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Newsletter

Center for international Development and Environmental Research

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Editorial

In 1998, the Center for international Development and Environmental Research (ZEU) was founded as the successor of various other research institutions. This makes it the oldest center at Justus Liebig University. Now, after 20 years, alumni have a chance to celebrate with *their* ZEU, to meet friends, acquaintances and former principals, and to gain insight into the Center's current activities.

Thanks to this, this newsletter has become somewhat more substantial than usual, as its aim is to document 2018 based on teaching and research activities. This will help our alumni to learn more about the constant alterations the ZEU has been and is going through. Alterations which are necessary for a research institution mainly based on third-party funds.

In 2015, the ZEU decided on and subsequently began a structural change that had become necessary due to a profound generation change taking place, but was also required thanks to important parameters set by the research landscape. Since then, a new team at the Center has been busy to develop and work out in detail a new profile, in order to further ensure that the ZEU continues to embody the appeal of development and environmental research at Justus Liebig University.



Staff News

Michael Düren was elected as a new member of the Executive Board by the Council of the Center. Prof. Düren studied Physics at the RWTH in Aachen, Germany and obtained his PhD in 1987 in the field of particle physics. After being a postdoc at the Max-Planck-Institute for Nuclear Physics in Heidelberg, he habilitated at the University Erlangen-Nürnberg, was interim professor at the University Bayreuth and, since 2001, he is a full professor for experimental physics at the JLU Giessen. In 2006, he was co-founder of the interdisciplinary SEPA working group (Solar Energy Partnership Africa-Europe) at the JLU and in 2008 co-founder of the DESERTEC foundation. In July 2011, he became coordinator of the DESERTEC Academic Network.



Ramona Teuber studied food economics at the Justus Liebig University Giessen and received her PhD in agricultural economics in 2011. Her PhD thesis focused on the economics of geographically differentiated agri-food products. From 2011 to 2015 Ramona worked as a research associate at the Leibniz Institute of Agricultural Development in Transition Economies (IAMO), Halle (Saale). In 2015 she became assistant professor at the Department of Food and Resource Economics (IFRO), University of Copenhagen (Denmark). Since October 2018 she is a full professor for market analysis of agricultural and food markets and member of the Center for international Development and Environmental Research (ZEU) at the JLU Giessen. Her current research focuses mainly on consumer attitudes, perceptions and willingness to pay for different product attributes such as local, organic, geographical indications and health claims. However, she is also interested in and has worked on product differentiation strategies employed by



agri-food producers as well as agri-food trade issues.

Martin Petrick is a professor of agricultural, food and environmental policy at Justus Liebig University Giessen, Germany. Until September 2018 he was Deputy Head of the Department of Agricultural Policy at the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) in Halle (Saale) and a professor at Martin Luther University Halle-Wittenberg (MLU), Germany. He is now a Visiting Researcher at IAMO. Martin holds a PhD in agricultural economics from MLU (2003). Major fields of expertise include structural change in agriculture, agricultural transition in former Soviet countries, the evaluation of agricultural policy measures, and public action in rural development. Martin has worked in senior positions for activities funded by the Deutsche Forschungsgemeinschaft (German Research Council) (DFG), the European Commission, the World Bank, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and other institutions. He currently leads the research and capacity building project SUSADICA - Structured doctoral programme on Sustainable Agricultural Development in Central Asia financially supported by the Volkswagen Foundation and the Government of Uzbekistan.



Manuel Miltscheff-Petroff will start as a student assistant at ZEU in February 2019. He studied Atmospheric sciences at the Leopold-Franzens-University Innsbruck and received his Bachelor degree in 2017, with his Bachelor thesis focusing on the analysis of winter snow conditions at an Arctic glacier. In 2016 he started the master of science study for „Human-Climate-Paleoenvironment“ at the JLU.



Fieldwork to research the distribution and the dynamics of *Betula pendula* subsp. *litwinowii* and *Betula raddeana*

