative and for the people involved.

Methodology: The study is situated in the Western Cape, South Africa, and applies a qualitative research approach, assuming case study as strategy of inquiry. From March to May 2012 data was gathered through participatory action research at the training facility and the lodge. Additionally, interviews with eight key stakeholders were conducted. Local Food Systems (LFS) and the Sustainable Livelihoods Framework serve as underlying theoretical frameworks for conceptualization and analysis.

Preliminary Findings: The cooperation between the lodge and the training program shows characteristics of a LFS. This linkage closes natural resource cycles, provides capacity building for the local community, and serves as a unique selling proposition to this tourism enterprise. However, among the main challenges are a lack of communication, weak management support, and ambitious short-term goals, which can compromise the success of this initiative.

Preliminary Recommendations: To establish LFS by combining eco-friendly tourism operations with local food production initiatives has the potential to foster small-scale farming and capacity building for the rural poor. If planned and executed with broad consent and support at all levels of all stakeholders involved this combination might serve as a blue print for similar initiatives wishing to engage in sustainable rural development.

SUPPLY CHAINS:

Food security

Saturday 11:00 – 12:00 Room 107

Global Food Security: Feeding a Growing Population – An Analysis of the Challenges, Prospects and Consequences of Achieving Global Food Security by 2050. ‘Business-as-usual’ vs. ‘Green Economy.’

[Simon Bager](#), University of Copenhagen, Faculty of Science, Copenhagen, Denmark, simonbager@gmail.com.

Abstract

This thesis focused on the challenges, prospects and consequences of achieving global food security by 2050 under two different economic systems; a conventional, ‘business-as-usual’ (BAU) scenario and a new, ‘green economy’ (GE) scenario, understood as an economy that results in improved human well-being, while reducing environmental scarcities.

The world’s food system is facing unprecedented challenges as population growth and changing consumption patterns require food production to almost double by 2050. Current production patterns cause environmental damage and undermine the resource base upon which food production depends. Increasing production to meet future demand under a BAU scenario will cause significant damage to the natural environment and do little to reduce the number of chronically under- and malnourished.

The challenge is exacerbated by the threat of climate change, increased production of biofuels, and growing resource scarcity. Food production systems are also affected by changes in economic and social issues, and focus was put on increased global trade in commodities, a rising globalization trend, different educational patterns, and waste issues, amongst others.

It was discussed that the current production system is inherently flawed and it was concluded that achieving global food security by 2050 under a BAU scenario is probably not possible, and that a continuation of the current system will have severe human and environmental costs. Although a general definition of the concept has not yet been agreed upon, it was concluded that the costs to humans and environment would most likely be smaller under the GE scenario, but that a GE would need a supporting political climate if global food security is to be achieved by 2050, and that the challenges faced are enormous.

Key words: Food security – Green Economy – Climate Change – Agriculture – Environmental degradation.

URBAN ENVIRONMENT: Governance for sustainable cities

4.2



Euroleague
FOR LIFE SCIENCES

Room Aulan
SATURDAY 12:00-13:00

URBAN ENVIRONMENT:
Governance for sustainable cities
Saturday 11:00 – 12:00 Room Aulan

Sustainable Urban Development in Accordance with the Principles of Cradle to Cradle
– from Theory to Practice in Kilen, Ronneby

Erik Fälth, Jens Thulin
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Abstract:

What is sustainable urban development and will it in the future be possible to plan urban environments, which have a positive impact on nature instead of negative?

In addition to examining Cradle to Cradle (C2C) as a design theory for sustainable urban development, the purpose of this paper is that its findings and conclusions should serve as tools for working with sustainable urban planning. The essay begins with a theoretically based discussion of what may constitute normative principles for sustainable urban development. After an objective review of Cradle to Cradle Design, the theory is analyzed based on these standards. The results are then transferred from theory to practice in the development area Kilen in Ronneby, Sweden.

The main focus of C2C is today on ecological and economic sustainability and the important social aspect is not developed. For realization of the visions of the theory, transferring to C2C, which stands for ecological modernization, need to be accompanied by behavioral change. This requires a questioning of the standards that we live by today. Ecological modernization in combination with normative principles of behavior change can thus be a path to sustainable urban development.

While planning sustainable, it is essential to also make it easy and natural for people to live sustainable. Designing an area using the principles of C2C can, at the right approaches, represent an important step in the sustainable urban development. Not least as a manifestation of good intentions, a platform for innovation in ecological modernization, a pedagogical example and a call to the user and the viewer to also live sustainable.

Keywords:

Sustainable Urban Development, Cradle to Cradle, C2C, Spatial Planning

URBAN ENVIRONMENT:
Governance for sustainable cities
Saturday 11:00 – 12:00 Room Aulan

“Selbsternte”: A Concept to Strengthen Peri Urban Agriculture? – The Case of Stuttgart and Munich

Dhusenti Manoharan, Department for Gender and Food/Nutrition, Institute for Social Sciences in Agriculture, University of Hohenheim, Stuttgart, Germany, thusenti_m@gmx.net

Keywords: Peri Urban Agriculture, Selbsternte, Regional Food Supply, Urban Citizens, Small Scale Farms

Peri urban agriculture depicts an important regional food supply for urban citizens. A local consumer oriented peri urban agriculture provides multifunctional use and creates many benefits for local economy, society, and environment and enhances a healthy consumer region.

Worldwide agricultural land in peri urban areas is under tremendous pressure due to expanding agglomeration of urban areas. New infrastructural investments and buildings are more economical viable in comparison to agricultural holdings in peri urban areas. Literature shows that the number of farms decreased whereas the area of the farms size increased during the last decades. In order to be economically competitive farms need to be organized in large enterprises with intensive and specified production especially in areas with high competition on land. This development negatively impacts small scale farms with local consumer orientation, diversified production and extensive systems in peri urban areas.

Stuttgart, the state capital city of Baden Württemberg is one of the seven metropolitan areas of Germany which is also highly influenced by peri urban agricultural activities. During the last 30 years the total agricultural area of Stuttgart decreased about 20 % and many small scale farms in the peri urban area disappeared.

This study tries to identify what the peri urban agriculture concept called “Selbsternte”, which exists since 2012 in Stuttgart, can contribute to strengthen small scale farms in the peri urban area. Therefore the study uses an assessment tool based on the community food systems measures.

The study further evaluates what the city of Stuttgart can learn from the experience gained in Munich which has implemented the concept of “Selbsternte” into its urban and peri urban planning concept since 13 years. The results of Stuttgart and Munich show that “Selbsternte” creates new societal, environmental, and economical values for the city, urban citizens and for local agricultural practices. It can be looked as a tool for strengthening peri urban agriculture and their citizens.

URBAN ENVIRONMENT:
Governance for sustainable cities
Saturday 11:00 – 12:00 Room Aulan

Korogocho Streetscapes

-A Study of the Street as Place in a Slum Setting, and how Local Concepts of Place are Affected by Political and Global Development Interests

Marlene Thelandersson, Emma Skottke, Pia Jonsson, Maria Höök

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Key-words: Nairobi, slum upgrading, streets, place, urban development, informality

In 2011 Maria Höök, Pia Jonsson, Emma Skottke and Marlene Thelandersson, went to Nairobi to study urban structures as part of a master course at SLU. We spent two months in Nairobi and experienced issues we had never met before. Fast changes in the urban fabric create a physical and social fragmented city where urbanization is disconnected from industrialization and economic growth. In order to widen our understanding of planning processes, we decided to return to Nairobi.

Today we see unprecedented growth in urban slums that are increasingly putting pressure on land and public spaces. Often the need for public space in slums is not considered, however, public space is particularly important for these settings. Open space is a much-needed break from crowded housing conditions. Streets are one of the oldest elements of the public realm and are a vital component of livelihoods and the only space allowing the public to interact. Streets in slums are very much needed, serving as democratic meeting places, public spaces and aid economic and social development in highly dense areas.

This Master Thesis explores the role of streets in slum upgrading. It focuses on the Korogocho slum in Nairobi, which is used as a case study to document the outcomes of upgrading an area's network of streets. The study puts particular emphasis on documenting the streets 'on the ground', where the daily life for residents in Korogocho slum takes place and how their concept of place is affected by the represented image of the streets placed in the area from above, driven by political and global development interests. It qualitatively explores key issues regarding slum upgrading where the street is used as an entry point. Understanding the dynamics of slums will be key for handling the massive urban growth that our cities are facing.

SUPPLY CHAINS: Animals

4.3



Euroleague
FOR LIFE SCIENCES

Room Terra Nova
SATURDAY 12:00-13:00

SUPPLY CHAINS:

Animals

Saturday 12:00 – 13:00 Room Terra Nova

Methodology to Test Consumer Preferences of Beef Appearance During Beef Purchase

Ewa Gil

Warsaw University of Life Sciences, Warsaw, Poland

Meat and meat products represent an important segment of the food produced and consumed. It is important because of the value of nutrition, but also of the quality and sensory attractiveness. In Poland, consumers reach for the meat products daily. In competitive conditions, it is more difficult to adapt to diverse consumer needs than to manufacture meat and meat products. The album diverse beef chop photographs, additionally computer-modified to increase their appearance variation has been elaborated. In parallel, the questionnaire has been adapted to get more information on consumers' lifestyle, food habits, and activity in culinary preparation of food, etc. Both tools combined were checked in the pilot study. Methodology used allows for testing preferences during buying meat over a long time among the numerous consumer populations, and also creates opportunities for international comparative studies, which may be especially interesting. Using the album method in combination with the questionnaire followed by cluster analysis of the results, a segmentation of consumers in beef appearance preferences can be determined and various segments (clusters) accurately identified in terms of socio-demographic and dietary habits and preferences. This is important because it offers the possibility of establishing appropriate guidelines for innovation and development of new products, meeting exactly the needs and expectations of consumers. In the context of the observed changes in life style and associated dietary habits of consumers, the study should help in predicting changes in food (especially meat) consumption in the future.

Keywords: album, beef, consumer needs

SUPPLY CHAINS:

Animals

Saturday 12:00 – 13:00 Room Terra Nova

Role of leptin and insulin in metabolism of dairy cows in transition period

Miroslav Joch, CULS Prague

Dairy cows in the first weeks of lactation are not able to take enough nutrients for the coverage of milk production and get into a negative energy balance. Some studies suggest that hormones leptin and insulin are also involved in the coordination of changes in energy and fat metabolism in early lactation of dairy cows. The aim of the study was to confirm the relationship between levels of leptin, insulin and selected metabolites of energy and fat metabolism during transition period in dairy cow. In study was involved 15 Holstein and Fleckvieh dairy cows. Blood samples were collected in the period between 60 days before parturition and 100 days after parturition (-60, -25, -7, +3, +10, +25, +40, +55, +70, +85, +100). Blood levels of leptin and insulin were quantified by enzyme-linked immunosorbent assay (ELISA), non-esterified fatty acid (NEFA), β hydroxybutyrate (BHB) and glucose by spectrophotometric method. Mean levels of leptin ranged from 0,39 to 1,28 ng·ml⁻¹. The highest values were found in 60 days before parturition. After parturition, leptin levels decreased, but due to individual variability the differences were not statistically significant. Mean levels of insulin in dairy cows in transition period ranged from 0,37 to 1,28 μ g·l⁻¹. The highest mean insulin level was measured 25 days before parturition. After parturition there was a statistically significant decrease in mean insulin levels. Simultaneously after parturition in cows we observed significantly increased NEFA and BHB mean levels and decreased glucose mean levels, these changes are typical for cows in negative energy balance. Insulin levels positively correlated with blood glucose levels and negatively with the NEFA levels. Leptin levels correlated neither insulin levels nor NEFA, BHB and glucose levels. Results of this work indicate that insulin has closer relationship to energy and fat metabolism in transition period than leptin.

SUPPLY CHAINS:

Animals

Saturday 12:00 – 13:00 Room Terra Nova

The use of exhaust carbon dioxide for the cultivation of algae with their subsequent application in dairy cow nutrition

Lenka Dědinová, Veronika Legarová, Lenka Kouřimská (supervisor), CULS Prague

Maize silage, straw and animal waste of all stables were gathered in fermentors of a biogas station. Anaerobic digestion resulted in production of biogas and digestate which can be used as a good fertilizer. Biogas combustion produces carbon dioxide, which is accumulated and used to produce electricity and thermal energy.

Algae (*Chlorella* sp.) were cultivated on thin layer photobioreactor, which was specially constructed for this experiment. Part of the combustion products was drained as a source of carbon for algal growth on the photobioreactor which contributes to the reduction of carbon dioxide in the atmosphere.

Algae contain high levels of proteins, carbohydrates, essential fatty acids, essential amino acids and a number of other important vitamins and mineral, which can improve and enrich the diet of dairy cows with subsequent benefits to the quality of milk.

After two months when sufficient quantities and concentrations of algae were produced they were added to the feed (1.5% of the diet) of a tested group of dairy cows. Milk from monitored cows was collected daily and analysed for the main milk components content. This milk had statistically higher levels of total solids, free fatty acids, fat and lactose content compared to the reference group of animals without algae supplementation. In case of colostrum noticeable increase of protein, total solids, casein, non-fat solids, fat and free fatty acids was found.

SUPPLY CHAINS: Quality / health aspects

5.1



Euroleague
FOR LIFE SCIENCES

Room 107
SATURDAY 14:00-15:00

SUPPLY CHAINS:

Quality / health aspects

Saturday 14:00 – 15:00 Room 107

Assessment of the Current Status of Small-scale Nurseries in Kenya – Effectiveness of the Input Supply System

Niklas Holtne, Forest and Landscape Denmark, University of Copenhagen, Denmark.

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In Kenya, forest cover has been reduced to about 2%, and forests are still threatened by increased population and climate change. To increase resilience against climate change and conserve remaining forests many organisations are promoting tree planting on farms. Agroforestry systems are more resilient and sustainable than monoculture systems, and can generate income and food security for farmers. Currently research on agroforestry value chains are focused on outputs, from farmers to markets, while the input supply chain often is neglected. The current system of input supply consists of many actors, among them NGOs supporting community nurseries with free or subsidized seeds. The different actors use no specific coordination of efforts and there is a lack of an economically sustainable contingency plan for the future of the input supply system. This situation is typical for Eastern and Southern Africa. The purpose of this study was to assess the current status of small-scale tree nurseries in terms of their operation, their financial profitability, and to identify actors in the input supply system. Subsector assessment was used to identify constraints and opportunities in the value chain and an OSL-regression model was used to test factors influencing profitability. The study showed that small-scale nurseries are economically viable and that profits are influenced by experience, training and access to own grafting material. Findings also showed that NGO promoted group nurseries are less suitable as providers of seedlings because of their reliance on subsidized inputs and voluntary labour. Market distortions exist created by actors selling under market price, undermining the market for seedlings. NGOs and other organisations need to redefine their roles as input providers. By providing training for small-scale nurseries in marketing and business, facilitate access to high quality germplasm sources, and establishing market channels for agroforestry products the current input supply system can be improved.

