

3RD VIENNA WORKSHOP ON SUSTAINABLE DEVELOPMENT FOR DOCTORAL STUDENTS

20TH NOVEMBER 2013
UNIVERSITY OF NATURAL RESOURCES AND LIFE SCIENCES (BOKU),
VIENNA

BOOK OF ABSTRACTS



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Welcome to the 3rd Vienna Workshop on Sustainable Development!

Dear participants of the 3rd Vienna Workshop on Sustainable Development for Doctoral Students,

We are happy to welcome you at BOKU on behalf of the Doctoral School of Sustainable Development (DokNE).

The goal of DokNE - to support and promote young scientists in sustainability research - is much in line with the goal of the workshop itself, and we are glad to have a chance to organize this year's event, and to exchange knowledge and experience with our counterparts from other doctoral programs.

We hope to bring to the discussion, apart from our individual projects, our shared vision of sustainability and our experiences with the transdisciplinary approach in concept and practice:

For us sustainability means more than reaching a consensus between different interests, but it refers to equity as the basis of freedom and to respectful treatment of nature.

In our research we strive for facilitating societal benefits and sustaining ecological functionality. We conceive us humans as an active part of nature with responsibility for our actions and we believe that ways exist towards balanced relationships and mutual support between societal and ecological systems.

And we hope that this year's workshop will be a useful step in building the network of young sustainability scientists in Vienna.

Looking forward to an interesting workshop with all of you,

Andrea, Hermine, Kerstin, Kisi, Kiengkay, Mathias, Michi, Peter, Resty and Tamara

(The DokNE student team)

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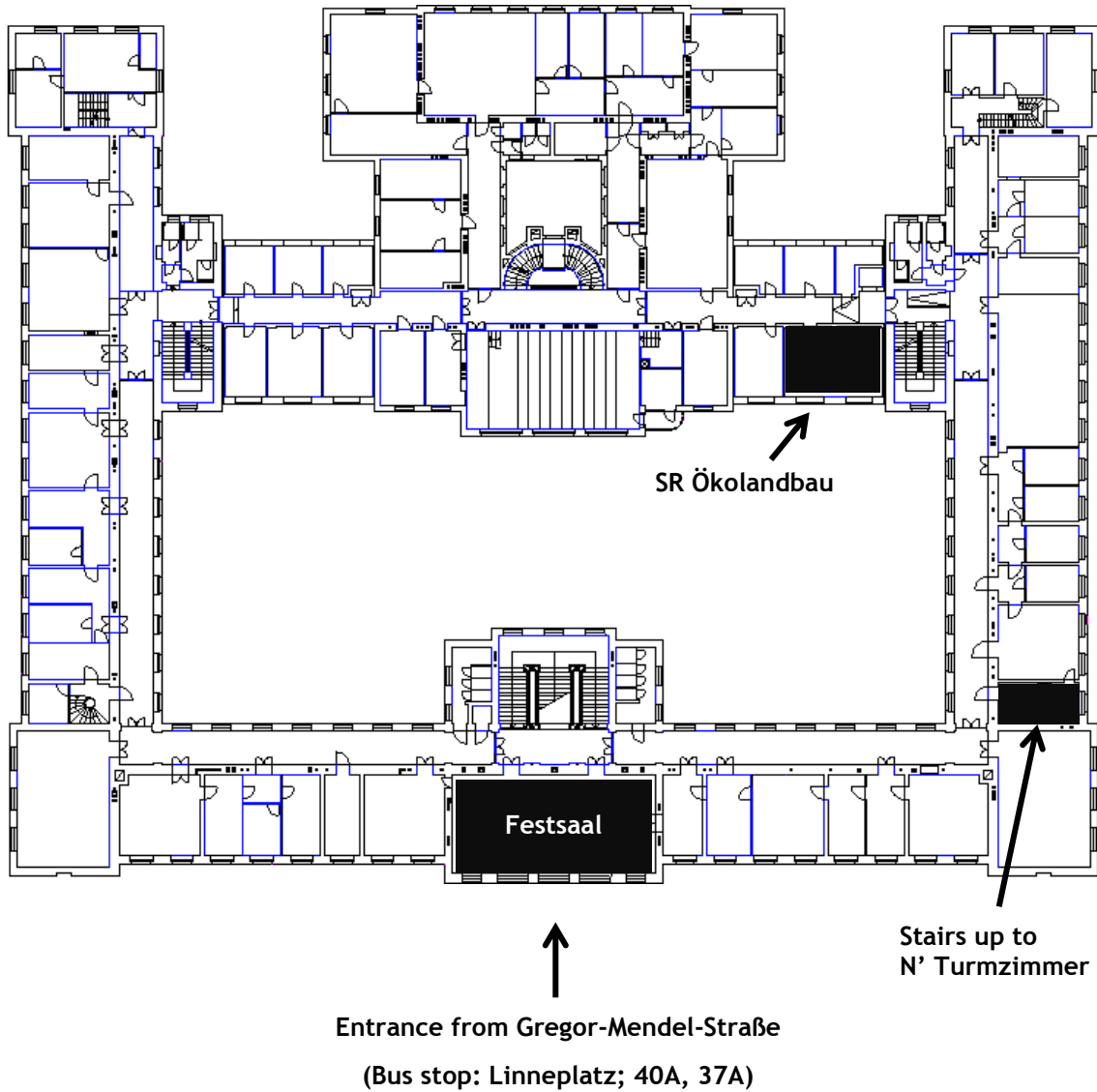
Program

9:00-9:45	Welcome & Round of introduction	Festsaal
9:45-10:00	Introduction into the day	Festsaal
10:00-10:30	6 short presentations à 5 min (Group 1) 6 short presentations à 5 min (Group 2)	Festsaal SR Ökolandbau
10:30-11:00	Coffee break	N' Turmzimmer
11:00-11:40	8 short presentations (Group 1) 8 short presentations (Group 2)	Festsaal SR Ökolandbau
11:40-12:40	Poster round I (4 posters, Group 1) Poster round I (4 posters, Group 2)	Festsaal SR Ökoandbau
12:40-14:00	Lunch	Meierei
14:00-15:00	Poster round II (5 posters, Group 1) Poster round II (5 posters, Group 2)	Festsaal SR Ökolandbau
15:00-16:00	Poster round III (5 posters, Group 1) Poster round III (5 posters, Group 2)	Festsaal SR Ökolandbau
16:00-16:30	dokNE presentation (Andreas Muhar, Head of the Doctoral School of Sustainable Development)	Festsaal
16:30-17:00	Evaluation & closing Who comes next?	Festsaal
18:00	300 Jahre Nachhaltigkeit 1713 bis 2013 - Ende einer Ära?	Vienna University of Technology, Kuppelsaal, Karlsplatz 13, 1040

Venue

University of Natural Resources and Life Sciences, Vienna
Gregor-Mendel-Straße 33
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Festsaal (main building, 3rd floor)

Plan of the third floor of the Gregor-Mendel-House:



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Introduction to dokNE

Development of dokNE

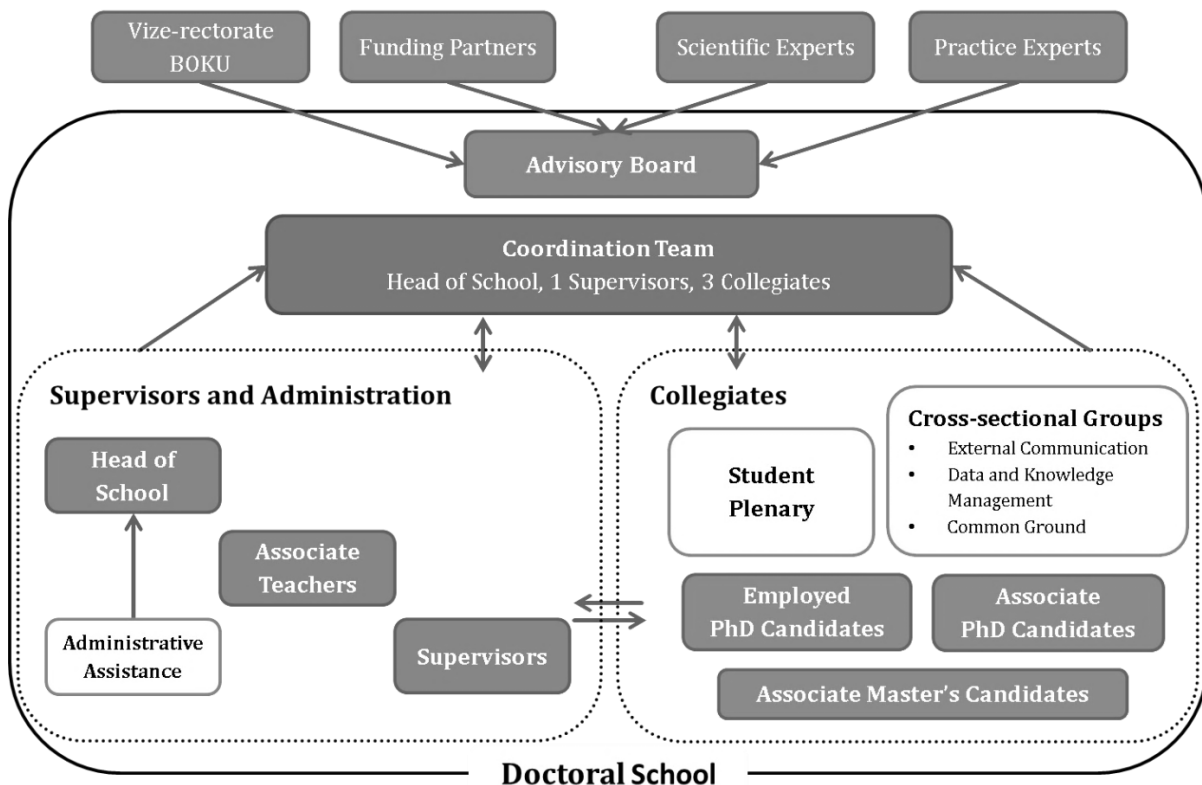
The Doctoral School of Sustainable Development ("Doktoratskolleg Nachhaltige Entwicklung" dokNE) was established as the first structured doctoral school at the University of Natural Resources and Life Sciences, Vienna (BOKU) in 2007 in order to support and promote young scientists in sustainability research. To date it is still the only doctoral school in Austria with a specific focus on sustainability. The school provides an organisational framework for cross-disciplinary research with a practical orientation at the interface of regional development, resource use, policy and society.

The first project phase dokNE I (2007-2010) was initiated by BOKU in collaboration with the research program proVISION of the Austrian Federal Ministry of Science and Research, the Federal Provinces of Vienna, Lower Austria and Styria as well as the Austrian Federal Ministry for Agriculture, Forestry, Environment and Water Management. Through this joint initiative of project partners and funders, networks were built and expertise increased. Numerous scientific reports and journal articles as well as popular scientific publications were produced as a result. In October 2011 the second three-year round of dokNE was launched.

dokNE II comprises an interdisciplinary and international team of ten PhD-students from Austria, Germany, Laos, Uganda, Italy and Russia, a number of master students as well as 16 supervisors from several departments at BOKU and from other universities. dokNE II is financed by BOKU, the Austrian Federal Ministry of Science and Research, the Federal Provinces of Vienna and Lower Austria, the Ecosocial Forum Vienna and by the BILLA AG.

Project structure

The project structure of dokNE II comprises supervisors and administrative personnel, PhD candidates, a coordination team and an advisory board (see figure below).



Employed PhD candidates are funded directly via dokNE, either from BOKU funds or from funding partners. Their employment is in accordance with the collective contract of the Austrian Universities. The associated PhD candidates have their individual scholarships and are not employees of the university. Within dokNE there is a possibility to award scholarships to associated master theses, which each PhD project can make use of, if relevant for the given research design.

The head of school, a second supervisor and three PhD candidates constitute the Coordination Team. It is responsible for taking operational decisions, preparing base-materials and considering more general questions for the plenary; in addition, it serves as a bridge between the supervisors and the PhD candidates.

All PhD candidates are members of the Student Plenary. The Plenary provides an open platform for articulating and discussing individual and common interests, concerns and aims to provide input for the work of cross-sectional groups and the coordination team. Each student also participates in one of the three 'cross-sectional groups', which are dedicated to specific and crucial functions and services of the doctoral school. The External Communication group is responsible for public relation issues (e.g. homepage, press articles), the Data and Knowledge Management group tackles issues like internet forum or wiki set-up and the Common Ground group addresses issues like the mission statement and common definitions of key aspects of the doctoral school.

Collegiates receive feedback from the supervisors on a regular basis. In addition, associate teachers contribute to the knowledge of the doctoral candidates, especially in the field of inter- and transdisciplinary research. The head of school is, in addition to his role as an academic supervisor, the formal line supervisor of all employed collegiates, and also responsible for cooperation contracts, budget and the selection and organization of teaching classes. He is supported by a part-time administrative assistant.

In addition to the group of supervisors, an external evaluation body is set up to oversee the doctoral school. PhD students are receiving constructive feedback from the independent Advisory Board, which regularly provides critical input to both the doctoral school's development and the individual PhD-projects. Members of the Advisory Board are the Vice-Rector for research (BOKU), representatives of the funding partners, external academic experts from the scientific community, as well as practice experts from Austria.

The structure of the doctoral school provides the basis for focused study and research at BOKU and optimal support of an interdisciplinary team of supervisors. This serves, among others, to enable joint planning of research and teaching contents in order to facilitate integration of current developments and innovative ideas of the collegiates.

Vision and Mission Statement

We, the members of the “Doctoral School of Sustainable Development” at the University of Natural Resources and Life Sciences (BOKU), Vienna, share a common vision of a just and balanced world. Docs, master students and senior researchers collaborate across departments and with experts from relevant fields of science and practice to contribute to sustainability knowledge in different societal areas ranging from agriculture to science-policy interaction.

From Vision...

Our sustainability vision comprises the commonly addressed goal to balance the ecological, social and economic dimensions, based on the principles of inter- and intragenerational justice. Thus, for us sustainability means more than reaching a consensus between different interests, but it refers to an idea of equity as the basis of freedom and to respectful treatment of nature.

In our research we strive for facilitating societal benefits and sustaining ecological functionality. We conceive us humans as an active part of nature with responsibility for our actions and we believe that ways exist towards balanced relationships and mutual support between societal systems and ecosystems.

...to Mission

The school’s self-defined mission is to educate outstanding young scientists in the field of sustainability research and to provide innovative, problem-oriented scientific knowledge by adopting an inter- and transdisciplinary research approach. Through relating to different theories, methodologies and disciplinary paradigms and by engaging with experts and stakeholders from different parts of society, the young researchers shall develop skills beyond the boundaries of single disciplines.

Furthermore, we see the school as an integral part of the sustainability strategy of BOKU University.

Strategic goals

The school’s teaching, research, community and other activities are driven by four strategic goals:

Problem-orientation

We want to contribute knowledge, solutions and answers to current societal challenges. Although many of the PhD-projects focus on problems in specific regions or places, we aim at relating them to a wider context by recognizing the multidimensional interrelations between various scale levels in politics, the economy, societies and the environment.

Inter - & Transdisciplinarity

To adequately address these societal problems, we aim at integrating knowledge of different scientific disciplines with that of practitioners and to provide it to the scientific community as well as to the society. This also entails our commitment to communicating results and findings in an understandable language.

Diversity, Plurality and Equity

We honour biological diversity as well as human plurality. We try to grow beyond European-centred cultural hegemony into a cosmopolitan perspective raising our awareness to global effects of the regional processes under study. Hence we take care to include various stakeholders from different backgrounds (e.g., ethnical, gender, age, educational background) and acknowledge their different perspectives, interests and needs.

Systems approach

Aiming at holistic research, we respect the systemic character of ecological and also societal problems and try to reveal their underlying causes, processes and interlinkages. This paradigm does not exclusively refer to system theories. In our research we are open to applying diverse methodological approaches.

Abstracts

Guidelines for Sustainable City in Hot Arid Region of Iran

A Combination of Modern Sustainable Urbanism and Traditional Iranian Urbanism - Case Study: Yazd

Hossein Abbasimehr

*Institute of Architecture and Design
Vienna University of Technology (TU Wien)*

ABSTRACT

This dissertation aims to adapt the useful sustainable patterns and solutions of the old city of Yazd (a central city in hot arid zone of Iran) to the modern life in new city of Yazd, in order to get to a city that will be designed and constructed on basis of local criteria of sustainability.

The project involves 3 successive stages: studying the **historical condition**, **contemporary condition** and providing **guidelines for future**. I examine three criteria of environmental sustainability: **resource management**, **comfort** and **health** on some historical and modern districts of Yazd.

Historical condition:

For the first criterion of sustainability (resource management) I examine different historical districts to know how the historical city uses and manages different resources like: water, wind, solar energy and ground. This part involves surveying on water resources, orientation of urban fabric for the best use of solar radiation and favorable winds and compactness of each district for ground management part. In addition in this part I survey the range of using renewable and local materials in the historical city.