Keywords: Input supply system, seed sources, agroforestry, small-holders, NGO

SUPPLY CHAINS:

Quality / health aspects

Saturday 14:00 – 15:00 Room 107

Effect of Harvesting Date on Combustion Quality and Yield of Different *Miscanthus* Genotypes

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Key words: *Miscanthus*; Genotypes; Combustion quality; Harvest date; Dry matter yield.

Miscanthus, a perennial C₄ rhizomatous grass with high biomass yield potential and exhibits greater photosynthetic efficiency, is a very promising energy crop. Generally the requirements for agrochemicals are low because *Miscanthus* is a healthy crop and has low to no nitrogen fertilizer demand as it recycles nutrients from the above ground biomass back to the under ground rhizomes. There are three alternatives for the energetic use of *Miscanthus*: combustion, ethanol and BtL (=Biomass-to-Liquid) production. Presently in the EU there are about 3000 ha used for the direct combustion of *Miscanthus* biomass. Major problems for the combustion of *Miscanthus* biomass are corrosion, fouling and low ash melting temperatures, which are mainly triggered by high concentrations of ash, chloride and potassium. The aim of this study is to assess the effect of harvesting date on dry matter yield and combustion quality of different *Miscanthus* genotypes. Field experiments with 15 *Miscanthus* genotypes (including *Miscanthus* × *giganteus*, *Miscanthus sacchariflorus*, *Miscanthus sinensis* pure & hybrids) were performed at the agricultural research station of the University of Hohenheim, Ihinger Hof, (from 1997-2011) to test the yield and biomass qualities for combustion. The main quality characteristics relevant to combustion are nitrogen (N), phosphorus (P), potassium (K), chloride (Cl), magnesium (Mg), silicon (Si), calcium (Ca), sodium (Na), moisture and ash. Over the years the highest dry matter yield of 178 dt ha⁻¹ was obtained from the *Miscanthus* × *giganteus* genotypes with comparatively high K and Cl concentrations (K = 0.76%, Cl = 0.06%). The pure *Miscanthus sinensis* genotypes proved to be consistent over the years with highest biomass qualities for combustion, especially with low K and Cl concentrations, but dry matter yield was the lowest of all genotypes. Different harvest dates for each year caused large variation in biomass qualities and yield. The effect of harvest date was small for N, P and Na. However, early harvested biomass yielded the highest concentrations of Ca, Mg, Si, ash and moisture content. The concentrations of K and Cl were decreased because of delayed harvest. This shows that late harvest has a positive effect on fuel qualities. Thus better biomass quality and quantity over the long run can be achieved by the adjustment of appropriate harvest dates.

SUPPLY CHAINS:

Quality / health aspects

Saturday 14:00 – 15:00 Room 107

The Investigation of Polycyclic Aromatic Hydrocarbons Presence in Ash Derived from Biomass Incineration

Zdeněk Košnář*

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Abstract

Renewable energy resources play more important role in the production of heat and electricity to partly replace fossil fuels. The biomass combustion is seen as one of the most promising energy resources to mitigate greenhouse gas emissions. However, mechanisms of biomass combustion can also lead to form polycyclic aromatic hydrocarbons (PAHs) sorted into the group of persistent organic pollutants. The ash derived from the biomass combustion can contain higher amounts of PAHs that may give a rise to health risks during uses of combustion ash, because some of these compounds are carcinogenic and mutagenic. The aim of the investigation was to determine amounts of 16 PAHs in fly ash, bottom ash and mixed ash from 38 Czech incinerating plants using different materials. Analyses of ash samples for PAHs were performed using the extraction method and 83 sample extracts were evaluated in the laboratory by means of gas chromatography coupled with mass spectrometry detection. The highest amount of PAHs reaching the value of $86\,837\ \mu\text{g}\cdot\text{kg}^{-1}$ was determined in fly ash derived from the phytomass combustion - wheat straw and hay in ratio 2 to 1. The lowest amount of PAHs reaching the value of $414,7\ \mu\text{g}\cdot\text{kg}^{-1}$ was determined in fly ash derived from the dendromass - wooden chips combustion. The level of PAHs in bottom ash was relatively low the highest reached the value of $99,5\ \mu\text{g}\cdot\text{kg}^{-1}$ determined in bottom ash derived from the dendromass combustion and the lowest amount of PAHs reaching the value of $11\ \mu\text{g}\cdot\text{kg}^{-1}$ was determined in bottom ash derived from a mixture of phytomass and dendromass. The highest amount of PAHs reaching the value of $2485\ \mu\text{g}\cdot\text{kg}^{-1}$ was determined in bottom ash derived from the phytomass combustion and the lowest amount of PAHs reaching the value of $9\ \mu\text{g}\cdot\text{kg}^{-1}$ was determined in mixed ash derived from mixture of phytomass and dendromass. In most cases more than 90% of the 2-4 ring PAHs content was found in ash derived from the biomass combustion. The 68 % of the 5-6 ring PAHs content was exceeded in mixed ash derived from the phytomass. In terms of presence of higher PAHs content in ash the phytomass combustion seemed riskier than the dendromass combustion. A direct proportionality of the 5-6 ring PAHs content was observed in ash depending on the 2-4 ring PAHs content. A direct proportionality of benzo[a]pyrene content depending on naphthalene content was determined in fly ash derived from phytomass and dendromass combustion, an indirect proportionality was observed in mixed ash derived from the phytomass combustion and any influence of other biomass materials was not observed. Due to higher content of polyaromatic compounds in fly ash, mainly in ash derived from phytomass combustion we should omit it for the application as mineral fertilizer.

Keywords: Polycyclic aromatic hydrocarbons; Combustion; Biomass; Ashes

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URBAN ENVIRONMENT: Food production and urban development + human impact on the environment

5.2



Euroleague
FOR LIFE SCIENCES

Room Aulan
SATURDAY 14:00-15:00

URBAN ENVIRONMENT: Food production and urban development + human impact on the environment

Saturday 14:00 – 15:00 Room Aulan

The Ems Full Hybrid: an Integrative Design for a Troubled Estuary

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Conference theme: Urban environment

Key Words: Ems estuary; Hybrid landscape; Hydrologic processes; Landscape architecture; Economic ecologic interaction

The uncertainty of a natural system is often replaced by the certainty of human control to ensure safety and economical activities. This conflicts with the balance seeking natural system and can result into friction and eventually a clash with the controlled system. The Ems, an open estuary on the border of Germany and the Netherlands, is a system where such a clash has occurred and has escalated. The natural estuary has been shaped into a controlled state with a decreased hinterland and a severally deepened riverbed. This has resulted in an enlarged tidal effect, bringing in high amounts of sediment and increasing turbidity. But to accommodate economic activities, this depth has to be maintained by constant dredging, which in return leads to more sediment, thus making the problem worse. The result is a highly turbid system, which cannot support higher life during six months of the year and costing millions of euro's each year to maintain this troubled state. Solutions for the problem are numerous, but actions remain because of an impasse between economical progress and natural conservation. A fitting solution thus not only lies in solving the turbidity problem, but also breaking through the dichotomy of culture versus nature. This is achieved by introducing the idea of a hybrid landscape; this states that, instead of choosing between economic gain and nature conservation, processes of different dynamics are mixed and benefit from each other. The needed technical solutions, coastal breakwaters and new saline polders, are then designed in such a way that the new system not only solves the turbidity problem, but also creates new habitats, raises water safety and produces food. Thus the Ems becomes a hybrid-system with a restored ecosystem, new economic possibilities and remaining accessibility for birds, seals and large ocean cruisers.

URBAN ENVIRONMENT: Food production and urban development + human impact on the environment

Saturday 14:00 – 15:00 Room Aulan

The Urban Agriculture Classroom: Urban Agriculture as a Learning Mechanism for Environmental Learning and Community Development

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The Netherlands

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Keywords: (peri-)urban agriculture, environmental learning, community development, action learning

The potential contribution of urban and peri-urban agriculture (UPA) to future sustainability of cities in developing countries remains heavily debated. Recent food security and environmental crises provide opportunities to expand UPA in developing countries. However, UPA continues to be challenged by uncertain legal status and water shortages. This thesis has two research objectives: to critically analyse the claims from both UPA opponents and supporters, and to explore if UPA acts as an effective learning mechanism for environmental learning and community development. The research was carried out through a literature review, a visit to an UPA festival and an interview with an UPA expert. The opposing claims on UPA were analysed on individual household level and on system level. The analysis concluded that on the individual level, UPA does not have proven positive or negative effects on health and income for most households. Other claims were validated: poor households do benefit economically, and UPA also has positive effects on culture and identity for households. On the system level, negative health claims regarding UPA could not be verified. It was proven that UPA can have small-scale positive impact on a city's environment, but UPA does not help to solve larger environmental problems affecting cities. UPA's potential as learning mechanism was analysed using the action learning and Education for Sustainable Development (ESD) approaches. The study found that UPA can indeed serve as a learning mechanism for environmental understanding among its practitioners. It also contributes to community development among both practitioners and non-practitioners. Yet the effectiveness of UPA as a learning mechanism is limited by participants' willingness to learn and their ability for didactic reflection. Legal, physical and cultural constraints to UPA also seriously affect its potential as learning mechanism. UPA needs to address these challenges to become an effective strategy for urban sustainability.

URBAN ENVIRONMENT: Food production and urban development + human impact on the environment

Saturday 14:00 – 15:00 Room Aulan

Concept and Impacts of Awarding the status of Fairtrade Town

Josefina Smrčková, CULS Prague

Fair Trade is a concept where people from developed countries use their purchase power and help producers from developing countries. While Fairtrade is related to certified products, Fair Trade refers to broader movement where consumers support producers who are guaranteed that their products will be purchased for “fair” price. Fairtrade Town is a community, where people behave according to principles of Fair Trade and increase the sales of Fairtrade products.

The main aim of the paper is to investigate the concept of Fairtrade Towns, therefore the both quantitative and qualitative researches were conducted in the Fairtrade Town of Litoměřice. The interview with the chief of the Fairtrade local controlling group showed that 15 pages long application form was prepared during 3 months, after submitting in May there was an audit in the town in order to prove that all criteria for Fairtrade Town were fulfilled. Litoměřice was awarded the status in September 2011.

The illustrative qualitative research was conducted in January 2012 with one hundred respondents. It showed that 62% of respondents have noticed the national campaign and most of them approved that it rapidly increased their knowledge about Fair Trade. Only 59% of respondents know about the town’s status of Fairtrade Town, and 5% of respondents buy more Fair Trade products since the town has been awarded.

According to the research the both national and town’s campaigns were not very effective, but other towns have already applied, so the higher interest and awareness are expected. It would be recommended to undertake better promotion strategy with specific activities aimed on various target audience. The worldwide movement of Fairtrade Towns is successful and fast growing and there are no reasons why to believe that it would be different in the Czech Republic.

SUPPLY CHAINS: Climate change

5.3



Euroleague
FOR LIFE SCIENCES

Room Terra Nova
SATURDAY 14:00-15:00

SUPPLY CHAINS:

Climate change

Saturday 14:00 – 15:00 Room Terra Nova

Teaching Climate Change Science to Emerging Adults: Assessing opinions and Knowledge Development in 16-17 Year-old High School Students

Inez Harker-Schuch, University of Copenhagen; Copenhagen, Denmark

Abstract. With the ever-increasing progress of climate change science it becomes more apparent the absence of a concomitant policy necessary to combat the consequences of climate change. With little social impetus to support policy implementation, those involved in climate change policy development must look for alternative pathways to drive climate policy evolution. One of the most effective avenues will be through the education of young adults emerging into the economic and political systems of our modern society. This study explores how prior knowledge influences opinions about climate change in the emerging adults' age-group (16-17 years) as well as how formal education in climate change science affects both knowledge development and opinions. The data was obtained through the application of a survey in Austria and Denmark on 188 students. The effects of knowledge, country, school, specialisation and gender on opinions about climate change were analysed with logistic regression and the effects of the lecture (before vs. after), country, school, specialisation and gender on knowledge about climate change were analysed with analysis of variance. The results show that prior knowledge about climate change science in emerging adults' age group significantly affects opinion about climate change. Students with a higher number of correct answers are more likely to have the opinion that humans are causing climate change (odds ratio (OR)=1.14; confidence interval (CI)= 1.01-1.29; $P<0.05$) and that both individuals and governments are responsible for addressing climate change (OR=1.14; CI: 1.01-1.28; $P<0.05$). The results also show that the lecture in climate change science significantly improved knowledge development, whereas it didn't affect opinions. The student's performance in terms of percentage correct answers was improved by 11% after the lecture compared to before the lecture ($P<0.001$). Even though the lecture improved knowledge development, the percentage of correct answers after the lecture was still below 60%.

Key words: Climate change, emerging adults, education, survey, opinion, scientific knowledge, policy development

SUPPLY CHAINS:

Climate change

Saturday 14:00 – 15:00 Room Terra Nova

Effects of Temperature Increase and Precipitation Variability on Biomass Production and Amylase Activity in Wheat Grains

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Keywords: climate change, wheat, amylase activity, biomass

Abstract

Global climate change is one of the biggest challenges for future agricultural food production. Prognoses for Europe suggest that the temperature will increase and precipitation patterns will change in both amount and frequency.

This study addresses the effects of these predicted changes on biomass production and grain quality of wheat, one of the most important crops worldwide.

The impacts were measured with plant material obtained in 2009 from the Hohenheim Climate Change (HoCC) field experiment, which was established in 2008 at the University of Hohenheim near Stuttgart, Germany. Climate change was simulated by increasing the soil temperature by 2.5°C, reducing the precipitation amount by 25% and extending the time between precipitation events by 50% during summer. After harvest at maturity, various biomass parameters and α - and soluble/total β -amylase activity in grains were determined.

Biomass production was increased by elevated soil temperature for biomass parameters such as ear and grain weight, harvest index and thousand grain weight, while effects of reduced precipitation amount on biomass were mostly not significant. However, some parameters such as biomass of stem, grain and ear tended to decrease due to precipitation amount reduction. Reduced precipitation frequency showed no effects on any of the measured parameters. Elevated soil temperature increased the total β -amylase activity in grains, while manipulated precipitation patterns resulted in no changes in enzyme activity. Interactive effects of elevated soil temperature and reduced precipitation amount were found for total β -amylase activity. Both α - and soluble β -amylase activity were not affected by any simulated climate change treatments.