For the second criterion of sustainability (comfort) I survey the range of district facilities that are essential for the inhabitants and also I measure their distances from residential parts. Also in this stage I examine the comfort issue by interviewing the inhabitants who live in historical districts.

For the third criterion of sustainability (health) I use observation and local information about garbage management in the historical districts, as an item of health.

Another important item in this part is to know the range of green area in each district.

Finally the results of sustainability items in each district are compared with other districts to get the average points for the whole city.

Contemporary condition:

In the part of contemporary condition of Yazd I use the similar methods with the same items used in historical condition of Yazd, but on several newly established districts in the city.

I compare the range of sustainability between historical and new parts of the city of Yazd to find out which is more sustainable: the historical or the contemporary parts? If the results show that the old city was more sustainable (my hypothesis) I begin the third stage of my dissertation: **guidelines for future** on basis of the historical experiences.

Supervisor: Univ.Prof. Mag.arch. Françoise-Hélène Jourda

Spatial Justice as a Tool for Sustainable Reform in Khartoum Metropolitan Area

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ABSTRACT

This study is an attempt to clarify the concept and dimensions of spatial justice, and its impact on sustainability of urban system. Khartoum metropolitan area, Sudan (developing Country) has been chosen as a case study. The study is mainly seeking to maintenance and improvement of the quality of life in Khartoum urban area, through enhance of spatial circumstances for humans and nature. The study tries to answer the main question that how can the intensification process in Khartoum be managed in a way that promote justice spatially, and be controlled to produce a sustainable compact city?

The study should assess the changes that happened recently due to urban renewing, increasing of building densities, and new large real estate projects at water frontage, islands, and agricultural lands, and its reflection on sustainability and spatial justices in Khartoum metropolitan area according to views, concepts, and experiences in spatial planning and sustainable development. This study is intended to assist town planners and executive planning bodies, with clear tools to guide intensification and to emphasize that urban renewal and intensification process is the best method to transforming a sprawling city to an intensified sustainable form, if spatial Justice used as a tool to address the existing situation.

Data of spatial resolution needed to establish the relationship between the socio economic performance of urban system and its different sub-units (i.e. housing schemes, services, commercial and industrial development) on the one hand and the open spaces and greenery on the other.

The study should be conclude with a number of recommendations that could have a significant impact on the leadership of sustainable reform for Khartoum metropolitan area which is still confused due to absence of planning guidelines and standards.

Finally the study is likely to show that, better spatial planning and design would be possible, and Khartoum is eligible for sustainable reform, guaranteed by the leasehold law, and the city is still flat and the proportion of high-rise buildings is low, it is just in need for serious studies, proposals and effective solutions to assist decision makers and politicians to decide the future of this unique city.

Development of a Social Impact Assessment Methodology for Recycling Systems in Low Income Countries

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University of Natural Resources and Life Sciences (BOKU), Vienna*

ABSTRACT

Informal recycling is one of the most significant activities within waste management systems in low income countries. The main aspect of a number of recently implemented waste management systems has been to organise the informal recycling sector and to integrate it as a formal stakeholder. These formalisation approaches are expected to eliminate not only the poor economic situation of informal recyclers but also their common social problems e.g. social rejection, lack of education and inappropriate health and working conditions. However the effectively elimination of social problems related to the informal sector has not been precisely measured and evaluated. A lack of methodology to assess social impacts persists, as does the comparison of different formalisation approaches.

This work aims to develop a methodology for assessing the contribution of formalisation approaches in terms of social impacts. A further goal is to determine the feasibility of applying this methodology by identifying and measuring the social impacts of three case studies in Peru.

A review of literature was carried out in order to describe the current situation of waste management systems in low income countries and to evaluate some existing social impact assessment approaches including sLCA. For the social impact assessment this study proposes an approach based oriented towards the Social Life Cycle Assessment methodology (sLCA) considering 3 social impact categories, 9 social subcategories and 26 semi-quantitative indicators for the social. The methodology was tested on three Peruvian case studies with two different formalisation approaches thereby confirming or rebutting the expectations and forecasts of organisations (NGOs, Local Authorities, Ministries & Business) involved in the implementation.

It can be concluded that although sLCA was originally used to analyse the environmental impacts of products, it is feasible to adapt it for the social assessment of recycling systems based on formalisation of the informal sector in low income countries. The impact categories and subcategories identified represent the social problems of informal recyclers. The comparison of current social impacts between different formalisation approaches using this methodology is also viable. A further conclusion is that it is feasible to measure the social impacts of formalisation approaches using the selected indicators and characterisation procedure.

Analysis of operational forest management and planning approaches in community forests in the mid-hill region in Nepal

Sita Aryal¹, Bishnu H. Pandit², Manfred J. Lexer¹

¹*Institute of Silviculture, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria*

²*Kathmandu Forestry College (KAFCOL), Kathmandu, Nepal*

ABSTRACT

In Nepal, the concept of community forestry (CF) has evolved to ensure that forest assets remain sustainable and are accessible for the benefit of local communities. In recent years huge emphasis was on the implementing structures and processes which aimed at fair and equitable access to resources for various social and ethnic groups within community forest user groups (CFUG). So-far in community forest management, operational forest management activities are not fully addressing the timber and non-timber products as well as a variety of other ecosystem services. As a consequence developed plans may not be technically sound and not fully implemented due to lack of technical knowhow regarding silvicultural operations and insufficient planning procedures. Addressing these issues the aim of the current research was to assess the currently practiced operational forest management in selected case study CFs and to propose alternative forest management strategies to improve the utilization of forest resources in a sustainable manner to the benefit of the CFUGs.

Based on intense stakeholder interaction processes and forest inventories in the case study CFs a thorough assessment of current resource state, current management plans and its coherence with resource capacities and interests and expectations of the CFUGs was done. Multi-criteria analysis (MCA) techniques and a local set of criteria and indicators for sustainable forest management were used to evaluate forest management approaches with regard to different stakeholder preference profiles. It was concluded that appropriate forest management strategy with respect to resources potential should be adapted to efficient utilization of forest resources. And the careful assessment of the forest resource should be done based on qualitative and quantitative data, users' expectations to achieve multiple products and ecosystem services that enhance livelihood of local people while maintain forest conditions.

Key words: community forest, operational forest management, criteria and indicators, management strategy, Nepal

Perception and assessment of ecosystem functions and services on river landscapes

Kerstin Böck

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ABSTRACT

The “ecosystem service concept” is often used in the scientific context as an assessment and communication tool.

Although this concept has gained importance in terms of practical application at policy level (especially through the Millenium Ecosystem Assessment (2005) and the TEEB report (2009)) and is intended to be used as information tool for decision makers also in the water sector, it is not clear which role it actually plays in policy and how it is perceived by the addressed actors.

As these questions are also relevant for river management processes, this project aims at (1) analysing perceptions, (2) detecting knowledge gaps and (3) identifying the practicability of the “ecosystem service concept” at the example of two case study rivers (Drau and Enns) in Austria. Therefore, a survey, including questionnaires and guided interviews, on this issue was undertaken.

Consideration is also given to the fact that the stakeholders’ perceptions may be influenced by different understandings of and attitudes towards nature. To analyse that, it must be ascertained which values are assigned to selected river landscape functions and services by different stakeholder groups and which understandings of human-nature-relationship can be found within these groups.

Supervisors: Susanne Muhar (BOKU), Andreas Muhar (BOKU), Jochen Kantelhardt (BOKU)

Sustainability: Breaking the Vicious Cycle

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ABSTRACT

It is blatantly apparent that the global human society is nowhere near proposing a viable solution to, much less solving, the pressing sustainability issues of our time. In the course of our interdisciplinary work on the multiple social, environmental, and economic conflicts associated with the production of biofuels, we have often come to wonder at the seeming inertia of an increasingly unsustainable global socio-ecological system pushing hard on planetary boundaries and endangering its own survival. Global material and energy use and the associated environmental pressures have been on a steady path of growth for all of the 20th and 21st century. With a very few exceptions based on specific historic conditions (e.g. the reunification of Germany), this material growth accompanied any and all monetary growth and improvements in average incomes. Examples in which monetary wealth and ecological sustainability could be simultaneously achieved are very hard to come by. At the same time, it can be shown that increased wealth drives resource consumption (which in turn drives wealth). What could intervene into this loop? A clear answer seems to be that there is a feedback between the negative environmental effects caused by increased resource consumption and perceived quality of life. Here, a factor comes into play which keeps these effects from breaking the loop we previously described: the disconnect between consumption and its environmental impacts. This disconnect may be spatial as is the case when consumption occurs somewhere else than production (metabolic rift) but it may also be temporal (i.e. impacts occur later than consumption and are the concern of another generation) or based on wealth, social standings, or other forms of power. We postulate that it is this spatial disconnect which forces us to essentially fight a vicious cycle when striving for sustainability.

Transformation towards sustainable energy behaviour!

Concepts of Human-Nature Relationships and biospheric values: a gateway to a better understanding of environmentally friendly behaviour?

Michael Braito

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ABSTRACT

Government policies are needed when people's behaviours fail to deliver public goods like a healthy environment. Environmental economists suggest market-based measures. But addressing the problem of environmental pollution or exploitation by economic incentives only seems to fail in seeing the complex socio-ecological interactions. As a likely result egocentric values may be activated, weakening cooperation and increasing the social dilemma even more. Actually, short-term acceptability of policies is often more important, rather than their longer-term efficiency. But to enhance a transformation towards a sustainable (energy) behaviour, governance should take both timescales into account. Socio-psychological factors such as values, norms and concepts of Human-Nature Relationships have to be considered, since they are strongly related to the stability and direction of a society. Therefore, an essential question is how these socio-psychological patterns are touched and triggered by governance strategies. It is hypothesised that different policy approaches attract specific groups of participants and crowd out others. Furthermore it is assumed that communication strategies and incentive structures focusing on short-term individual benefits might activate self-enhancement values weakening cooperative environmental responsibility. In the research different governance strategies for photovoltaic programs are analysed if they attract groups with specific values and concepts of Human-Nature Relationships and crowd out others. Engagement in photovoltaic projects is considered as an opportunity for individuals or social groups to perform environmentally friendly behaviour and to make statements about their environmental beliefs. In an ex-post field experiment of cases with contrasting framings (e.g. support for individual versus collective engagements), participants and non-participants are analysed regarding their concepts of Human-Nature Relationships, as well as values, norms and actual behaviour to better understand why some people engage in photovoltaic facilities and others do not. The results will help to understand the governance of photovoltaic more comprehensively. Additionally, the findings should encourage a reflection on future sustainability processes in order to devise more targeted communication strategies and behaviour change interventions.

Supervisors: Marianne Penker (BOKU), Andreas Muhar (BOKU), Courtney G. Flint (Utah State University, USA)

Identifying global hotspots of grazing pressure and future potential for food production from grassland based agricultural systems

Tamara Fetzel

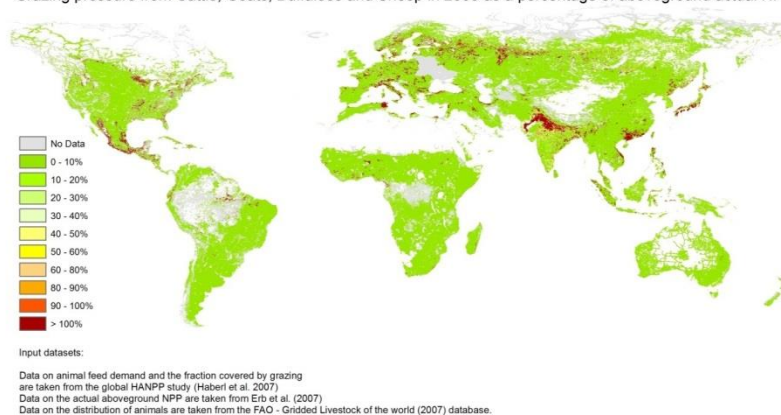
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ABSTRACT

Grasslands and livestock systems play a key role in the Earth system and are closely linked to the food system and sustainability issues. It is well known that on the global level large grassland areas are exposed to soil degradation which is often caused by overgrazing. The resulting productivity losses on world's grasslands may strongly influence the global food system and foregone productivity may limit the future ability of livestock systems for food production. However, despite their important role, grasslands and related production potentials are associated with large knowledge gaps. The analysis presented here aims to improve knowledge about the spatially explicit distribution of grazing pressure (i.e. harvest through grazing animals in a pixel) on the global level. Based on the daily feed intake of Cattle, Goats, Buffaloes and Sheep which together constitute almost 90% of total harvest through grazing animals grazing pressure per grid cell is calculated and related to the annual Net Primary Production. This allows to identify hotspots of grazing pressure which can be found on all continents. On large areas, however, pressure is relatively moderate. My ongoing research aims to identify areas exhibiting further potential for livestock production and areas where stocking densities should be reduced to prevent ecosystems from severe degradation.

Regarding my expectations from the workshop I just can refer to last year's workshop where doctoral students were enabled to present their research topics to other students in a very nice and informal atmosphere. I think such workshops are an excellent way to network, share current research highlights as well as future plans with other students and more importantly allow to get valuable feedback from people related to other organizations and working in other research fields. I am looking forward to seeing you in November!

Grazing pressure from Cattle, Goats, Buffaloes and Sheep in 2000 as a percentage of aboveground actual NPP



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Are European public policy instruments to encourage the development of “sustainable products” effective?

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ABSTRACT

Sustainable products, broadly defined, have a lower environmental footprint, are more energy efficient, more durable and less waste producing than alternative standard consumer goods in wide circulation. Pathways to sustainable products are integral to realizing ‘green economy’ goals. I will research and write about the incentives to industry to develop and market products that are sustainable products through specific programs including research support, market entry support, subsidies, green public procurement, awareness raising, and labeling schemes, etc.

My main objectives for this field of research is to 1) add to the knowledge base on why governments should or should not try to encourage sustainable products and 2) provide guidance on how to effectively use policy instruments to bring more sustainable products onto the market. As I am at the beginning of exploring this topic, I would like input from other researchers on how to launch the research project. What is the critical literature on this topic? How do you judge the relevance and interest in this topic? What are your thoughts on appropriate research methodology and design?

Production of bacterial plastics (PHA) from renewable resources

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ABSTRACT

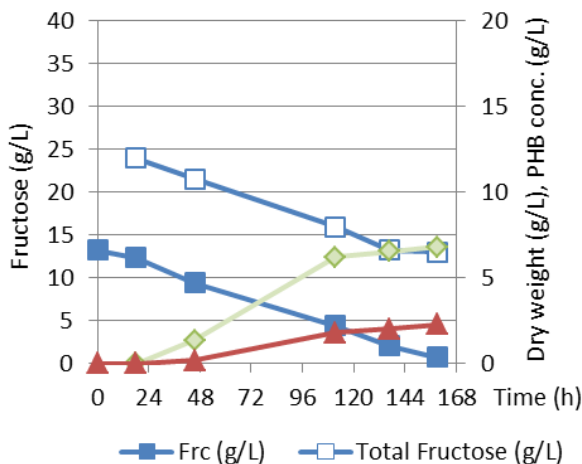
Bioplastics are witnessing a remarkable upsurge due to an increased interest in sustainable utilization of resources. Bio-PET, starch blends and PLA are the best established ones in the field and compete hard against emerging materials. Polyhydroxyalkanoates (PHAs) are currently promising candidates for industrial-scale utilization due to their 100% biobased production, biodegradability and multitude of tuneable material properties.

The production process I am working on is using chicory roots, an abundant food residual from salad production in Navarra (Spain). The process involves hydrolysis of the raw material, bacterial fermentation of PHAs, isolation/purification of the intracellular granules and production of a packaging material for the locally produced vegetables.

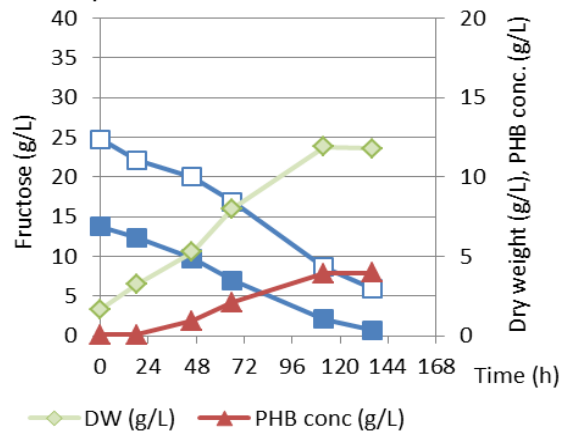
I designed a chemical hydrolysis protocol for chicory roots with various parameters being optimized. The solid to total ratio was varied, the effect of pH and autoclaving as well as temperature were studied. The chicory root material used is composed of $36 \pm 0,8\%$ carbohydrates and $77 \pm 0,8\%$ of this amount are extractable using the designed protocol. About half of the extracted carbohydrates are monomeric. Fructose is the main constituent (70-80% of the extractable carbohydrates), followed by glucose (~15%) and some other sugars present in smaller quantities. The concentration of sugars in the obtained hydrolysate is 30 g/L and a significant amount of liquid hydrolysate was retrievable.