The results of this study suggest that climate change and especially global warming will influence many biomass parameters of wheat as well as total β -amylase activity in grains. This knowledge is important for predictions of yield and bread making properties of wheat in the future.

SUPPLY CHAINS:

Climate change

Saturday 14:00 – 15:00 Room Terra Nova

Analysis of the Carbon Footprint Along the Supply Chain of Wooden Biomass for Energy Use

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Key words: Carbon Footprint, woody biomass, supply chain, excel based tool

There have been substantial increases in power generation from co-firing wooden biomass in coal power plants. This trend is also seen in the international pellet market, where the EU is already a net importer.

Co-firing is attractive due to low CO₂ avoidance costs and thus a good instrument to achieve company CO₂ reduction goals.

Among Renewable Energies, bio energy is particularly sensitive to negative environmental impacts such as land degradation. Thus, implementing regulations on sustainability, as exist for the liquid biomass market, is important. With a lack of binding regulation on solid biomass sustainability, Vattenfall Europe AG negotiated and signed the binding “Agreement on Sustainability of Procured Biomass” with the State of Berlin, regulating sustainability criteria of co-fired wooden biomass there.

Following the intention of the CO₂ reduction goals of Vattenfall, it is necessary to analyze different parameters of the Carbon Footprint, in particular, to investigate how the processing steps can positively affect the Carbon Footprint. To analyze the influence of new pellet technology on Carbon Footprint, the following case study was considered.

How big is the quantitative Carbon Footprint difference between the transportation of chips, white pellets and refined pellets, according to the different refining steps, when the same supply chain is assumed?

An EXCEL tool was created for calculating the Carbon Footprint along the supply chain. The tool is based partly on generic data, and on company preferred practices. The modelling focuses are on the elasticity of different parameters, such as transportation systems, and modification of the generic ship transport data to consider the bulk density.

There are two main findings of the case study. The removal of non combustible constituents of the biomass, via higher bulk density in transport, causes the largest reduction in CO₂ emissions. Second, what appears as a high savings process compared to fossil fuels, when the scope is expanded to account for environmental factors such as land use change, may in fact be a low savings processes, calling into question international sourcing decisions.

POSTER PRESENTATIONS



Euroleague
FOR LIFE SCIENCES

Poster Session 1: Saturday 11:00 – 12:00

Poster Session 2: Saturday 13:00 – 14:00

Venue: Alnarpsgården/Loftet and Foajén

Bringing the decision closer to the people:

Is decentralization policy lead to improved sustainable forest management at local level?

Wiene Andriyana

Universität für Bodenkultur Vienna

This research project will be looking at the impact of decentralization policy in Indonesia to the forest management scheme in Java Island. In theory, decentralization policy should performs better than the centralized system, in terms of sustainable forest management, as it brings the decision on forest closer to the people (forest community). Several researches on decentralization in Indonesia has shown that the decentralization policy has improved several local aspects, such as the Original Regional Income, Regional Budget, per capita income, the prosperity of people, participation and transparency. However, some other researches also suggested that decentralization is seen by local actors merely as means to secure short-term economic gains, which could lead to massive forest ecosystem destruction in exchange for that economic gains.

Researches on decentralization in Indonesia have shown that results of those studies were varied as each region has different political, socio economic and cultural and physical characteristics. Most case study research on decentralization have focused on the forest management situated in forest-rich islands outside Java Islands¹; thus, little is known about such impact in the forest of Java Island.

This research therefore attempts to bridge a gap in the forest decentralization literature by focusing on Java. The result will contribute to a better understanding on the impact of the decentralization policy in Indonesia. This can inform state and non-state actors and policy makers, in order to achieve the intended objectives of decentralization policy in the most effective and efficient manner.

¹ Outer Islands refer to main islands in Indonesia other than Java, which are: Kalimantan, Sumatera, Sulawesi and Papua – the forest rich islands, where most commercial forest-related activities are taking place.

Forest Gardens in the City

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Due to proceeding urbanisation, population growth and current suboptimal strategies of food supply, cities have a negative impact on the surrounding areas and the quality of the living environment within. Considering this dynamics there is an urgent need to improve ecological conditions, increase integration of green city structure and enhance novel concepts like Urban Agriculture, which attempt to incorporate agricultural production in the urban environment.

This thesis hence seeks to combine the ecological qualities of the green city structure with the food benefit of Urban agriculture. The used element “Forest Garden”, a small structured, diverse agroforestry system, is investigated for bearing this function. Forest Gardens mimic natural forest systems at a mid-successional state and constitute designed plant communities, consisting of perennial food plants. Due to high structural and functional diversity, self-sustaining fertility and the directed work with natural dynamics and succession, Forest Gardens constitute one of the most energy extensive and sustainable food production systems for the temperate climate region.

As an example of an existing Forest Garden, “Skogsträdgåden i Holma” in Sweden and its social and spacial environment is illustrated. Based on these observations and on studies of Vienna’s community garden practise, a concept for a Forest Garden in the city of Vienna is elaborated to exemplify the necessary social, economic, ecological, legitimate and spacial conditions to establish a Forest Garden in an urban context. Furthermore, merits and demerits are discussed that possibly result from an integration of Forest Gardens in urban environments.

The element of Forest Gardens integrated in the city could enhance biodiversity and production of local healthy diverse yields, reconnect people with nature and educate about the origin of our edibles, complement green urban structure and effect city climate and therefore contribute to a higher level of sustainability, resilience and quality of life in cities.

urban agriculture, urban greenery, forest garden, perennial polyculture, community garden

Efficient Solvent Extraction of Tomato Seed Oil for Industrial Use

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Abstract

From industry processing of tomatoes results a big amount of waste and a main component of this waste are tomato seeds. Tomato seeds are sources of vegetable oil and production of biofuel is a promising option. For this purpose, optimization of extraction and derivatization of tomato seed oil has to be performed. Results of the investigation on solvent extraction of tomato seed oil are reported in this work. Three different solvents were tested in extraction experiments with optimising different parameters. Soxhlet method was used to extract oil from tomato seeds (mechanically and electrically grinded) collected from tomato cultivated in the West Plain of Romania, using as solvents: petroleum ether, diethylether and n-hexan. Highest yield of oil extraction was registered in the case of petroleum ether and indicated an economically efficient clean up step preceding transesterification for utilisation of tomato seeds in biofuel production.

Keywords: tomato seed oil, extraction, solvents, biofuel, optimization.

ELLS Conference 2012, November 8-9, 2012, Alnarp, Sweden

Assessment of the effectiveness of graded stone bunds on soil erosion processes

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soil erosion, soil conservation techniques, stone bunds

Abstract

According to the European Soil Protection Strategy soil loss due to water and wind erosion is the mayor thread to future soil quality. The consequences of soil loss jeopardize food security and a sustainable development in developing countries. The implementation of soil conservation techniques can have a positive impact on soil erosion processes.

This work forms part of the project “Unlocking the potential of rainfed agriculture in Ethiopia for improved rural livelihoods”. Project area is the Gumara-Maksegnit watershed near Gondar, Ethiopia.

In the rainy season (June to September) intense rainfall leads to serious soil erosion, especially in the steep parts of the slopes. The implementation of graded stone should decrease the erosive power of runoff and reduce soil erosion. As there is no information on the effectiveness of the stone bunds, the objective of this work is the evaluation of graded stone bunds concerning soil erosion.

In a field-scale experiment runoff and eroded material between bunds will be collected by means of field plots. Measurements will be conducted along three stone bunds, with three replications at each level. Modeling soil erosion for the same hill slope using its total length (ignoring the applied stone bunds) and comparing soil loss gained from the model and the monitoring makes possible a quantitative evaluation of the effectiveness of the implemented soil conservation technique.

Improved knowledge on the effectiveness of graded stone bunds can reduce uncertainty in large-scale hydrological and transport studies and can be an input parameter to the USLE in terms of a P factor.

Typing and characterisation of potential wine starter-cultures

AUTHORS

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Abstract

Lactic acid bacteria (LAB) play a very important role in wine production, especially in red wine. They are responsible for the malolactic fermentation (MLF), which occurs spontaneously or due to added starter cultures. It takes place during or after alcoholic fermentation. The main reaction during this process is the decarboxylation from malic acid to lactic acid by malolactic enzymes. The results of the malolactic fermentation are deacidification, production of flavour compounds and microbial stability of the wines. After MLF wines are usually stabilized by addition of sulfur dioxide. The aim of this work was to discriminate and characterize lactic acid bacteria of Viennese wines using two different PCR-based fingerprinting methods. The samples were continuously taken from two wineries and inoculated on specific media for lactic acid bacteria. For all PCR-based techniques, it was necessary to isolate DNA from typical colonies grown on the media. Furthermore different strains were tested for the production of the malolactic enzyme and the capability to produce biogenic amines, e.g. histidine, tyrosine and ornithine. The results of this study have significance in relation to the risk of biogenic amines in wine as lactic acid bacteria are a possible source. Thus the presence of lactic acid bacteria in wine is of dual importance.

KEYWORDS

Wine, Lactic acid bacteria, Malolactic fermentation, RAPD, cultural techniques

Development and Application of a Consecutive Water Soluble Phosphorus Extraction Method

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Keywords: water soluble phosphorus, long term field experiment, sewage sludge

Phosphorus, P, is indispensable for life. Recent studies suggest the end of easily available P sources within the next 50 to 100 years, which has strong implication for agriculture: There, P fertilizer is required to maintain food security. In this Master's thesis a consecutive water soluble phosphorus extraction method was developed to determine total amount of water soluble P in soil. The method was applied on seven treatments of the Ultuna long term soil organic matter field experiment. This allowed the relation of newly gained data of the developed method to well-studied properties of the site. Phosphorus is hardly soluble in water and soil solution is quickly saturated. To estimate potential total amount of water soluble P, regular replenishment of soil solution was performed. A model was developed to extrapolate concentrations of P release from ten extraction steps. It was shown that high amounts of P can be removed by consecutive water extraction, partly more than 10% of total P content, within 24h. Besides of that, also the labile P pool could be estimated by correlating data on P solubility with initial values of the field experiment, which started in 1956. Sewage sludge was one of the amendments used in atreatment, showing high total P content. However, water soluble P content is relatively low, due to P sorption on iron oxides. This has implications on the use of sewage sludge as fertilizer in agriculture, where it is considered as potential source of P in future.

Please note: I have applied in June 2011 to present the intermediate results of this study at the ELLS conference in Wageningen and got accepted. However, due to unforeseen circumstances the laboratory work had to be postponed and I only could present the research plan on the conference in October 2011. Hereby I apply to present the final results of the study. I know that participation places for the student conference are limited. I want to express my full understanding if other students get the chance to present their work, which have not participated in an ELLS conference yet.

ELLS Conference 2012, November 8-9, 2012, Alnarp, Sweden

Assessment of gully erosion by linking photogrammetric methods and field measurements

Florian Kluibenschädl, Stefan Strohmeier, Andreas Klik

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Abstract

The given MSc thesis addresses an essential sub-process of soil erosion. Clearly, countless different factors lead to the process of surface runoff and human activities are a main initiator of them. A significant rainy season in the research area seems to be the only natural “wrongdoer.” Agricultural and forestry practices also lead to the need for measures against erosive forces within existing gully systems.

Such a system of gully channels is present in the Gumara – Maksegnit watershed in the northern Amhara region. To monitor certain sections of this system, I will conduct fieldwork between the 20th of June and the end of September, 2012. Overlapping photographs, taken with a non-metric digital camera, will serve as the input data.

It is feasible to collect data in a relatively high temporal resolution. As it is possible to derive volumes via spatial analysis (measuring the differences between temporally distinct photographs) the research will reveal the sediments eroded within the gully. We use cross-section measurements to validate the remote sensing methodology however, in terms of spatial resolution these evaluations can’t compete with the first approach. Continuous spatial measurements along a gully reach allows detailed evaluations of measures to combat erosion. Such measures have existed in one sub-watershed for one year. To be more precise, several gabions have been installed perpendicular to the gully axis. An assessment of these measures is also part of the work.

A prophylactic measure against soil erosion generally helps to act in a economically and ecologically responsible way. Nevertheless, especially in urban environments it is often necessary to manage unbalanced situations rather than to keep systems in a natural equilibrium. Detailed knowledge of gully erosive processes and the impact of soil conservation techniques will help us to deal with these challenges.

Spatial Variation Scales Among the Hydraulic Properties of Two Contrasting Land Uses

Konrad Madry¹, Svatopluk Matula², Willibald Loiskandl¹, Andreas Schwen¹

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2: Department of Water Resources, Czech University of Life Sciences (CZU), Prague, Czech Republic

Keywords: evaporation method; HYDRUS; land use; hydraulic properties; spatial variation

Abstract

Soil hydraulic properties are subject to a high natural spatial variability. This makes the estimation of representative parameters, e.g. for modeling soil water balances, highly challenging. To assess the representativity of measured soil hydraulic properties, which means the unsaturated hydraulic conductivity and the retention functions, geostatistical methods can be applied. Therefore, the objective of this study was to capture changes of the hydraulic properties within the depth and distinction of it regarding different soil horizons for 2 contrasting types of land use.

To derive the unsaturated hydraulic conductivity, two contrasting land uses and soil types were analyzed: A Chernozem at the agricultural research farm in Gross Enzersdorf and a Luvisol at the forest demonstration center in the Rosalian mountains (both Lower Austria) were sampled in steps of 5 cm down a vertical transect. The samples were measured using the evaporation method (HYPROP device, UMS GmbH Germany). The evaporation data was used to subsequently derive the hydraulic conductivity and retention functions using parameter fitting procedures. The simulation software HYDRUS was used to assess the impact of different soil hydraulic properties regarding depth, as well as, varying soil horizons on water balance components. The simulation results showed how water movement and storage in the soil is affected by the soil hydraulic parameters and climatic conditions and improved our knowledge regarding spatial variations. The derived parameters of the conductivity function were also analyzed using geostatistical methods (e.g., semivariograms) to evaluate the different spatial variation scales between both analyzed land uses.