I conducted fermentation experiments in shake flasks using the well-established strains *Cupriavidus necator* DSM 428 and 531 and monitored the reaction for 7 days. Both strains consumed the monomeric fructose in the medium, but had difficulties with the oligo-/polymeric forms of fructose (see figure 1). In order to overcome this hurdle, I need to modify the hydrolysis protocol to obtain more monomeric fructose. At the end of the fermentation with DSM 428 / 531 a cell dry weight of 5.4 / 11.8 g/L was reached of which 33 % was PHA. In the next step, the fermentation will be transferred to bioreactors for a better process

1.a. *Cupriavidus necator* DSM 428



b. *Cupriavidus necator* DSM 531



control and optimized to increase yields.

Particularly due to the technical focus of my work, I am eager to engage in a multidisciplinary exchange with other students from different backgrounds. Thereby, I am looking forward to fruitful discussions which can broaden the minds of all of us. Furthermore, I expect this event to be a good platform for getting to know more about the scientific environment working on sustainability in Vienna.

Locational Affordability and Economic Sustainability

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ABSTRACT

My research interests lie in the social and economic domains of sustainability, more specifically the role of transport in household, community, and regional sustainability. Taking an economics-based approach, my tentative research proposal outlined quantitative research into aspects of locational affordability—defined as the combined costs of housing and transport connected with a given residential locational choice—as a measure of economic sustainability. Although many studies have mapped housing and or transportation affordability, the definition of affordable is typically established by ‘rules of thumb’ or existing policy. Further, there is no policy explicitly defining transport affordability.

At present, I have completed a paper that has been peer-reviewed and will be presented at the Transportation Research Board Annual Meeting in January. The paper uses mortgage foreclosure data as an indicator of *unaffordability*, and explores the relationship to housing and transport costs. This study provides an empirical analysis using data from the Research Triangle Region of North Carolina, USA, to model the relationship between housing expenditures, automobile costs, and foreclosure rates at the neighborhood level. The analysis finds a positive association between high housing and high transportation costs and foreclosure rates. The findings support the case for integrated planning, policy, and programs to better coordinate the transportation and housing sectors as part of improving sustainability and livability. They also suggest that locational affordability could offer a meaningful policy framework for economically sustainable development.

While this analysis represents a positive start to my doctoral research, I am currently working to develop a richer conceptual framework for a dissertation, one that builds on my Master’s research on Environmental Justice and equity. My intent is to develop a research plan with linkages between equity, affordability, and sustainability. Further, I hope to find ways to incorporate the European context by using Austrian or EU data for a comparative study. The VWSD offers an opportunity to interact with scholars working in a range of sustainability topics who can provide feedback on ways to expand my initial work, informing the development of a rich and policy-relevant full-length Research Proposal.

Scientific climate policy advice in neo-corporatist systems

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ABSTRACT

Scholarly analyses argue that political systems and cultures shape the way the interactions between science and politics are organized and practiced. Institutional factors, such as the degree of formalization of policy processes and cultural-behavioral principles affect the roles of scientific expertise, the rules for the choice of experts, or the visibility of expert bodies.

Starting from this assumption we discuss whether and how the peculiarities of (neo-)corporatism manifest in scientific policy advisory systems. Climate policy represents a particularly suitable policy field for the examination of (neo-)corporatist leverage because the relatively 'young' field is not at the very center of these traditional politico-cultural arrangements. Hence, it provides opportunities for new actors and more pluralist forms for the mediation of interest and expertise. Against this background, the paper conducts a comparative analysis of scientific advisory systems in Austrian, Dutch, and Swiss climate policy by drawing on document analyses and semi-structured interviews. It addresses the actors involved in and organizational forms of scientific advice, the relative relevance of researchers' knowledge compared to other forms of expertise and interests as well as prominent interaction patterns between scientific and policy actors.

The comparison indicates that despite the similar politico-cultural environment the national climate science-policy interfaces considerably differ. However, our analysis identifies common neo-corporatist patterns in all three countries: For instance, administration and interest groups have considerable leverage on climate policy advice. Thus, scientific expertise has frequently to compete with, and is often sidelined by, more political advisory structures. Consensus-orientation within advisory bodies and research programs also reveals politico-cultural imprints. At the same time, these countries share features which counter the notion of neo-corporatist advisory structures: Besides the broadening spectrum of actors engaged in advisory settings, we observed tendencies toward a stronger formalization of scientific climate policy.

Sustainable Architecture: Climate Responsive Design

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ABSTRACT

The building sector in Serbia is the largest energy consumer, representing more than 40% of the total final energy consumption in the country. The First NEEAP¹ point out that residential sector has the biggest cost-effective savings potential. On the other hand, EPBD directive 2010/31/EC defines the year 2020 as the deadline for all new buildings to be “nearly zero-energy buildings”. Although solar irradiation in Serbia is 40% higher than the European average, architects and planners design mostly conventional buildings. Due to the lack of sustainable design, we assumed that a substantial change in the local design procedures is necessary to deliver more energy-efficient buildings and meet the targets set.

This aim of this research is to establish design patterns and integrate them into the conventional design process. The study focuses on thermal properties of building envelopes and especially on climate-appropriate design. The research includes an investigation of the house design in different geographical regions in Serbia (diverse by topography, climate and vegetation).

The research has a linear analytic organizing structure. We used case study methodology as well as combined strategies (2002, Groat, L.). Simulation in relation to the experimental research is a dominant research tactic. The study is divided into three sections. Firstly, traditional houses in Serbia are reviewed. Secondly, the existing housing stock is analyzed and refurbishments are proposed. In the third part of the research, we develop design patterns for new houses and analyze each house as a system, through dynamical simulations.

The scientific investigation completes with an overview of the results for different building types investigated in specific case studies. A survey of the results contains the following parameters for building design:

- 1) Positioning;
- 2) Orientation of the building;
- 3) Type of construction;
- 4) Building form and volume;
- 5) Proportion of glazing per facade;
- 6) Shading criteria;
- 7) Materials.

The output data can be used in the rest of the Southeast Europe, since Serbia has a unique position in the middle of the region, covering diverse geographical areas that spread far out of country borders. The patterns presented in the conceptual form will improve the building design by suggesting appropriate and cost-effective actions throughout the design process. Establishing design patterns and integrating them into the conventional design process upgrades the platform for sustainable design and provides a solid foundation for future projects.

Key words: Buildings, Design patterns, Energy efficient design, Sustainable architecture, Serbia.

Supervisors: Prof. Dr. Karin Stieldorf, Prof. Dr. Manfred Berthold, Prof. Dr. William Alsop Institute of Architecture and Design, Vienna University of Technology (TU Wien)

¹NEEAP - National Energy Efficiency Action Plan of the Republic of Serbia

Modeling Impacts of Regional Climate Change on Agricultural Production and Land Use in Austria

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ABSTRACT

This manuscript provides a methodology for an integrated modeling framework to assess regional climate change impacts on Austrian agriculture and land use development indicators for four different climate change scenarios and the period 2025-2040. The integrated modeling framework consists of data, models, and indicators to cope with the climate-biophysical-economic interfaces in agricultural ecosystem management. Our climate scenarios differ with respect to annual precipitation sums (no change, high, low and shift). At country level, regional climate change has small but positive effects on agricultural producer rents. Further, most land use development indicators, such as sediment loss, nitrogen and phosphorus emission as well as topsoil organic carbon content (SOC) are positively affected by our climate change scenarios, except in a high precipitation scenario. In contrast, irrigation, and thus water demand, increases highly in all but the high precipitation scenario. Our study highlights that regional differences matter greatly. While forage yields in alpine and higher elevation regions increase substantially, we find that yields in semi-arid crop production region in the East can decline. Thus, positive economic impacts are felt more in the West of Austria and can even be as low as -15% in Eastern semi-arid pannonian regions. SOC increases in areas with high yield increases (i.e. grasslands), but declines on croplands. Ideally, the results could help to identify regions where policies are needed to support more sustainable adaptation measures, e.g. soil conservation measures in soil erosion prone areas (e.g. Voralpenland) or regional water policies in the East.

Calculating the Net Present Value of One Extra Child

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ABSTRACT

While ecological perspectives of human population sizes reveal that carrying capacities have been exceeded at both national and global levels, pronatalist policies persist in developed countries with declining fertility rates and are largely based on economic arguments pertaining to the future cash flows required to maintain social security systems. Economic benefits are commonly assumed to flow from augmentation of the dependency ratio yet these effects are seldom quantified and, when they are, they tend to employ a cash-flow perspective which routinely fails to acknowledge the significant indirect costs of domestic fertility borne by society. Moreover, existing models tend to be static models which are incapable of incorporating future uncertainties over variables such as unemployment and discount rates which are relevant to any calculation of the Net Public Gain associated with increased population sizes.

The current research seeks to address this omission by developing a model for calculating the marginal economic impact of fertility: both using a cash-flow approach and a more holistic Net Public Gain approach. The model generates forecasts of the economic impact of one extra child being born into a population through the input of data and trends from published governmental sources. These baseline figures can then be manipulated as variables to develop a range of possible scenarios. As this marginal calculation represents a simplification which omits significant costs such as the extension of infrastructure provision and increased environmental degradation and mitigation costs associated with a larger population, the model can be seen to systematically overstate the economic and societal benefits of domestic fertility. The exclusion of these stepped costs justifies the assumption that the economic impact of each subsequent birth will be of diminished value to society.

The model will prove valuable in corroborating or contradicting claims that increased fertility yields economic benefits and in quantifying this impact over a range of different scenarios. Such information should find application in informing decisions regarding optimal rates of population change.

Coping with Complexity: Decision-Making in Flood Risk Management

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ABSTRACT

In the past fifteen years (1998-2013), Europe experienced a total of 327 flood events causing some 1680 fatalities and affecting more than 4.4 million people (EM-DAT, 2013). A series of floods in the early 2000s, severely affecting regions along the northern Alpine ridge and within the Danube, Elbe and Moldau flood plains (EEA, 2010), focused attention on the continuous upward trend in the exposure of people and assets in flood-prone areas (Munich Re, 2013).

Policy makers at the European level (see Floods Directive 2007/60/EC), but also at the national and regional level (for Austria, see e.g. ÖROK, 2005 and Land Steiermark, 2007) responded with a fundamental shift in the approach to the management of floods. Accordingly, traditional approaches of structural flood protection are complemented by more integrated flood management approaches which emphasize preventive measures (e.g. in the field of land management or spatial planning) aiming to reduce the severity of and the vulnerability to flooding (Schanze et al., 2008).

The regulatory frameworks for an integrated management of flood risks are meanwhile overwhelmingly in place. However, thus far, little is known about the flood policy shifts' ramifications on the municipal level, (Hall and Solomantine, 2008), where local decision makers now have to choose amongst a host of flood management measures and face the challenge of engaging in collaborative planning approaches with multiple state and non-state actors (Kuhlicke and Steinführer, 2013). Moreover, as an integrated approach to flood risk management needs to consider spacio-temporal dynamics, such as climate-change related shifts in precipitation patterns or land use changes in flood plains and catchment areas (Apperl et al., 2013), decision making processes take place in an ever-changing risk environment characterized by new uncertainties and increased complexity (White, 2013; Renn, 2008). To ensure a more thorough consideration of these underlying uncertainties in flood-related planning, some European governments have drafted guidance documents (see e.g. DEFRA, 2001) and manuals regarding the effective implementation of participatory processes in flood risk management (see e.g. BMLFUW, 2008; Technical University Dortmund, 2012).

Against this planning background, the author aims to analyse how the shift towards an integrated flood risk management influences local authorities' flood management decisions. Research questions of particular interest include the following:

- How are local flood management decisions taken in an increasingly uncertain and complex risk environment?
- What role do uncertainty analyses currently play in local flood-related planning practice?
- Under which conditions may collaborative planning processes help to cope with uncertainties, and thus, support "robust" decision making as part of an evolving flood risk governance?

The research design is framed by decision theory (Knight, 1921; Smith, 2003), complexity theory (de Roo and Silva, 2010; Hillier and Healey, 2010) and communicative planning theory (Healey, 1997; Innes, 2007).

The above-stated research questions will be addressed in a quantitative online survey (to be sent to all Austrian flood-prone municipalities) as well as in one in-depth case study analysis where a mix of research methods shall be applied:

- *participatory observation* in the collaborative planning processes;
- *qualitative surveys* among local residents and workshop participants with regard to the perception of flood risks and the assessment of flood management measures;

- *review of municipal council protocols* regarding the political rationale of flood management decisions;
- *qualitative, partially structured interviews* with stakeholders and local decision makers (as well as with flood-related planning experts and top-level bureaucrats on the federal and national level);
- *review of primary sources* (e.g. spatial planning instruments or planning laws) of relevance for the respective case study regions.

A key research aim is to develop a guidance for local planners and decision makers which may serve as a frame of reference for a more systematic consideration of uncertainties in future flood-related decision making and, thus, contribute towards reducing the vulnerability of areas prone to flooding. Application for the 3rd Vienna Workshop on Sustainable Development for Doctoral Students Lukas Löschner - Abstract

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Natural resource management using a PES approach in the “Chong-Kemin” National Nature Park in Kyrgyzstan

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ABSTRACT

Payment for ecosystems services (PES) can be a valuable approach for solving ecological problems in developing countries such as Kyrgyzstan. According to scientific literature several characteristics have to be met in order to implement successful PES mechanism (e.g. well defined land uses that ensure the availability of those services, the presence of at least one provider and one buyer in the market, reliability in the provision of the service, and voluntary transactions). Currently social tensions and economical needs lead to increasing consumption of natural resources and at the same time the Government as owner of the resources cannot provide enough finances for the protection and sustainable management of the surrounding ecosystems. Therefore gaps between the demand and actual use of the ecosystem services and their provision are becoming large and are increasing year by year.

After the collapse of the planned economics in the former Soviet Union (USSR) Kyrgyzstan faced difficulties on its way to the market. New market economics destroyed the old trading connections between parts of the USSR which had provided working solutions for several resources including timber, foods or medicines. The independent country had to rely on the provision of its own natural resources, which increased the pressure on natural resources dramatically. During the last decades the forest ecosystems of Kyrgyz Republic have therefor suffered from anthropogenic pressures due to a sharp increase of livestock amount, overgrazing and illegal cutting wood for fuel and construction timber. Mountain forests in Kyrgyz Republic provide enormous ecosystem services including soil protection, flood mitigation, air quality, biodiversity conservation and renewable resources comprising about 40-50% of all water resources. To develop sustainable forest management and policy in mountain's area is not only important for the Kyrgyz Republic but also for whole Central Asia as the water resources are originating mostly from the glaciers of Kyrgyz Mountains.

Chong-Kemin National Natural Park is representative for most ecosystems of the country. The general objective of the research is to identify the role of protected ecosystems for the livelihood of local people and to suggest applicable and practicable solutions for the management of this area. The use of a PES approach will be studied in order to stimulate the development of regional policy including the sustainable provision of ecosystem services. The National park authorities, the representatives of watersheds, forest users, water users, pasture users, hunters, miners and tourists will be engaged in the process to maintain the existing ecosystems and work out a new approach for protecting and managing the natural resources of the park. This contribution presents the first results of a survey on the current demand and actual use of the natural resources in the Chong-Kemin National Natural Park as a basis for the design of a PES mechanism.

Key words: Payment for ecosystems services, National Nature Park, managing the natural resources, forest users, pasture users, water users, Chong-Kemin, Kyrgyzstan.

Intergenerational Learning as a factor in Protected Area Management

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ABSTRACT

Establishment and management of protected areas constitutes a key way of preserving biological diversity - an important aspect of sustainable regional development. However, objectives of protected areas reach beyond natural protection and include preserving traditional and cultural practices, supporting local economic development, education and research. Scientific literature acknowledges the importance of participation and co-management by the local stakeholders, and empirical evidence demonstrates that community based conservation can be an effective conservation tool, especially when such initiatives are well designed and initiated in favorable local contexts. The latter includes well-planned participation and social cohesion of the communities.

Intergenerational learning - the joint and mutually beneficial learning among all generations - is a process, which can contribute to the social cohesion of the local communities and provide a useful contribution to the participatory management process. It has received more attention in the last years, due to the aging of the global population, and increasing generational divide, caused by changing social and economic realities and especially prevalent in the rural areas. However, its potential role in natural resource management has not been considered by the research community to-date. Although intergenerational learning is more directly related to social aspects of sustainability - through strengthening connections between the community members, addressing stereotypes, promoting mutual respect and mutually-beneficial collaboration - it can also influence economic and environmental spheres.