Carotenoids and Carotenoid Derived Compounds in *Pandanus amaryllifolius*

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In Indonesia, several herbal leaves also generally for condiments to improve aroma and flavor in foods e.g. pandan leaves. *Pandanus amaryllifolius* leaves, commonly known as pandan, are often used to give a refreshing, fragrant flavor to both sweet and savoury South-East-Asian dishes. Pandan leaves are also used in cooking ordinary non-aromatic rice to imitate the more expensive aromatic Basmati and Jasmine rices. As a traditional herbal this leaves are generally used to encounter the typhus illness in Indonesia. The effect of antimicrobial effect of *Pandanus amaryllifolius* leaves have been investigated on the preservation of stored milk.

In this research the general objective is to investigate the formation of natural aroma compounds (carotenoid derived aroma compounds or norisoprenoids) from natural pigments (carotenoids) as an approach for green chemistry application. Green chemistry is a part of sustainable development so it is called as sustainable chemistry. This term means that green chemistry refer to a philosophy of chemical research and engineering that encourages the design of products either processes that will minimize the use and generation of several hazardous substances .

At the beginning we used *Pandanus amaryllifolius* leaves from Indonesia as a model plant. Several natural resources in Indonesia as one of developing countries have not yet been fully utilized and have low economical values, so that give further impact for the food security in Indonesia and thus correlated to the sustainable development. In our preliminary research, we have investigated carotenoids e.g. β -carotene and lutein which are potential as enzymatic precursors by HPLC RP-C₁₈. Norisoprenoids e.g. α -ionone and β -ionone as putative enzymatic reaction products can be identified also by HS-SPME GC-MS as one approach for solvent-less flavor analysis which is suitable to green chemistry. Furthermore, we will investigate the enzymatic reaction activities in this model plant.

Key word: *green chemistry, carotenoids, norisoprenoids*

Dynamics of *Oenococcus oeni* Populations during Malolactic Fermentation of Highalcoholic Wine

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Malolactic fermentation (MLF) is a process done by lactic acid bacteria (LAB) in wine, during which L-malic acid is converted to L-lactic acid, having positive effects on sensorial quality and biological stability. Especially *Oenococcus oeni* isolated from wines is used as starter culture. Unfortunately, also these bacteria are inhibited by harsh environmental conditions during winemaking, such as high ethanol- and SO₂-concentrations or low pH and temperature. Several researchers selected and proofed strains of LAB, which are able to perform MLF under these conditions. Their results facilitated the development of starters for wines with alcohol concentrations exceeding 15% (v/v). The aim of this study was performing MLF in a Viennese Chardonnay with 15.3% (v/v) ethanol and pH 3.46. Four different, high-alcohol tolerant starter cultures were inoculated either directly or after a 48h-acclimation in a 1:1 wine-water solution. The microbiologic analyses were done by counting colonies on BCM-Agar and MRS-Agar after seven days of anaerobic incubation at 30 °C. Subsequently isolates were cultured for several molecular typing methods. Additional, L-malic acid-depletion and L-lactic acid-production were measured using special test strips. The results showed that two of the four starters, directly inoculated as well as acclimated, were able to grow after a lag phase, and thus performed MLF. The third starter was able to induce MLF with a delayed and slow performance only when inoculated directly. The fourth starter did not perform any sufficient MLF in both cases. Comparing directly inoculated to acclimated starter cultures, there was a faster recovery of the directly inoculated starter cultures. The results of the L-malic acid- and L-lactic acid monitoring agreed with that. These findings lead to the conclusion, that two of the four starters tested are suitable for this special wine. Furthermore, direct inoculation is preferable, because acclimation may additionally weaken starters.

Key words: Malolactic fermentation, high-alcohol wine, *Oenococcus oeni*, acclimatised bacteria

A GIS-Based Method for Predicting Hourly Domestic Energy Need for Space Conditioning and Water Heating Of Districts and Municipalities

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Key words: domestic buildings, energy need, GIS, sub-regional administrative units, model.

This work presents a method developed for predicting the hourly domestic energy need for space conditioning (SC) and water heating of the domestic buildings of administrative units on the sub-regional level (districts and municipalities).

The core of the method is an RC-model, which is able to predict the hourly energy need for SC of individual buildings based on limited input data and with low computational capacities. The required data concerning the physical characteristics of the buildings will be obtained from buildings typologies. The differences in energy need of every single building due to human occupancy patterns will be considered by using a stochastic occupancy model. In order to classify the individual buildings into the different typologies GIS data is used.

The results of the method represent an improvement in the way that ground and peak loads of heating/cooling are predicted for administrative units on the sub-national level. Furthermore, the geo-referenced results provide a solid information basis for energy use plans, climate protection plans or in the early planning stages of district heating/cooling nets or Combined Cooling/Heat and Power (CHP or CCHP) communal investment initiatives.

Reliability and robustness of the method were tested. A case study with a Bavarian municipality showed the ability of the method for rapidly predicting the hourly energy need for SC and DHW of a large domestic building stock. A global sensitivity analysis was used for testing the robustness of the method to changes in the input variables. The results of the analysis showed that the method is able to reproduce typically observed patterns and that the input variables related to human behaviour are decisive for the obtained predictions.

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Spatial Distribution of Soil Properties as Indicators of Soil Erosion

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Abstract

This MSc-thesis is part of the project “Unlocking the potential of rainfed agriculture in Ethiopia for improved rural livelihoods” in Gondar, Ethiopia. Here, intensive rainfall events over a short period of the year and steep slopes can lead to severe soil erosion. In addition, the high runoff of rainwater leads to water scarcity in periods of no rain, due to a lack of water storage in the soil. Within the scope of the project, soil conservation measures were set to decrease runoff and erosion. The improvement of the field cultivation through conservation measures may result in more sustainability of agriculture that will play an important role in the future.

The objective of this MSc-thesis was to find a relationship between the spatial distribution of soil properties and the location of the soil conservation measures (in the case of this work applied stone bunds) that can probably give information for the soil translation processes taking place since the set up of the measures. The measured physical parameters underlie a certain variability, because of the natural spatial variability within the physical soil properties and possible measurement inaccuracies. To overcome this problem and evaluate the spatial variation, geostatistical data analysis methods (auto correlation and cross correlation) will be applied.

In a field-scale experiment, transects will be measured crossing several stone bunds. The measurement along these transects include saturated hydraulic conductivity, bulk density and soil moisture. In addition, measurements with tension infiltrometer will be conducted to gain information for the near-saturated hydraulic properties.

The experimental approach with knowledge of the spatial distribution of the measurements will support studying the spatial behavior of the soil properties. Showing a cyclic behavior at the same scale as the conservation measurements may indicate an influence on the soil properties and soil erosion.

Title: Balancing Residences and Green Spaces in a Growing City: Changes in Actual Use of Allotment Gardens in Vienna after 1990s

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Keywords: allotment gardens, *Kleingärten*, management of recreational green spaces, landscape planning

Allotment gardens have been a kind of important green spaces in European cities since the end of 19th century. The main function of them had been food producing until W.W.II ended and we are not facing such a food crisis now. However, many allotment gardens still remain in many cities. Vienna is one of such cities and the city government amended the allotment garden law in 1994. Since then, users of allotment gardens can legally live in their plots all year round. This research aims to find what changes have occurred in actual use of Viennese allotment gardens since the amendment of the allotment garden law and discuss the current function of them. By recording present layouts of plots and comparing them with ones in 1970s which can be referred to documents, the following facts were found. First, there are fewer trees in plots renovated after 1994 than in older plots. Second, visitors walking a path can hardly see and enjoy gardens within renovated plots because of the position of new buildings inside plots. Third, there still remain older plots as they were before 1994. Because Vienna is still a growing city, the decision of changing allotment gardens is an appropriate solution to secure both residences and green spaces. However, they are going to be just private residences with large gardens and the character as public green spaces will be lost. As long as they are part of limited green spaces inside a city, they should be more public spaces to some extent so that visitors can also have enjoyment. The next step will be to consider how we should manage renovation of older plots.

URBAN ENVIRONMENT

From “Brownfield” to “Greenspace” - The Concept of Wilderness in modern Landscapearchitecture

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A collateral phenomenon of cities and cultural development seems to be the exclusion and alienation of nature. In a world that is getting increasingly urbanised this relation towards nature is no longer valid and needs to be reconsidered. By dissolving the original contradiction between city and nature beneficial long-term perspectives can be engaged creating green cities of tomorrow.

Derelict land in periurban areas can be regarded as the missing link between cultural impact and natural dynamics. Due to structural changes in economy their former functions became obsolete inducing the withdrawal of anthropogenic actions. Boundless in its development and perfect in its adaptability nature recaptures these sites and transforms them gradually into an urban wilderness increasing biodiversity and enabling informal occupancy.

As a way to assure green structures within growing cities, this thesis focusses on the conversion from brownfield to greenspace and how the concept of wilderness can be integrated into a new design concept. After referring to major qualities of brownfields, encouraging efforts and interests as well as hindering barriers of a “green” transformation will be investigated. Planning examples from Berlin, Paris and Vienna demonstrate a new generation of parks characterised by a transition from strict maintenance towards a *laissez-faire* attitude. This approach will be transferred into a design proposal for one part of the urban expansion area “ErdbergerMais” in Vienna where the conversion of brownfields into a central landscape park is intended.

Green spaces enhance the image and development of urban districts. By preserving the dynamic character of brownfields, design becomes the framework for a spontaneous progression of vegetation instead of solely generating a finished and functionalised product. Thus natural dynamics could be experienced within an urban context overcoming the distance towards nature and enabling green spaces to adapt to changing demands and needs of people.

Key words: brownfields, green space, urban wilderness, transformation

Saxony-Anhalt's Strategy to Adapt to Climate Change – Evaluation from an Economic Point of View

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Vulnerability, Adaptation, Economics, Forestry

The German federal state Saxony-Anhalt implemented a strategy to adapt to climate change in 2010. It presents the vulnerabilities to regional climate change of different sectors and the fields of action to adapt the country to these impacts. In a corresponding action plan adaptation measures for each sector are listed.

The present thesis analyses the latest climate projections of two regional climate models – REMO and WETTREG – and thereof identified vulnerabilities for the sectors water, agriculture, forestry and nature protection. The region of Saxony-Anhalt will suffer from increasing temperatures and less precipitation. Hence the already by droughts affected region will further exsiccate. In a second step and with having these results in mind, the strategy and the action plan are evaluated. Evaluation criteria are whether the vulnerabilities presented match the vulnerabilities identified in the analysis, whether state intervention is justified from the economic theory and whether the adaptation measures are efficient. First the strategy and the action plan are examined in general and then concrete adaptation measures on the example of forestry are assessed. Forestry shows to be especially affected due to the high water demand of trees. Its long planning horizon raises the need for timely adaptation. For this section the results will be obtained until the end of July.

The results are expected to show, if the strategy and the action plan achieve their aim to adapt Saxony-Anhalt efficiently to the expected climate changes. Recommendations for local decision-makers to improve the strategy and the action plan shall be derived as well as recommendations for decision-makers in adaptation processes in general.

The thesis is integrated into the research project “Implementation of a study about the impacts of climate change in Saxony-Anhalt”, appointed and funded by the State Agency for Environmental Protection of Saxony-Anhalt.

Dissolution of Risk Elements from Silver Smelting Slag

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Slags produced during the medieval smelting of precious metals contain elevated levels of risk elements (RE) acting as a source of inorganic pollutants into surrounding soils and surface waters where they are deposited. This experiment examines the solubility of selected risk elements (Pb, Zn, Cd, Mn) from slag samples taken from the silver smelting slag deposits of Kutná Hora in the Czech Republic. Samples were subjected to different solvents prepared in the laboratory to simulate environmental solutions which may be involved in the dissolution of REs from the slag as part of the natural chemical weathering process. Slag was exposed to a rainwater simulation solution (RSS) and a weak citric acid solution plus control solutions (deionised water) over a one month period with solution analyses made at intervals of 1, 24, 168 and 720 hours. The results showed that Pb, Zn and Cd have low extractability by citric acid as the soluble concentrations decreased along with the decomposition of citrate, whereas Mn showed an overall increase. RSS proved to be more effective in the dissolution of REs whereby an overall increase in soluble concentrations was observed in each case except for Pb. The content of Cd remained low despite an overall increase (≤ 0.32 mg/kg). The RSS correlated significantly with the control solution of slightly higher pH for Cd, Mn and Zn. This experiment serves as a base study for risk assessment of the studied environment.

Herbal therapies for treatment and prevention of human and canine hyperuricemia

Lucie Frůblingová (main author), Jaroslav Havlík, **CULS Prague**

Herbal drugs are more and more used both in human and veterinary medicine to mitigate and prevent minor diseases or to support conventional medicine. Hyperuricemia is the condition occurring in great apes including humans, but also in Dalmatian breed dogs. While all other mammals excrete allantoin, in these species uric acid is the end product of purine metabolism. It occurs in blood at high levels and just a slight alterations lead to formation of urate crystals in joints and inflammatory conditions called gout or urinary calculi development. Xanthine oxidase is the key enzyme of purine metabolism and thus its inhibition is the therapeutic target for anti-hyperuricemic drugs.

Fruits- and vegetable-rich diet or red wine consumption is related with reduced gout risk in humans and the effect is linked to polyphenol constituents. Several plant-based dietary supplements claim to alleviate symptoms of gout in humans, but not in pets, although there may be market opportunities.

We screened 20 medicinal extracts, 20 essential oils and 20 fruit extracts rich in polyphenols in order to select potent xanthine oxidase inhibitors. In the first series of tests, extracts were tested *in vitro* by the microdilution spectrophotometric method. The most potent product in first stage of tests was the bud extract from the black poplar (*Pupulus nigra*), which inhibited XO at 8,2 µg/ml. As the most potent candidate, this extract has been administered to hyperuricemic rats, where its effect was compared to non-treated control and standard drug allopurinol treatment. Unlike allopurinol, the extract did not show xanthine oxidase inhibition in rat liver, but showed an increased renal excretion of uric acid and reduced urate levels in blood by 25%. Currently, poplar extract is a permitted feed additive under EU directive 1831/2003 and thus, it has a high potential as an effective feed supplement for dalmatian breed dogs.

Revitalizing Dying Detroit Analysis of Urban Transformation in Detroit Metro

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The city of Detroit is one of the first to have to deal with economics problems of post-industrialisation. Detroit was once a crowded urban center, at its peak in 1950s it had population nearly two million dwindling to 800 000 today. Nowadays Detroit is struggling with chronic urban issues like high unemployment, population loss, criminality, deteriorating infrastructure and property abandonment.

This work is focused on determination of the main cause of the depopulation in Detroit Metro and the other forces which led the city to the current state of regression. The main centrifugal and centripetal forces were calculated according to the created econometric model.

There have been several plans for Detroit development, briefly there are two opinions on what to do about Detroit, those who want to see more investment in the city by federal government to help bring industry and people back and those, who feel the city has to accept that it has changed and look to the future. As Jason Peete said "It's not going to look like the Detroit of 1950. It's not even going to look like Indianapolis which has 500,000 people. It has to be something unique" (Good, 2012). Which urban development plan should be chosen and why? That is question, which is analyzed in the second part of this work.

The experience of Detroit and the problems that it now faces now should be instructive for the rest of the developed world. In the coming decades, as countries population decline and factories move to the developing countries, cities in developed countries can follow Detroit example.

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City Real Estate Impact on the Environment and Brownfields

Tomáš Klika, CULS Prague

The purpose of this research is to identify the impact of city environment on real estate value. Specifically analysis of Brownfields will be conducted for the city of Prague. Prague has seen successful development projects in the past and overcome some the larger environmental burdens and ecological setbacks with industrial properties.

As part of this research project, impact of environment upon real estate value is estimated using HPM (Hedonic Pricing Method). The results show that the interference of environment is significant in almost all analyzed areas of Prague.

Reuse value of Brownfield properties, opportunities to create a new part of a district or a completely new district, providing healthier living environment and higher quality of life for Brownfield areas. Positive cultural impacts as well as potential touristic industry are a direct result of brownfield reusage.

With this information we can then measure the environmental impact of city expansion. A better understanding will be obtained from the result of the study, allowing us to form a picture of further development trends in this sector of real estate.

Cultivation of different lupin varieties in the central Bohemia region

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The varietal experiment with lupin was placed on the fields of Cooperative Farm Nečín, which is located in the central Bohemia region, at an altitude around 400 m above sea level. They have grown lupin since 2005, with yields 1 - 2 t/ha and use lupin seeds for feeding milk-cows. The reason for our varietal experiment was to find suitable low-alkaloid varieties of lupin for that area. The experiment lasted from 2009 to 2011. Slightly different varieties were seeded every year. During the three years were tested 4 varieties of white lupin, 11 varieties of narrow-leafed lupin and 1 variety of yellow lupin. During all three years there were seeded 2 varieties of white lupin (Amiga, Dieta) and 6 varieties of narrow-leafed lupin (Boregine, Boruta, Galant, Probor, Rose, Viol). Lupin was seeded during April every year. Lupin seeds were grinded (with exception of 2 varieties in 2010) and inoculated with root-nodule bacteria. Pre-emergent herbicides were applied after seeding. Harvest was divided according to the lupin sort. Narrow-leafed lupin was harvested in August or September, white or yellow lupin was harvested in September or October. In 2009 there was heavy rainfall during the vegetation period. It influenced yields of white and narrow-leafed lupin, the yields were more than 3.5 t/ha. In the next two years the rainfall was lower and the yields were lower too (around 2 t/ha). It is necessary to stress that the yields during the first year were negatively influenced by the strong attack of anthracnoses. Suitable fungicide Amistar Xtra (1.0 l/ha) was applied during the next two years. Boruta was the best variety from narrow-leafed lupin. But we found that after application of suitable fungicide white lupin can have the highest yields and highest content of nitrogen substance in seeds. Problem has been post-emergent application of herbicides against broadleaf species.

Energy balance of growing and use of energy crop – hemp

Michela Krejčová, CULS Prague

This thesis discusses energy balance of hemp biomass autumn and spring harvest to make solid biofuels –briquettes. The hemp plant (*Cannabis sativa* L.), variety Bialobrzeskíe, was sown in the Suchdol district of Prague in May 2009 and June 2011. Its samples were subjected to experiments during which moisture content (MC) and gross calorific value (GCV) were determined. Autumn harvest produced 24.30 t. ha⁻¹ of green and 10.93 t. ha⁻¹ of dry biomass. GCV measured in adiabatic calorimeter MS 110 was 17.04 GJ. t⁻¹, which determined the gross energy yield 186.28 GJ. ha⁻¹. Spring harvest produced a 31% decreased biomass yield with a moisture content of 19.09% and GCV at a level of 19.31 GJ. t⁻¹. The detected gross energy yield was 145.59 GJ. ha⁻¹. Autumn harvest total inputs (22.154 GJ. ha⁻¹) represented 11.8% of outputs. Spring harvest sum of energy inputs (16.849 GJ. ha⁻¹) made 11.5% of total produced energy. Autumn share of direct inputs was 49.99%: labor force 0.53%, energy in fuels 49.46% and indirect inputs: energy embodied in machines 4.3%, energy in fertilizers 39.51% and energy in seeds 6.19%. Spring harvest consisted of 34.2% of direct energy and 65.8% indirect energy; individual items of inputs: energy in fertilizers (8,753 MJ. ha⁻¹), fossil energy (5,663 MJ. ha⁻¹), energy in seeds (1,371 MJ. ha⁻¹), energy in machines (960 MJ. ha⁻¹) and energy of human labor (104 MJ. ha⁻¹) which represented: 51.95%, 33.61%, 8.14%, 5.7%, and 0.62%, respectively. Regardless higher energy gain in autumn (164.13 GJ. ha⁻¹) compared with spring (128.74 GJ. ha⁻¹), it was found that for the listed conditions spring harvest should be preferred because its energy efficiency (EROEI = 8.64) is higher as compared with autumn harvest (EROEI = 8.41).

Quality of Life in Future Cities: Development of a Multicriterial Index

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Up until recently, quality of life has been measured only by conventional economic indicators such as GDP or GNP per capita. With the rise of large urban areas around the world, new problems and challenges emerged that needed to be accounted for. Therefore, a number of new indicators that measure other than economic variables have been introduced. These include, for example, HDI (published by United Nations), Happy Planet Index (introduced by New Economics Foundation) or Index of Sustainable Economic Welfare (is computed by adjusting conventional GDP measurements or Quality of Living prepared by consulting company Mercer. Even private companies invest in improving quality of life because that can extend the market they operate in. An example of this is IBM's Smarter Cities.

With the technological progress and deteriorating environment, these new indicators are rapidly aging. There is a need for a new multi-criterial indicator that will hold pace with fast development. This is developed in this paper considering intraspatial and intratemporal dimensions and it includes new technological and environmental circumstances.

Using this indicator, life in future cities around the world may be evaluated. As an example, following two cities are analyzed: Prague and Amsterdam. Number of criterions were values with weights that can be changed (and therefore the index remains compatible throughout time) according to importance of the factor. Among those were 'traditional' economic variables such as purchasing power, number of working hours but also more abstract concepts of quality of air, availability of public services and their quality, availability of public transportation, openness of local governments and strength of democratic mechanisms (number of referendums and easiness to amend wrongdoing by a municipality.) As far as the current results stand we can argue that Amsterdam was stronger in most categories, losing only in public transportation chapter.

Influence of Microbiological Quality of Raw Milk on its Technological Parameters

Kamila Nováková, CULS Prague

Diploma thesis deals with the microbiological properties of raw milk and it refers also to some other different influences on its quality and technological parameters. For the experimental work, the milk samples were collected from two stables with Holstein cattle of a private farmer from April 2011 to February 2012. First part of the milk samples came from the stable 1 with 540 cows that could not graze in the pasture. The second part of the analyzed milk samples came from the stable 2 with 110 dairy cows, which were allowed to use the pasture.

Based on the results, it can be stated that the cattle-keepers approach was one of the most important factors influencing the quality of the examined raw milk. That aspect revealed as significant for the whole farmer's herd when the cattle from the stable 2 have been moved to the stable 1; milk from that unified herd presented a significant deterioration in microbiological quality for a weeks. However, raw milk quality has been improved to the required status soon after proper care of animals and appropriate hygiene had been introduced to the whole herd.

Laboratory research of milk samples was carried out in the Dairy Research Institute - Výzkumný ústav mlékárenský s.r.o. in Prague, where microbiological, physico-chemical and technological parameters were analyzed. There were two model experiments done in that research laboratory to verify the effect of the Lactococcus culture CCDM17 (Culture Collection of Dairy Microorganisms Laktoflora CCDM 17) on the quality of the sterilized milk.

The model experiments have proven that application of Lactococcus culture CCDM 17 had improved the quality of such treated milk in terms of its increased thermostability and much better taste.

Environmental Protection Activities in the City of Kladno (Case Study).**Ivana Plučarská, CULS Prague**

Environmental policy is a coordinated policy that the individual States of the European Union largely created themselves. Searches of literary documents, laws and documents the first phase of this thesis. Further, the work concentrates on the city of Kladno. The aim was to evaluate the current and prospective activities of the city government, leading to environmental protection and public health. Also, to evaluate whether this activity corresponds with the Charter of sustainable development. The methodology was derived from survey methodologies phasing Local Agenda 21, principles of environmental management system (EMAS). Environmental impact assessment, as amended, provides an objective and systematic development of policy. To obtain information from the population, a survey was used. Kladno City Government is not sufficiently open to the public and does not motivate people to do more to enter into environmental issues. On the other hand, a focus on projects that are funded from the grant program is implemented. Based on new knowledge, we developed a set of specific recommendations in order to more objectively and more effectively enforce appropriate guidelines and methods of environmental management. Kladno city should change its approach and environmental management in the way to focus on working with individual citizens and companies operating here and to develop communication with them, volunteer programs, as well as an integrated collaboration on paid projects.

Keywords: sustainable development, environmental policy, environmental management

Anaerobic Biodegradability of Two Biodegradable Biopolymers at Mesophilic (35 °C) and Thermophilic (50 °C) Temperature

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This work is focused on anaerobic biodegradability of two major bioplastics - polylactic acid (PLA) and polycaprolacton-starch blend (PCL-starch) during anaerobic digestion at mesophilic 35 °C and thermophilic 50 °C temperature. These materials are commonly used bioplastics represented by widely used products – PLA cold drink cups and PCL-starch blend shopping bags. Experiment had been given at discontinuous batch reactors of 1 l volume. During 60 days, cumulative biogas production was recorded and biogas composition was measured. Changes in surface structure of used biopolymers were determined after end of the experiment. Biodegradability around 7 % was similar for both biopolymers at mesophilic temperature. Highest biodegradability rate (88 %) was reached by PLA at thermophilic temperature. PCL-starch blend reached 14 % at the same temperature. More visible changes in surface structure were observed after anaerobic digestion at thermophilic temperature. Temperature is noticeably important factor influencing biodegradation of biopolymers in anaerobic conditions, especially for PLA. Depending on the operational temperature it is possible to obtain from 0,03 to 0,411 m³CH₄.kg⁻¹ by the anaerobic digestion. Energetically valuable methane coming from anaerobic biodegradation in biogas plant can be used for combined electricity and heat production or as a fuel in transportation.

The behavior of risk elements in soils affected by metallurgical activities

Adéla Rubešová (main author) Václav Tejnecký, Antonín Nikodem, Petr Drahota, Snejana Bakardjieva, Ondřej Drábek. Luboš Borůvka (supervisor), **CULS Prague**

Determination of total concentrations of risk elements is not sufficient for risk assessment associated with their environmental burden. Use of speciation or fractionation was proved to be necessary for risk assessment of soils contaminated by anthropogenic activities. Moreover, it is essential for evaluation of risk element mobility and bioavailability.

This study was aimed to perform risk elements fractionation and to identify main factors affecting their mobility in anthropogenically polluted soil.

The study area is located in the vicinity of historical Czech mining town Kutná Hora. This locality has been contaminated by risk elements from silver ore mining and processing and waste (slag) management. In total, 25 soil samples were collected from 9 sampling sites covering the study area.

Basic soil characteristics were determined for all collected samples. Moreover, four-step sequential extraction procedure proposed by the Community Bureau of Reference was performed. The total concentration of Ag, Cu, Cd, Pb, and Zn in digests or extracts were determined by flame atomic absorption spectrometry.

Our study confirmed the contamination of studied area by risk elements originated mainly from metallurgical activities. The most abundant fraction was the reducible one – with the bonding of investigated elements on Fe and Mn oxyhydroxides. In the main body of slag heap this fraction of risk elements was bound mainly to sulfides (e.g. wurtzite - ZnS). While in the surrounding soils the reducible fraction of risk elements was associated with organic matter. Considerably lower share of risk elements was found in the exchangeable fraction; however, this fraction presents the highest risk for the environment. The residual fraction does not represent risk for environment and originates from naturally elevated or silicate bonded content of studied elements.

As the main factors affecting the elements mobility was revealed the distance from the source of contamination, pH and organic matter content.

Rural development policy and the demands of young rural population (the case study of one small rural town)

Jitka Šolínová, CULS Prague

Because rural development is complex issue which is targeted towards people, it is necessary to have comprehensible information about the needs of people in certain localities where rural development projects are implemented. Mismatching the expectations (demands, needs) against the projects which are based on certain documents means the rural development does not achieve its goals as they are formulated in rural development documents. They are the frames in which this thesis is developed. The main aim is to analyze the demands of the population in one small rural town (population about 2,000) and to compare these demands (which are articulated by surveyed population; the members of this population are also tax-payers who contribute through their taxes to the funds used for rural development) with concrete measures in Rural Development Programme of the Czech Republic 2007-2013. The comparison will demonstrate how deep is the gap (if there is any) between expectations (demands) of concrete population and officially proclaimed measures aiming at helping the people to meet their needs and to deal with the problems in the countryside (in the other words: is there a gap between what the people want in concrete locality and what the official documents / and experts/ want?). The research will also indicate which measures in Rural Development Programme of the Czech Republic 2007-2013 are considered as the most needed and which are not considered as important by taxpayers in the investigated locality. The research focuses on young people (20 – 30 years old) living in the Eastern Bohemia small rural town who are highly important for further development of the rural area where they live (they will be the main taxpayers in the future). The main method used in the thesis is questionnaire survey in the locality under research. The research will be conducted in the summer 2012 and the findings will be available in September 2012.

Passive safety of pedestrians

Pavel Tulach, CULS Prague

The aim of the presented project is an examination of the consequences of traffic accidents involving the collision between vehicles and pedestrians and of the measures which could minimize these consequences. In the first part of the research the existing legislative arrangement is introduced, which revolves around the relationships with unprotected parties - i.e. with pedestrians. The following part is focused on potential head injuries, an evaluation of the injury criteria known as HIC (head injury criterion) and the associated biomechanics of injuries to the head, the most vulnerable part of the human body. Thereafter possibilities of passive protection of the pedestrian are described, for example by means of active hoods, a system of outer airbags for pedestrians and night vision systems. In the practical section of this work, experiments are introduced and described. Calculated head injury criterion for two different types of hoods and angle the head impactor. Also introduced and described are the results of data collection and the discussed factors which influence the level of injury to the pedestrian in a collision with a passenger car.