The proposed paper examines intergenerational learning as a factor in protected area management. Relevant management objectives and challenges were selected based on a literature review, and for each intergenerational learning - related solutions and examples are proposed. The latter have been derived from literature, interviews with experts and protected area managers, as well as case-studies found via literature search and by participation in the project "Big Foot. Crossing Generations, Crossing Mountains." The Big Foot project aimed at testing intergenerational learning actions in the 3 rural municipalities in Bulgaria, Greece, and Italy, and highlighting their contribution to the sustainable development of these areas.

The results suggest that intergenerational learning could contribute to several aspects of protected area management, and thus could become an asset in management plans. Recommendations call for protected areas to consider including intergenerational learning topics in training of relevant staff, and for adapting and implementing existing examples of intergenerational projects in protected areas.

Supervisors: Andreas Muhar (BOKU), Marianne Penker (BOKU)

Assessing climate-induced risks in crop production in Austria

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ABSTRACT

Climate-induced agricultural production risks are likely to increase over the next decades. We assess climate change impacts on level and variability of crop yields and profits. Furthermore, we identify optimal crop management portfolios which aim at reducing climate-induced variability in profits for alternative levels of risk aversion. Crop yields with alternative management practices (i.e. crop rotations, fertilization rates and irrigation) are simulated with the bio-physical process model EPIC (Environmental Policy Integrated Climate) at 1 km grid resolution for a historical period (1975-2005) and five climate change scenarios (2010-2040). A non-linear mean-standard deviation model is applied to determine spatially explicit crop management portfolios capturing the trade-off between profit expectation, variability, and risk aversion. We find, as expected, that portfolio diversification increases with the level of risk aversion. Under climate change, optimal portfolios result in higher average crop yields and profits of 7 to 18%. Risk aversion, climate change, and specific site conditions (i.e. semi-aridity, clayey soils) result in more diversified crop management portfolios.

Determinants of users' willingness to contribute to safe water provision in rural Uganda

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ABSTRACT

This paper presents factors influencing users' willingness to contribute to collective action for water provision in rural Uganda. Household interviews were carried out in two districts and show disparity in actual contribution and willingness to contribute to water provision. Using quantitative approach (binary logistic regression), 802 interviews were analysed. The results demonstrate that gender, district and reliability of the water source has a positive effect on users' willingness to contribute whereas, lack of community participation, water quality and lack of trust of Water User Committees has a negative effect on users' willingness to contribute to water provision.

Social Capital and Innovation: Trust in heterogeneous social networks of multi-stakeholder innovation platform interactions in Central Mozambique.

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ABSTRACT

This study explores the processes that build or erode trust among actors in multi-stakeholder innovation platform interactions with farmers in Manica District in Mozambique. It analyses how relations of trust influence innovations towards increased farm productivity and improved market linkages for participating farmers. The specific objectives are to: 1. Explore how processes of interaction in Innovation Platforms (IPs) succeed or fail to build relations of trust towards innovation at different interfaces of multi-stakeholder interactions. 2. Analyze how relations of trust amongst Innovation Platform actors create or hamper market linkages and interplay with different markets for farmers in the IPs. 3. Analyze how public and informal policies create enabling or constraining environments for relations of trust, processes of partnering and innovation between farmers and relevant actors in the selected value chains. The study works on the assumptions that (i). Processes of multi-stakeholder innovation platform interaction build partnerships of trust at different interfaces of interaction within the IP which result in innovations for increased crop productivity and food security for participating farmers. (ii). The presence of trust among IP actors at different interfaces creates opportunities for market linkages and interplay with different markets for farmers in the IPs which result in increased incomes and improved livelihoods for participating farmers. (iii). Formal and informal policies create enabling environments for trust relations, processes of partnering and innovation for farmers and relevant actors in the selected value chains. Qualitative case study methodology is used to address study goals and answer key research questions. This includes the use of participant observations, Key Informant Interviews, Focus Group Discussions (FGDs) In-depth interviews, Participatory Rural Appraisal (PRA)-Historical profile, Market Mapping and Actor Analysis. Atlasti.7 is used for data analysis.

Community-based Ecotourism in Laos: Benefits and Burden Sharing Among Community Members

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ABSTRACT

Ecotourism has been regarded as a tool for socio-economic development and promote conservation of cultural and natural resources. The government of many developing countries including Lao PDR is focusing attention on the development of ecotourism in the rural areas, especially in the protected areas in the hope that it will create employment opportunities and raise income for local people. These will lead to increase in living standard and bring them out of poverty trap. Ecotourism is also expected to contribute financial resource for conservation activities. However, the findings from previous researches indicate that local communities receive minimal benefits from tourism and furthermore the distribution of the benefits is unequal among tourism stakeholders. In some cases, ecotourism activities exacerbate environmental degradation in protected areas. Therefore, this study will address the problems associated with benefits and burdens sharing among stakeholders and how ecotourism contribute to safeguard fragile ecosystem.

The overall objective of this project is to examine the benefits and burdens sharing among stakeholders from the development of ecotourism in Laos PDR and further to investigate how ecotourism has contributed to the conservation activities in the protected areas. The research has been conducted in protected areas located in Northern and Central Laos where ecotourism plays an important role in socio-economic development of the communities living in and at the adjacent areas of these NPAs.

Key words: Community-Based Ecotourism, National Protected Areas, Benefits and Burdens Sharing, Stakeholders

What can we learn from the classical economists for the development of ecological macroeconomics?

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ABSTRACT

The appearance of environmental problems has long been marginalised and left to sub-disciplines such as resource and environmental economics. Problems related to such neo-classical approaches to comprehensively investigate environmental problems are manifold and have been described by various scholars (e.g. Georgescu-Roegen, 1975; Daly, 1974). A predominant problem is that neo-classical approaches operate in a micro-economic methodological framework. This leads to an inability of adequately addressing rebound effects, absolute resource constraints and resource depletion on a macroeconomic level. As a response to this critique, ecological economists have argued throughout the last three decades for the need for an ecological macroeconomics that reconciles economic stability within biophysical limits. However, there is no comprehensive theoretical framework for an ecological macroeconomics available yet.

This paper explores ideas and threads of reasoning from the classical economists and tries to establish ties to the current debate on developing ecological macroeconomics. A range of 18th and 19th century authors such as Adam Smith, Robert Malthus, John Stuart Mill, David Ricardo and Jean-Baptiste Say stressed the importance of natural resources and their limits for economic activities. These classical economists provide insights to concepts that are also covered in the recent literature on ecological macroeconomics such as a steady-state economy, non-renewable energy dependence, resource scarcities, population, distributional and ethical issues. In ecological economics, only limited forays have yet been made into such a historical context. The basis for this paper is a literature study that explores the writings of selected classical economists with the aim of better grasping how they understood environment-economy interactions as the basis for economic theories. The general concern is to throw light on neglected past works and to explore old ways of thinking about the relationship between the environment and the economy with the aim of inspiring further work on ecological macroeconomics. It is argued that classical economists were aware of the necessity of well-functioning natural systems as the basis for human activities and that aspects of their theories are still relevant today for progressing towards an adapted macroeconomic framework, particularly regarding its biophysical and ethical foundations.

Strategic planning for sustainable development in the Persian Gulf with focusing on the islands

Hamid Rastgar

ABSTRACT

Reasons and purposes

The Persian Gulf, in Southwest Asia, is an extension of the Indian Ocean located between Iran and the Arabian Peninsula. This inland sea of some 251,000 km² is connected to the Gulf of Oman in the east by the Strait of Hormuz. Countries with a coastline on the Persian Gulf are (clockwise, from the north): Iran, Oman (exclave of Macadam), Emirates, Saudi , Qatar on a peninsula off the Saudi coast, Bahrain on an island, Kuwait and Iraq in the northwest. Various small islands lie within the Persian Gulf.

The Persian Gulf has many good fishing grounds, extensive coral reefs, and abundant pearl oysters, but its ecology has come under pressure from industrialization, and in particular, petroleum spillages during the recent wars in the region.

The Persian Gulf and its coastal areas are the world's largest single source of crude oil and related industries dominate the region. Large gas finds have also been made with Qatar and Iran sharing a giant field across the territorial median line.