The evaluation of yield under controlled trafficking farming system

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Characteristic features of agriculture in the Czech Republic are the use of heavy machinery with big shots, causing soil compaction. In combination with random crossing of mechanization the soil is highly degraded. Controlled traffic farming (CTF) system can be tool for elimination of these negative effects.

In this diploma thesis, CTF system is introduced in the first section of the work. The basic elements of this system, the effects that has on soil properties and crop yields are listed here. The field trial samples of crops were taken in order to evaluate the yields. Random crossing and CTF technology were observed. Samples were subsequently processed in the laboratory and the data obtained were then statistically evaluated. Statistically significant differences between the technologies were demonstrated only in the year 2010 on chosen level of significance. Random crossings technology showed higher yield than CTF technology in this year.

Greenhouse Gas Emission Balance of a Danish Small-Scale Organic Farm

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Abstract:

A comprehensive quantification of farm-level GHG emissions has been performed on a Danish small-scale organic farm applying IPCC Guidelines, including direct and indirect energy use related GHG emissions and emissions from LULUCF.

A comparison of farm-level GHG emissions with the Danish national level was performed using the Danish National Inventory Report submitted to UNFCCC. Total farm-level GHG emissions were broken down in sectors energy, agriculture and LULUCF.

Soil C stocks of the case farm increased by 1.01 t C ha⁻¹ yr⁻¹ (cropland remaining cropland) and 1.33 t C ha⁻¹ yr⁻¹ (cropland converted to grassland). Due to high soil C sequestration rates the farm acts as a net carbon sink.

The energy sector of the farm emitted 91% and 83% less GHG emissions per unit area and per unit output, respectively due to a high level of extensification.

The farm's agricultural sector emitted 27% less per unit area and 69% more per unit output. Without LULUCF the farm emitted 47% less per unit area and 13% more per unit output. In a comparison based on annual caloric output the GWP was equal for both farm systems.

With the current livestock configuration and the ratio of cropland to grassland area the case farm could supply 1660 kcal person⁻¹ day⁻¹ if the farm would be scaled up to the Danish national level. Danish caloric supply is around 3400 kcal person⁻¹ day⁻¹. With a modification of livestock configuration and a proportional cropland area expansion the case farm could supply 3900 kcal person⁻¹ day⁻¹. The GWP (energy and agriculture) per unit area would be 32% lower than the Danish national level.

In conclusion, the model of an extensively managed small scale organic farm can offer an alternative to conventional farming with regard to GHG emission levels and caloric output.

Key words: GHG emissions, agriculture, organic farming, extensification

Environmental impacts of novel co-substrates for the production of Biogas – a comparative Life Cycle Assessment

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Animal production accounts for a high percentage of greenhouse gas emissions worldwide and contributes to environmental pollution through nutrient leaching to water bodies or acidifying emissions to air, among others. Novel ways to deal with animal production residues, such as animal manure and other organic wastes are needed to curtail these negative effects. In recent years the production of biogas from animal manure has gained increase attention as it is a holistic approach to address these problems, while providing the added benefit of energy recovery. Yet, because the methane production potential of animal manure is low, biogas plants depend on the addition of high energy organic wastes as co-substrates to manure to make their operations profitable. The latter are in short supply and are already being imported in countries like Denmark. Thus, it has become important for biogas plants to find additional co-substrates to manure to continue their plant operations with high biogas yields. Though biogas plants have already started their investigation into novel co-substrates, there is presently a lack of knowledge about the environmental impacts of using one co-substrate versus another. Therefore, this study focuses on assessing the environmental impacts of three co-substrates to pig slurry which are currently underexploited; namely wheat straw, the organic fraction of municipal solid waste, and the solid fraction of liquid-solid separated slurry. With this goal, a comparative life cycle assessment of biogas production with these three scenarios is being performed. The objective is to discover environmental hotspots of biogas production and offer guidance for future choices of co-substrates to animal manure, as well as to guide future research and development in this field.

Impacts of Quinoa Cultivation on Soil Stability in the Fragile Landscape Ecosystems of the Southern Bolivian Altiplano: A Case Study from Chacala, Potosí

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Increasing international demand and mechanization lead to high sales revenues and vast extension of quinoa (*Chenopodium quinoa* WILLD.) cropping, compared to traditional low-intensity cultivation accompanying livestock rearing. Harsh climate and soil conditions make quinoa one of very few crops that can be grown in the Bolivian Altiplano. The sensitive landscape ecosystems are characterized by a low resilience and slow recovery from disturbance. Increased quinoa cultivation caused the extensive conversion of natural shrub-land to cropland, exhibiting bare and sandy surfaces for most of the year, necessarily leading to accelerated wind/water erosion rates. Constrained production leads to further expansion of cropland area. Around Chacala, quinoa cropping gradually increased over the last four decades and today about 2/3 of the land are under active cultivation, fallow or were abandoned after years of use. Bare or poorly covered soils facilitate intensive erosion processes.

In a 200 ha watershed, erosion features were mapped and assessed in their current state. Wind and/or water erosion were found to be present throughout the entire catchment at varying severities. Soil structural degradation was widely encountered whereas highly dynamic gully systems and intensive deflation locally produced the total loss of top soil and soil fertility, strongly impeding soil productivity, phenomena intimately associated with poor and inadequate soil management and the absence of soil conservation techniques. The degradation seems to be purely triggered by unthoughtful anthropogenic land use changes, calling for sustainable soil stewardship.

The case presents a typical example for developments in recent decades, where the possibility of short term development will seriously jeopardize future livelihood of the local population. Integral and comprehensive measures have to be taken to stabilize the soils which are the key resource for all future production. The present situation is critical and self-perpetually triggers the permanent loss of marginal yet productive landscapes through desertification.

Non-state Cooperation in Environment Protection Area: A Solution for Waste Management in the Republic of Moldova.

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Key words: Chisinau, Moldova, non-state cooperation, waste management and governance

In many developing countries, where state actors alone are not able to ensure efficient waste management, the participation and synergetic cooperation of non-state ones, such as companies and non-governmental organizations (NGOs), is suggested.

Thus, the core of my work is the model of non-state cooperation aimed to address problems in waste management in a developing country and its cities. The country chosen as a case study of inefficient waste management is the Republic of Moldova, the city I pay much attention to is its capital Chisinau, and the non-state cooperation example the model is applied to is the campaign “Hai, Moldova!”.

All in all, the work is focused on answering the following questions:

- 1) Why is waste an important issue to be addressed?
- 2) How can waste be managed efficiently?
- 3) Why is waste management and governance a problem in Chisinau and the whole Moldova?
- 4) Why should private companies and NGOs be involved in waste management?
- 5) How can non-state actors work together to address the waste issue?
- 6) How can the waste issue in Moldova in general and in Chisinau in particular be solved through non-state cooperation?

Answers to these questions resulted in a practical model that can be used for assessing the performance of already realized non-state cooperation in waste management, monitor the development of a present cooperation system, and develop future efficient alliances. Applied for the case of “Hai, Moldova!” in Moldova, it has shown that despite certain achievements of this campaign, there are still improvements to be made.

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CAN URBAN CARBON SEQUESTRATION REDUCE CLIMATE CHANGE?

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Key words:

Soil
Carbon
Urban

Urban lands covers approximately 3% of the terrestrial land area, this constitutes an important component of the global land use and area change matrix (Holmen 2006; Grimm et al., 2008), thus must be considered in all climate and environmental issues. Offset of CO₂ emissions of which urban areas are a significant source, can be achieved through additional storage and protection of carbon pools located in human settlements (Churkina et al., 2010 ; Lal, 2012). One resource that has the potential to increase the terrestrial sink of carbon in urban areas is domestic home gardens due to its forest-like nature (Kumar 2011). Home garden size and managerial interventions of gardeners are important determinants of biomass and soil carbon pool. (Kumar et al., 1994; Saha et al., 2010 cited in Kumar,2011). The focus of this study is to quantify Carbon and Nitrogen in urban domestic gardens by looking at the contribution of different land uses to the soil organic carbon (SOC) pool as well as establish a relationship between Nitrogen deposition and Carbon sequestration in domestic gardens, since the cycling of the two elements (N and C) have been suggested to be tightly coupled. The project will also consider how different management practices by gardeners affect the SOC pool. The results of the study will allow conclusions on how to modify management practices in home gardens to increase their soil organic carbon stocks.

Potential wetland areas upstream Isefjord and Roskilde Inlet, Denmark

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Key words: Wetland restoration, Nitrate retention, Green structure, cost-benefit-efficiency

I want to investigate the environmental impact of the 'tool' wetlands in the Green Growth agreement and the Water Plan. The Green Growth agreement and the Water Plan is the Danish implementation of the demand in The EU Water Framework Directive to achieve 'good ecological and chemical status' by 2015. One million Dkr. is earmarked to establish and reconstruct wetland before 2015.

The reconstructions of wetland are planned in order to reduce the surplus of nutrients that are relished to Isefjord and Roskilde Inlet among others. It is stated in the Water Plan that the prioritization between areas for wetlands should be founded on the cost-benefit-efficiency to capture Nitrogen.

A Wetland area can give many other benefits and withdraws for the environment then capturing nutrients. Those pluses and minuses are poorly covered and is not planned to be incorporated in the prioritization between potential areas for wetlands.

It has been decided to establish 335 hectares of wetland to retain 38 tons N in the upland of Isefjord and Roskilde Inlet. I have chosen 6 potential wetland areas in the upland and will analyze, argue and discuss which areas should be chosen to establish responding to following criteria;

- Retention of N
- Land use in the surroundings that are affected and the size of the area affected by a higher water table
- Influence on Natura 2000 areas
- Benefit for the green structure in the region
- Stakeholders – and how their interests are affected
- Other environmental issues that local municipalities may have focus on
- Costs

Green areas as a revitalization centres – development of new functions in Polish cities**BEATA DREKSLER**

Urban revitalization projects started in early 60s' and quickly become a very important issue in the modern urban planning and design. There are many programs, projects and activities around the world associated to this concept. Streets, quarters, even the entire cities are revitalized. Revitalization, from the beginning was treated as an interdisciplinary process where urbanism, architecture, economy, sociology, psychology and more are involved. Landscape architecture is integral part of it. Green areas and open spaces are crucial elements for healthy city. They have so many different functions like biological, aesthetic, social, economic and recreational – just to mention some of them. There are many examples around the world where green areas are revitalization centers, the main point of interest and investment.

The main focus in this article is on the role of green areas as a centre of revitalization process in the urban environment. There is no doubt that green areas can become the most important, focal point of revitalization project and further "spread" different functions on the whole quarters and city itself. In many cases, it is connected to implementation and development of new functions that did not exist in the site before. Designing of new cultural, educational and recreational facilities can improve the impact of the project and change its functions and later - the character of the whole neighborhood. In the article different projects from Polish cities are analyzed. Some of them are located in the cities' centres as a new proposal for city inhabitants and tourists, others are design to be a main area for local communities' life and recreation. In all cases the involvement of neighbours, local authorities and business is crucial to respond to all needs and expectations.

The main goal of the research is to compare how and which functions are implemented to create a successful project and improve the life quality in the city.

The Importance of Profiles of Volatile Compounds in Food Quality Assurance Based on an Example of Honey Bee

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Nowadays, quality is a decisive feature of the desirability of the product. In the food industry product quality is of particular importance because of the need to ensure the safety of the food offered on the market. The quality of the food consists of many factors including functionality, practicality, durability and safety. One of the indicators commonly used in the assessment of food quality are the profiles of volatile aromatic compounds contained in products. Scent profiles provide not only sensory impressions but can also be used to assess the origin of raw materials used in production, identification of chemical compounds forming the correspondent sensory impressions, qualitative and quantitative determination of these compounds and to assess the suitability for consumption of the product. In the present work were included the possibilities of using the honey aroma composition to gain information about the product and instrumental methods commonly used to determine the aromatic profiles. The phenomena described are intended to realize the importance of odour in food quality assurance.

Keywords: food quality, aroma, honey, volatile compounds

Phytoremediation – Rescue for the Future Cities

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key words: phytoremediation, pollution, xenobiotic, contamination

As the urban environment is becoming more and more contaminated in recent years, sciences had to create the solution for the problem of pollution. One of the discovered methods is phytoremediation which is a plant technology for environmental clean-up. Using specially selected plants it is possible to eliminate pollution from the air as well as to clean up wastewater, absorb heavy metals from soil or, at least, to stop them from migrating into the groundwater.

Such plants are characterized by two factors: their ability to grow in contaminated areas and their tolerance for a high level of xenobiotic in their tissues. They can be found within high trees, small shrub, perennials, climbers and others. Some of them are able to metabolized removed contamination such as pesticides into non-toxic substances (phytotransformation), others may accumulate pollutants, especially heavy metals from water, soil or air into their biomass (phytoextraction). Also phytostabilization is an important type of phytoremediation. It concentrates on reducing effect of natural erosion that may cause pollutant movement. What is important, phytoremediating plants can be used not only for its cleaning talent. Many of them are considered to be ornamental plants, therefore, both features may be used in the cities of future.

It is visible that within the years more attention has been put into the use of phytoremediation. Many architects include this technology in their plans, especially those concerning arrangements of places with higher pollution risk such as roads. Phytoremediation, as natural method may easily compete with traditional, expensive chemical ways. Unfortunately, it still awaits our close attention.

Power Quality Analysis of a 110 MW Wind Farm in a 130 kV Switchyard

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Keywords: Power Quality, Wind Power, Flicker, Harmonics and Unbalance

The reliability of supply is in general high in Sweden, with around 0.3 interruptions per customer and year in urban areas. Accordingly, the power quality must be good? This is not given. Good power quality is not only determined by uninterrupted power supply, voltage deviations also affect the function of the network and the equipment connected. Electromagnetic disturbances as flicker, harmonics, interharmonics and unbalance are decreasing the power quality. How are the measurement methods and restrictions stated, to keep the voltage deviations within reasonable limits and thereby maintaining the network function?

Lillgrund wind farm has power quality restrictions set by E.ON Elnät to fulfill in the connection point to the subtransmission network. In addition is a fault ride through requirement set by SVK. All equipment connected to the network are introducing voltage changes, which can be measured at the point of connection. The scope of the thesis has been to explicitly determine Lillgrund's emissions. Three-phase voltage and current measurements have been performed, with measurement systems comprising different bandwidth, to analyze the power quality parameters. The limitations of the power quality parameters are stated as voltage and sometimes current values. Therefore conversion methods from current measurements to voltage values have been derived. Lillgrund fulfills the restrictions regarding harmonics, interharmonics and unbalance in Bunkeflo under high resolution, short time measurements. Weekly measurements are needed to prove the result.

Comparisons between standard documentation and technical specifications have also been made in order to precise what is considered as good power quality and how it can be measured accurately. The comparison of selected DSO's technical specifications has shown that different standards are used as basis which results in different limitations. This shows the importance to recall that good power quality is the goal and not only fulfilling standards.

Influence of Layer Thickness and Composition of Multilayered Oil-in-Water Emulsions on the Release Behavior of Lutein

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Multilayering and enzymatic crosslinking of emulsions may cause alterations in the release behavior of an encapsulated core material due to changes in thickness, porosity and permeability of the membrane. To test this hypothesis, an interfacial engineering technology based on the layer-by-layer electrostatic deposition of oppositively charged biopolymers onto the surfaces of emulsion droplets in combination with an enzymatic treatment was used to generate emulsions with different droplet interfaces. We then studied the release behavior of primary, secondary (coated), and laccase-treated secondary emulsions carrying lutein, an amphiphilic carotenoid. For our experiments we used whey protein isolate (WPI) and dodecyltrimethylammonium bromide (DTAB) as primary emulsifiers at acidic conditions (pH 3.5) to facilitate the adsorption of a negatively charged biopolymer (sugar beet pectin). Laccase was added to promote crosslinking of adsorbed beet pectin. The release of lutein-loaded emulsions was investigated and quantified by UV-vis-spectrophotometry. Our results show that the layer thickness of the interfacial membrane influenced the release of the active ingredients into the surrounding medium. Primary WPI-stabilized emulsions showed a ten times higher release of lutein after 48h than secondary emulsions (pH 3.5). Primary DTAB-stabilized emulsions released 5.0% of encapsulated lutein within the observation period, whereas beet pectin-DTAB coated emulsions released only 0.2 % of lutein. Crosslinking of adsorbed pectin did not significantly decrease release of lutein in comparison to non-crosslinked secondary emulsions. Additionally, release of lutein was also affected by changes in the pH of the surrounding medium. Results of our study thus suggest that modulating the interfacial properties of oil-in-water emulsion by biopolymer deposition and/or crosslinking may be a useful approach to generate food grade delivery systems that have specific release-over-time profiles of incorporated active ingredients.

Keywords: Release, Lutein, Multilayered Emulsions, Laccase, Sugar Beet Pectin

ASSESSING PLANETARY BOUNDARIES for NITROGEN USE in
AGRICULTURE USING MODEL APPROACHES

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Keywords: biogeochemical nitrogen cycle, nitrogen use in agriculture, nitrogen pollution, planetary boundaries

Changes in lifestyle choices and agricultural production methods including nitrogen (N) use are correlated with many planetary boundaries determined by Johan Rockström and colleagues in 2009. On the one hand, intensive use of artificial N fertilizer, which production is based on the Haber-Bosch process, has been the necessary action to feed the global growing population by increasing the production of crops and livestock feeding. On the other hand, an uncontrolled enormous N input in agriculture has led to various environmental problems such as loss of biodiversity, acidification, eutrophication, drinking water pollution, increase in greenhouse gas emissions, and human health risks.

The aim of this study was to create a methodology for assessing planetary boundaries in view of N use in agriculture (fertilizers, manure, biological N fixation, and N deposition) by investigating its impacts on the environment through literature study and environmental modeling. The literature study was focused on identification and estimation of N use in agriculture, its impacts on N fluxes and assessing the critical limits for N concentrations to enable the assessment of critical N fluxes at global scale. A back-calculation method based on the results of four existing environmental models, i.e. IMAGE, TM5, simple one box model of the atmosphere, Global NEWS, and the critical limits for concentrations of ammonia and nitrous oxide in the atmosphere, nitrate in leaching water, and N in surface runoff water were used to quantify planetary boundaries for N use in agriculture.

Endogenous Alcohol Synthesis: Studies in Lean and Obese Mice

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Results of recent studies in patients with non-alcoholic fatty liver disease but also overweight children suggest that both, despite not having drink ethanol, have elevated ethanol levels in peripheral blood when compared with normal weight controls. Indeed, it was shown that intestinal microbiota can produce ethanol; however mechanism involved have not yet been clarified.

Therefore, the aim of the present study was to determinate if the elevated ethanol levels stem from an increased formation of ethanol in the intestine or an impaired ethanol clearance in the liver in a model of obese mice with NAFLD. Accordingly, ethanol levels in peripheral and portal plasma but also in different parts of the gut (e.g. duodenum, ileum and caecum) in ob/ob and wild-type mice were determined. Expression of ADH1 and ADH activity were determined in the small intestine and the liver.

In the duodenum the expression of ADH1 did not differ between groups, whereas in the ileum of ob/ob mice expression of ADH1 was significantly lower than in wildtyp controls. Hepatic ADH1 expression was higher in the ob/ob mice; however no significant differences in the protein levels and in the activity of ADH1 in the liver tissue was found between groups. In portal plasma but also in plasma obtained from the periphery of ob/ob mice, ethanol levels were significantly higher than in lean controls ($p < 0,05$). Ethanol was detected in the small intestine and caecum of most wildtyp and ob/ob mice, with a trend to higher levels in ob/ob mice.

Taken together these data suggest that endogenous ethanol production but also metabolism of ethanol differs between lean and obese mice.

Further studies are necessary to determine underlying mechanism.

Ethanol, ADH1, intestinal microbiota

Sustainability Assessment of Food and Agriculture Systems (SAFA): Pilot Application of a Regional Beef Supply Chain

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At present the concept of sustainability is gaining more and more importance. With regards to sustainable development of food and agriculture systems there is much room for improvement. However, the way sustainability is interpreted and implemented within food and agriculture systems is strongly differing. In this study agriculture model I and agriculture model II broadly delineate (i) agricultural intensification, (ii) implementation of biotechnology and (iii) neo-liberal globalization as primarily oppositions.

The necessity of progressing sustainable development requires a sustainability assessment of existing systems to facilitate management along the supply chain. That in turns requires the identification of strength and weaknesses of individual entities within food and agriculture systems to assist decision-making and to set priorities for action.

This study implies a pilot application of Sustainability Assessment of Food and Agriculture Systems (SAFA), a currently developing assessment tool proposed by the Food and Agriculture Organization of the United Nations (FAO). The generic principles of SAFA cover the dimensions of environmental integrity, economic resilience, social wellbeing and good governance implying a set of core sustainability categories.

To conduct the pilot application a beef supply chain in Switzerland converging agriculture model II has been selected. Adopting the consecutive approach of SAFA to the respective entities assembling the analysed supply chain resulted in a discrete four-level rating according to the entity's sustainability performance in the respective category. Further this pilot study indicates the applicability of SAFA as assessment tool.

Owing to the fact that food and agricultural systems involve in a broad spectrum of interrelated ecological, economic and social aspects, it is difficult to achieve a streamlined system in globally heterogeneous conditions. SAFA offers an opportunity to holistically assess supply chains as a whole assisting sustainability management and decision-making that eventually contribute to the sustainable development of food and agriculture systems.

Key words: Food and agriculture systems, sustainability assessment, sustainability management, supply chain.

Comparison of Hydrothermal Carbonization and Pyrolysis of Biogenic Materials for the Generation of Biochars as an Energy Source Based on a Company Project

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key words: hydrothermal carbonization, torrefaction, pyrolysis, biochar

The conversion of biomass into a sustainable energy source has a strong potential to become one of the main renewable resources in the future. Within this field hydrothermal carbonization (HTC) as well as torrefaction seem to provide an appropriate technology. Both processes generate a solid energy carrier that is similar to lignite. In addition these two processes provide the solid in a more suitable amount compared to other technologies like slow pyrolysis or fast pyrolysis. The main difference is that fossil lignite is formed within thousands of years, while HTC and torrefaction are able to produce the equivalent within hours. HTC and torrefaction, that could be assigned to the pyrolysis methods, differ in the fact, that the HTC process takes place in a wet environment while the torrefaction process takes place in a dry environment. Consequently HTC is more suitable for biomass with a lower dry substance whereas torrefaction is more suggestive for biomass with higher dry substance.

Based on a company project it should be examined if these technologies are a recommendable investment. This should be investigated by comparison of the biomass potentials at the specific location of the conversion plant. Furthermore the energetic value of the product as well as the expenses to build a HTC or torrefaction plant should be taken into account to evaluate such a project. From the conclusions of the work a discussion about the most practical procedure shall be given. If the result is clear even a specific guidance for the company is possible.

Effects of climate change on crop performance of selected species in Baden-Württemberg

Key words: climate change, crop performance, flowering, Humboldt-Reloaded

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Climate change has been an intensively discussed issue for a very long time and will become more and more important in the future. Two consequences of climate change are more extreme weather events and shifting seasons. Combined with a growing population and agricultural area utilized for farming competing against renewable resources, climate change is a big threat to food security all over the world. It might affect some crops somewhere in a positive way, but generally it is expected to have negative impacts on agriculture.

The intention of this project is to identify the impacts of climate change on crop performance and senescence of five selected crops. Therefore, the study was performed at two sites with different climate conditions, one in Kraichgau, the other one in the Schwäbische Alb. The crops that were measured are maize, oilseed rape, wheat, summer and winter barley. Until flowering, the plants were measured in monthly intervals, after flowering in bi-weekly intervals. At each of the five plots on every field, canopy, height, the number of green and senescent leaves, phenological development and leaf area index is measured. The data will be analysed in order to identify the species-specific effects of climate change on crop performance and senescence of different crops in Baden-Württemberg. The study is part of the Humboldt-Reloaded study program, which is financially supported by the Federal Ministry of Education and Research, and associated to the DFG Research Unit “Agricultural Landscapes under Global Climate Change – Processes and Feedbacks on a Regional Scale” (FOR 1695) at the University of Hohenheim.

Economic Analysis of Energy and Matter Generation from Microalgae – An Environmental LCC Model for Hydrogen and Biogas Production from *Chlamydomonas Reinhardtii*

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Environmental life cycle costing has been applied to determine the economic viability of biogas and photoautotrophically hydrogen production from photoautotrophically generated algal biomass. If hydrogen is produced, the residual biomass will be anaerobically digested. This study especially evaluates the economic performance of a novel staggered photobioreactor (PBR) design with an appearance of interconnected roofs due biomass growth and hydrogen generation. The novel PBR design aims at minimizing energy consumption and at providing optimal light conditions for the growth of the microalgae species *Chlamydomonas reinhardtii*. Membrane aeration through diffusion instead of air sparging is a difference to conventional PBRs.

In a German production setting for 2011, environmental life cycle costs amount to 0.99 Euro/MJ for methane and to 12.17 Euro/MJ for hydrogen could be determined. These costs considerably exceed the market prices of 0.02 Euro/MJ methane and 0.04 Euro/MJ hydrogen. Operating costs amount to 72 percent of the life cycle costs for biogas and to 69 percent for hydrogen respectively. Major contributors to operating costs are personnel and overhead costs with a share of more than 70 percent. The investment costs consist to about 92 percent of those for the PBR, of which 61 percent are material costs for the membrane.

In the given setting, scenario analyses have shown that only for coupled production of hydrogen and a high-value product such as food supplements economic viability can be achieved. The choice of another production location – Madrid – with higher incident solar irradiation and mainly lower personnel costs compared to Germany reduces life cycle costs by about 40 percent for a similar production system. A future projection with experience curves has shown that the biogas life cycle costs amount to the projected market price of 2030. Those for hydrogen will amount to about six times the market price.

Key words: environmental life cycle costing, microalgae, photobioreactor, hydrogen, biogas,

Biomonitoring of Fluoride Emissions in Cameroon using Plant and Soil Samples

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Abstract

In order to study the gradient of vegetation damage by airborne fluoride pollution in the vicinity of two fluoride emission sources – a large aluminium smelter and brick making factory in Cameroon, passive biomonitoring was carried out. Soil at depths of 10-20 cm and the foliage from *Carica papaya*, *Persea americana*, *Mangifera indica*, *Musa paradisiaca*, *Zea mays* and *Vernonia amygdalina* were collected at different distances around the emitters up to a distance of 2000 m, and the fluoride concentration was analyzed. The influence of emission was discernible in the leaves of *Mangifera indica*, *Carica papaya* and *Persea americana* within 500 m away from the smelter. These species showed symptoms of typical fluoride injuries like chlorosis and tip burns. Fluoride concentration varied from 4.1 to 1722.3 ppm and *Persea americana* had the highest fluoride content out of the sampled species. More so, fluoride in soil samples showed a positive correlation with that in plants for all species. This study confirms that the aluminium smelter results in much higher F deposition than the brick factory. These results of present study were comparable to those obtained in the vicinity of a large facility in Argentina (Rodriguez et al. 2012). To assess the efficiency of air control measures; there is an urgent need to establish biomonitor networks around aluminium smelters.

Keywords: Central Africa; Pollution Gradient; Passive Biomonitoring.

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Effects of *Trans* Fatty Acids on Adipogenesis in Murine Bone Marrow Mesenchymal Stem Cells and 3T3-L1 Adipocytes

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New data show that increased adipogenesis in bone marrow may lead to osteoporosis, based on mesenchymal stem cells (MSC) favoring differentiation towards adipocytes instead of osteoblasts. *Trans* fatty acids (TFA) are associated with metabolic syndrome and cardiovascular health risk factors. Additionally *trans* fats raise the visceral fat content in mice and monkeys, lead to weight gain among females, and increase waist circumferences in men. Because *trans* fat are directly correlated with metabolic and consequently adipogenic pathways, the effects on the differentiation of MSC to adipocytes in the presence of *trans* fats were investigated.

Cells were differentiated into adipocytes for 6 days, derived either from MSC (D1) or preadipocytes (3T3-L1), and examined adipogenesis by using protein and posttranscriptional analyses. Peroxisome proliferator-activated receptor- γ 2 (PPAR- γ 2) was evaluated via Western analyses and PPAR- γ , CCAAT/enhancer-binding protein- α (C/EBP- α), lipoprotein lipase (LPL) and fatty acid synthase (FASN) mRNA were detected with RT-PCR. The *trans*-11 octadecenoic acid (vaccenic acid) increased PPAR- γ 2 protein expression and PPAR- γ mRNA levels in 3T3-L1, while *trans*-9 and *cis*-11 octadecenoic acids had no effects. The *cis*-9 isomer, oleic acid, increased mRNA expressions of LPL and FASN and the *trans*-11 of FASN in D1 cells, whereas other treatment had no effects.