Wildlife of the Persian Gulf is diverse, and entirely unique due to the gulf's geographic distribution and its isolation from the international waters only breached by the narrow Strait of Hormuz. Persian Gulf has hosted some of the most magnificent marine fauna and flora, some

of which are near extinction or at serious environmental risk. From corals, to dugongs, Persian Gulf is a diverse cradle for many species many of which depend on each other for survival; for instance the mangroves in the Persian Gulf, which require tidal flow and a combination of fresh and salt water, are also nurseries for many crabs, small fish, and insects; these fish and insects, are the source of food for many of the marine birds that feed on them.

Persian Gulf is home to many small islands. Bahrain an island in the Persian Gulf, is itself a Persian Gulf Arab state. Geographically the biggest island in the Persian Gulf is Qeshm island located in the Strait of Hormuz and belonging to Iran. Other significant islands in the Persian Gulf include Greater Tunb, Lesser Tunb and Kish administered by Iran, Bubiyan administered by Kuwait, Tarout administered by Saudi Arabia, and Dalma administered by UAE. In recent years, there has also been addition of artificial islands, often created by Arab states such as UAE for commercial reasons or as tourist resorts. Although very small, these artificial islands have had a negative impact on the mangrove habitats upon which they are built, often causing unpredicted environmental issues.

Questions for research

- 1) What is the best sustainable development model for Persian Gulf islands?
- 2) How can be the best scenarios planning for Persian Gulf islands ?
- 3) Which role can play Persian Gulf islands about security, economic, social and environmental Sustainability in Persian Gulf and Middle East?

Supervisor: Ao.Univ.Prof. Dipl.-Ing. Dr.techn. Wolfgang Feilmayr (TU Wien)

Implementation and evaluation of measures aimed at integrating aspects of sustainability into pig fattening

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ABSTRACT

Public concern about the sustainability of industrialized agricultural animal production has substantially increased during the last decades. Not only the ecological impact gained more attention, but also public awareness of animal welfare issues has increased. On the other hand, the high demand for low-priced meat and meat products has favored high-output, intensively managed, large-scale production systems. Producing under more animal and environmentally friendly conditions, which result in a higher input of certain resources and labor, therefore presents a huge challenge. When striving for more sustainable animal production systems (APS), it is important to take into account societal demands on APS in terms of enhancing animal welfare whilst reducing environmental impact. The objective of this project is to define measures, which aim at integrating aspects of sustainability into pig fattening, and implement them on pig fattening farms in Austria. In order to assess the effects of the implementation, they will be evaluated with regard to their effects on animal welfare, economic performance and environmental impact using already established evaluation methods.

Guidelines for Sustainable Modern Iranian Architecture in Hot Arid Region

A Combination of Modern Sustainable Architecture and Urbanism and Traditional Iranian Architecture and Urbanism - Case Study: Yazd

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ABSTRACT

Iran's traditional architecture has been admired by architects regarding its "aesthetic values" and "wise architectural solutions", but very rarely have the architects tried to inspire from these wise solutions and inventions and "re-vitalize" them to be adapted to contemporary architecture.

This dissertation tries to use the lessons and inspirations from sustainable Iranian traditional architecture solutions, assess them according to modern architectural design criteria, and apply them in order to provide guidelines for contemporary architecture in hot and arid region. The historical city of Yazd is the case study.

By implementation of empirical research, three major phases are defined for the project which is fulfilled by using mixed method through an inductive approach.

1. Environmental sustainable solutions in traditional architecture in hot and arid region of Iran:

The case studies are selected to cover the two main historical periods in Yazd (13th-15th (Ilkhanid, Mozaffarid and Teymurid dynasties) and 16th -20th (Safavid- Qajar) centuries AD) and also the building usages which include daily living activities: houses, mosques, madrasas, hammams...

These sample buildings are analyzed and graded due to their contribution to sustainability factors in the present discourse of sustainability: site, energy, air, material, water, health and well-being...

Although sustainability includes social, cultural, economic aspects too, but according to the author's field of study, this research only focuses on environment-based factors.

2. Contemporary architecture in Iran's hot-arid region:

In the second phase, six samples of the typical houses (two per category of single family house, multilevel house and residential complexes) from contemporary architecture in Yazd are selected, analyzed and scored.

Short structured interviews with the architects and studying the architectural design rules and regulations in Iran also help.

3. Guidelines for environmentally sustainable architectural design in hot and arid regions:

The last phase is to provide guidelines for a sustainable contemporary architecture, with the aid of traditional sustainable solutions. Which traditional solutions have to be kept? Which solutions do not respond any longer, and which ones should be adapted to new conditions of living.

These guidelines are expected to have the potential to be adapted and extended to the neighboring countries of Iran which have almost the same climatic conditions.

Supervisor: Univ.Prof. Mag.arch. Françoise-Hélène Jourda

The meaning of environmentally friendly farming: understanding farmers' different rationales

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ABSTRACT

Nowadays the system of modern (often called industrialized) agriculture is mainly perceived as opposite to nature or natural processes. Nevertheless, agricultural and environmental policies as well as environmental NGOs try to enhance environmental friendly production methods and it seems that most stakeholders are pretty much aware that agriculture and forestry are important partners not opponents when it comes to nature conservation or any form of a more environmentally friendly production. Based mainly on the assumption of a pure profit-maximizing, fully rational farm-manager, agricultural policy may fall short in addressing different types of farmers. In fact, besides structural classification mainly of farms, decision makers seem to operate with only one type of farmer, who holds the characterizations described above. Recent findings do not fully support these assumptions in the area of farming. Instead, there seem to be several different management-styles or farmer-types which place different values to a variety of goals. A solely profit-maximization aim doesn't hold for each and every farmer. Hence, any programme designed to foster environmentally friendly production which is based on these assumptions may have, at least to some extent, inherent efficiency losses. We assume that farmers put their utmost priority not solely on maximizing either monetary or other non-monetary utility but rather try to gain what is called a sufficient income and therefore also a sufficient amount of other non-monetary aspects (e.g. having the possibility to do something for the local community, foregoing income in order to preserve soil quality or rare species). What we expect to find is a variety of viewpoints, attitudes or approaches to cope with the tension field between the necessity to produce economically viable in order to stay in business and on the other hand trying to gain as much satisfaction of the job as possible. This may lead to the conclusion that an agricultural and environmental policy which is tailored for the respective needs of the various types could help to improve environmentally friendly behaviour. The present study tries to reveal the different kinds of meaning farmers assign to environmental sound practices. The methods that are used to gain detailed insights into these viewpoints are in the first phase in-depth stakeholder interviews and in the second phase the usage of Q methodology accompanied with semis-structured interviews with farmers. Based on this approach it will be possible to describe and better understand the rationale behind farmers' environmental behaviour.

Portfolioanalyse für regionale Versorgungsnetzwerke von Holzbiomasse - ein europäischer Vergleich

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ABSTRACT

Erstmals wurde eine länderübergreifende Portfolioanalyse im Bereich Holzbiomasse erstellt - aufgrund der zahlreichen teilnehmenden Länder (Bosnien-Herzegowina, Griechenland, Italien, Österreich, Schweiz, Serbien, Slowakei, Slowenien, Rumänien und Ukraine) mit europäischer Dimension.

Die Charakterisierung der Versorgungsnetzwerke erfolgt nach Sortimenten (z.B. Waldhackgut oder Pellets) und Eigentumsarten (z.B. Staatswald, Großprivatwald, Kleinwald). Mit den Beteiligten der jeweiligen Versorgungsnetzwerke wurden standardisierte Interviews durchgeführt, um eine vielschichtige Analyse der Prozessabläufe und der Einflussfaktoren zu ermöglichen. Darauf aufbauend wurde eine mehrdimensionale Portfolioanalyse erstellt und Strategien zur Verbesserung der Biomassebereitstellung abgeleitet.

Die Arbeiten wurden im Rahmen des EU-Projekts „FOROPA“ durchgeführt, dessen Ziele die Schaffung eines gemeinsamen Forschungs- und Innovationsnetzwerks zur Verbesserung der Wettbewerbsfähigkeit von forstlicher Biomasse am Energiemarkt, das Identifizieren und Schließen von Innovationslücken sowie die gemeinsame Entwicklung von nachhaltigen Biomasselogistik-Konzepten sind. Die hier vorgenommene Analyse gewinnt insofern an Bedeutung, als in stetig zunehmendem Maße auch der Einfluss der Bereitstellungsnetzwerke steigt. Denn für die aktuell immer größeren Biomassekraftwerke gewinnen die Logistikkosten durch größere Einzugsgebiete stark an Bedeutung. Gleichzeitig ist auf lokaler Ebene auch die Mobilisierung von Waldbiomasse an effiziente Bereitstellungslogistik gebunden.

Space for comments, ideas and inspiration