While more investigations are necessary to claim whether *trans* fatty acid, particularly vaccenic acid, elevate adipogenesis via the expression of PPAR- γ , this study is a first indication that 3T3-L1 preadipocytes and D1 mesenchymal stem cells are not equally affected by *trans*-fatty acids. Moreover, it suggests that the influence of oleic acid on adipogenic markers, such as LPL and C/EBP- α , needs to be examined more closely to understand better the connection between the early and late adipogenic markers during the differentiation.

Results should thus be of interest to academic and industrial food scientists interested in the physiological effects of *trans* fatty acids.

Keywords: TFA, Adipogenesis, PPAR- γ , C/EBP- α , FASN, LPL

A Case Study Investigating Environmental Effects on Roadside Trees in Copenhagen

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Healthy urban trees are a major focus in the economics of greening a city; therefore, the effect of different environmental impacts is examined on the health of Linden trees (*Tilia platyphyllos*) planted along the urban road, Øster Allé, in Copenhagen, Denmark. Stress from abiotic factors can induce changes in the leaf's photosynthetic system, crown density, and leaf size. These physiological parameters are investigated to determine which environmental factors significantly influence the health of urban trees.

Thirty-two roadside trees are investigated. Trees are grouped based on their exposure to a specific environmental impact: sunlight exposure, soil density, plant bed differences, road salt (NaCl) contamination, road location and distance from the road. Five trees, planted in a nearby park, are used as reference. All trees were planted in November 2009, in similar soils, and originate from the same provenance and batch. Leaves were collected in June, July, August and September 2011 for the investigation. Four leaves from each tree, one from each cardinal direction, were collected each month. In order to determine each environmental factor's impact on tree health, several physiological parameters are measured indicating tree performance and vitality: relative chlorophyll counts, chlorophyll fluorescence, leaf morphology, crown density, leaf color, annual branch growth, leaf chemistry, and visual inspections of overall health, such as, flowering, injury, necrosis and chlorosis. In this poster, only data from relative chlorophyll, chlorophyll fluorescence, leaf size and crown density will be presented.

Significant effects seen in the physiological responses from each environmental impact are investigated using LSMeans with Tukey's HSD multiple comparison test. The environmental factors investigated in this study do not make a significant difference to the health of these young trees. Although only a sub-set of data is presented, all other data measured in this study give the same conclusion.

Key words: urban, tree, health, chlorophyll fluorescence, SPAD

Growing the Future Project: Local Organic Food Production (Western Cape Province, South Africa)

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Key words: organic food production, local food, sustainable livelihoods, women, South Africa

Abstract: Grootbos Foundation, a non-profit organization located in Gansbaai, Western Cape province, South Africa was established to conduct various local development projects, aimed at providing poor people with improved access to natural resources and educating them about earning financial returns by working with nature.

One of Grootbos Foundation's new development projects entitled "Growing the future" (GTF) is an agricultural training programme, established particularly for education and training of women. The project recruits eight unemployed women per year who receive training on food production including organic vegetable production, free range chickens, pigs and bee keeping as well as life skills trainings. After finishing a successful year and graduation, the participants receive a certificate that shall enable them to find a job, continue their education in the future or establish their own enterprise. The Foundation's commitment within the GTF project is to teach local women how to manage their life by producing food to feed their families as well as producing food for the market and generating an income. The hope is that these women will be able to apply their knowledge and skills in various fields, from vegetable production on a small piece of land in the township to commercial food production in the form of co-operative land use.

The project site consists of a farm which includes different components:

- Vegetable cultivation plots, fodder plots, herb garden, students' garden, olive trees, vineyard
- Chicken rearing unit, pig rearing unit, beekeeping unit
- Composting unit, vermicomposting unit (earthworms), nursery unit (greenhouse and propagation house)

Farmer Managed Small Scale Irrigation Schemes in the Rift Valley of Ethiopia

Mesfin Guni, Wageningen University

As compared to large scale irrigation systems, that have not shown significant development in Ethiopia, farmer managed small scale furrow irrigation schemes (FMIS) show better performance (Rahel, 2008; Adams et.al, 1988; Halsema, 2008). Assessments made so far collect obvious facts from the fields and technical data to show cause-effect relationships and draw conclusions as if technical infeasibility is the sole problem. The main argument in this paper is that focusing only on a single possible factor may lead to naive grasp of the issue at stake.

The objective of the study is to understand how FMIS are expanding & proving to be resilient (with respect to operation, management, maintenance, service years, conflicts resolutions, and spread spatially); and to fill the knowledge gaps on FMIS in Ethiopia. It is also aimed at investigating how outside interveners could contribute to the expansion and Enhancement of FMIS.

Research question: *what are the driving forces for the growing number of farmer managed furrow irrigation systems in the Rift Valley region of Ethiopia*

I will follow a constructivist perspective to understand the social and political factors or processes in the community. I believe definitions of parameters, factors, or terms especially by technicians may result in confusions when they are brought to users. Understanding farmers' interests, strategies perceptions, skills, methods, decision stakes, and dimensions, and discourses in relation to (furrow) irrigation are the core points of this study. I will use the "property right relations" concept of Coward who states "irrigation development is a process of property creation" (Coward, 1986.P.492).

semi structured and open ended interviews and observations will be used collect key information including traditional (state) water rights , agreed rules, how they function, roles of traditional governance systems or WUAs that may include formalizing water rights, operation and maintenances, water allocations, making laws and sanctions/fines, who influences what in relation to the scheme.

Cookie or apple?

The effect of emotion, restrained eating and self-licensing on food choice

Yingying Zhang, Wageningen University

Background

Referring to studies on human eating behaviour for decades, it is widely accepted that emotions can affect food choice. Most of studies focus on the effect of negative emotions on food choice, while the effect of positive emotions is less conclusive. This study aims to explore how emotions can affect food choice by taking a further look at positive emotions. Besides, restrained eating and self-licensing are as well included, to examine their effects on food choice.

Methodology

Sample was prepared in a natural setting. Participants, college students (N=137, 74.3% female), were asked to choose between apple and cookie after they finished an exam. After choice, they filled in an questionnaire, which consisted of questions about that exam, emotions, eating behaviours and satiety.

Results

Results showed 52.6% (N=72) of the participants chose cookie, and food choice was significantly affected by positive hedonic emotions, negative self-conscious emotions, restrained eating and goal attainment. Gender, age and satiety had no effect. This study revealed both positive and negative emotions affected food choice. Goal attainment, mediated by positive hedonic emotion, led to hedonic food option (cookie); it might be explained by self-licensing effect.

Achievements

This study has proved that positive emotions and restrained eating could affect food choice. Self-licensing might be a possible explanation about goal-attainment's effect on food choice. It is suggested that future studies shall further test association between food choice and positive emotions, and also take weight status into account while testing restrained eating's effect on food choice.

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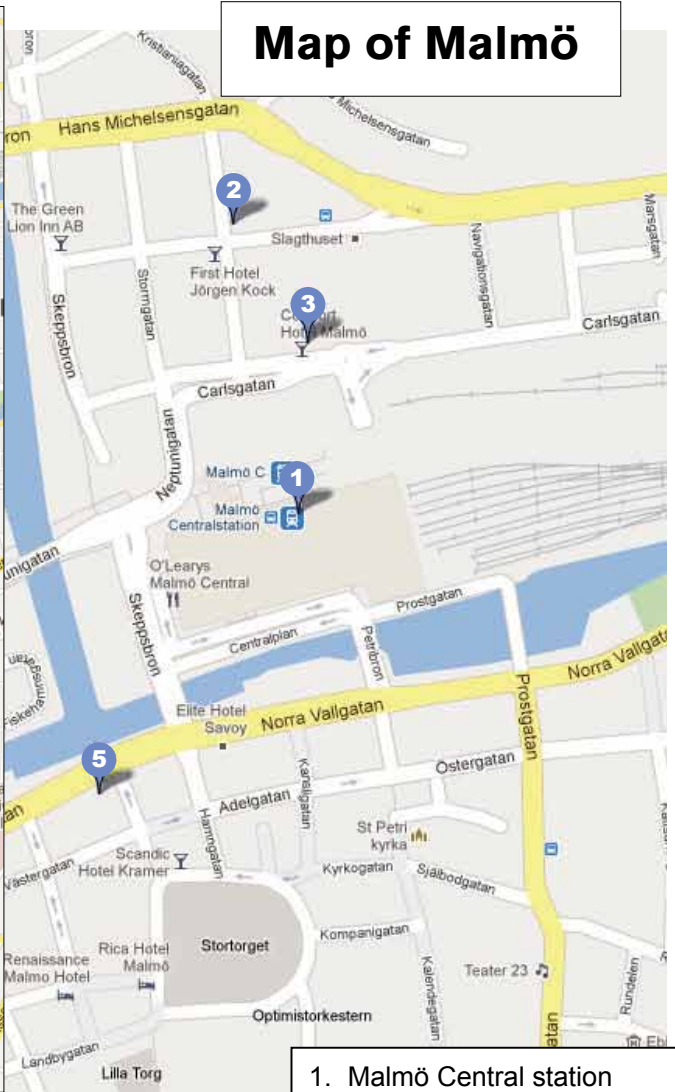
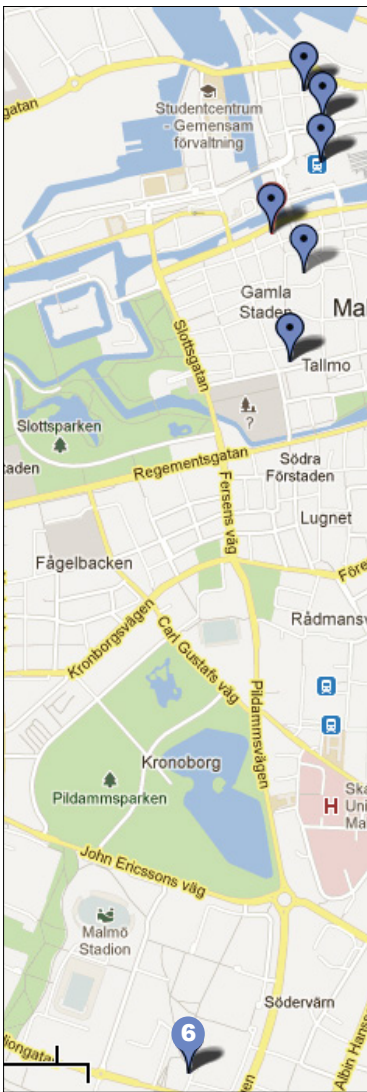
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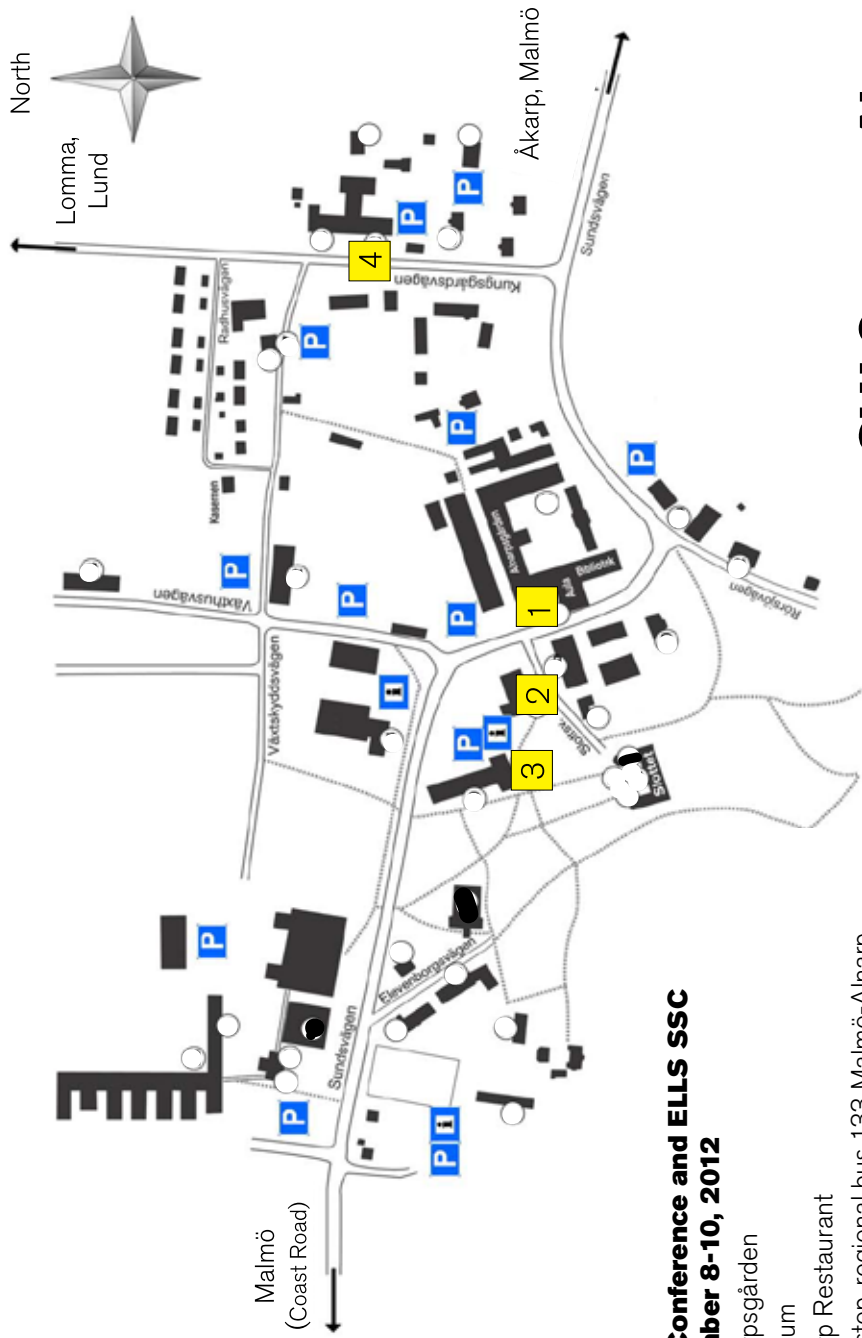
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Map of Malmö



1. Malmö Central station
2. First Hotel Jörgen Kock
3. Comfort Hotel Malmö
4. Hotel Elite Plaza
5. "Bus stop", shuttle buses, Norra Vallgatan 66
6. Hotel Ibis Malmö located about 3 km from the Central station





**ELLS Conference and ELLS SSC
November 8-10, 2012**

1. Alnarpsgården
2. Agricum
3. Alnarp Restaurant
4. Bus stop, regional bus 133 Malmö-Alnarp

SLU Campus Alnarp