Encroachment in the high mountains of the Greater Caucasus, Georgia

The botanical genus *Betula*, as in many other central Asian high mountain regions, forms the upper timberline in the central part of the Greater Caucasus, especially in the Kazbegi region. According to the potential natural vegetation the slopes should be covered by dense 'caucasian krummholz and open woodlands' with dominant *Betula pubescens* var. *litwinowii* and the less frequent species *Betula raddeana*. But instead, the typical high mountain birch forests are fragmented due to past land-use pressure and occur nowadays as remnants on steep north exposed slopes up to 2500 m. However, by analyzing multi-temporal imagery we could show that between 2005 and 2015 birch shrubbery and forests expanded with an increase in the wooded area of up to 20%. This recent reforestation process triggered our curiosity to start researching the encroachment dynamics, which are mainly dependent on land-use and climate change. During two weeks in July 2018 the AMIES II (2014-2018, project coordinator Prof. Dr. Dr. Dr. h.c. (TSU) Otte's team of Project Unit A (Landscape ecology, T. Theissen) and C (Phytodiversity, G. Tedoradze, A. Magiera) and two German (L. Drechsel, J. Thielen) and one Georgian bachelor student investigated the forest to grassland ecotone in Stepantsminda, Georgia. Besides common vegetation and soil seed bank sampling, increment borings for tree ring analysis were collected on 60 plots in a transect design to subsequently reconstruct the encroachment dynamics by using dendro-ecological methods. Moreover, the bachelor candidates had the chance to validate their own datasets, resulting in two bachelor theses on 'Effects of landscape characteristics on treeline form' (L. Drechsel) and 'Impact of touristic development on the landscape structure' (J. Thielen). The field work was followed by a research visit (October until December 2018) of G. Tedoradze from the Georgian Ilia Chavchavadze State University at the ZEU in Giessen to finalize his first manuscript titled: 'Site conditions impact the composition of the persistent soil seed bank: A case study of

steep high mountain grasslands in the Greater



Caucasus, Georgia' which was submitted to *Phytocoenologia* - a peer reviewed journal with focus on international vegetation science - in December 2018. Moreover, during the stay in Giessen G. Tedoradze supervised a germination experiment concerning the soil seed bank samples taken during his fieldwork. The results are expected to clarify the role of the soil seed bank in the process of shrub encroachment and reforestation. Moreover, his results on grassland productivity were integrated in the interdisciplinary development of sustainable land-use scenarios, which was the overarching aim of the AMIES II project. The set of scenarios was jointly published by the project group¹ of Georgian and German colleagues in a corresponding research article 'Environmental and socio-economic resources at the landscape level -Potentials for sustainable land use in the Georgian Greater Caucasus' in the *Journal of Environmental Management*.

¹Theissen, T., Aurbacher, J., Bedoshvili, D., Felix-Henningsen, P., Hanauer, T., Hüller, S., Kalandadze, B., I.U. Leonhäuser, Magiera, A., Otte, A., Shavgulidze R., Tedoradze, G., Waldhardt, R. (2019). Environmental and socio-economic resources at the landscape level - Potentials for sustainable land use in the Georgian Greater Caucasus. *Journal of environmental management*, 232, 310-320.

<https://authors.elsevier.com/c/1Y7Ru14Z6tX5kx>

HydroCrowdMod – Rainfall-runoff-models can be calibrated using crowdsourced water level data

Björn Weeser^{1,2,3}, Philipp Kraft¹, Mariana Rufino^{3,4}, Lutz Breuer^{1,2}

Hydrological models are widely used to predict catchment runoff, but they require comprehensive (and expensive) discharge observations for model development and testing. For many catchments, particularly in less developed countries or in remote areas, such data is not available. Water levels, however, can be easily measured by citizens to collect data in catchments which would otherwise remain ungauged. The feasibility of calibrating hydrological models using crowdsourced data has not been tested yet, although the concepts for using water levels instead of discharge data are described in literature.

Here we present a comparison between a rainfall-runoff-model calibrated against either automatically measured discharge data or water levels collected by citizens in a remote tropical catchment in Kenya. For this, Spearman-Rank-Coefficients between the measured water levels and the modelled discharge were calculated to identify the best 250 (CS250) and 50 (CS50) parameter sets out of 25,000 model runs in a Monte Carlo based framework. Crowdsourced water levels (n=271) and daily discharge from a one-year period starting on 1st April 2016 were used to calibrate a four-parameter lumped one-box model built with the Catchment Modelling Framework (CMF). For model validation, another one-year period of daily discharge data was used. In addition, we applied a simple water-balance-filter (F250 and F50) for bias reduction. In this case, we only accepted parameter sets in which the modelled discharge agreed with the estimated discharge obtained from the water balance of precipitation minus actual evapotranspiration derived from MODIS data ($\pm 30\%$ estimated uncertainty). When calibrated against discharge, 199 parameter sets fulfilled the calibration criteria of a Nash-Sutcliffe-Efficiency (NSE) ≥ 0.8 and a Root Mean Square Error ≤ 0.5 . In this case, the mean of all NSE was 0.86. When calibrated against crowdsourced data only, we obtained a mean NSE of 0.51 for CS50 and 0.23 for CS250,

when finally verifying the model with measured discharge. By including the water-balance-filter, NSEs were substantially improved to 0.87 and 0.86 for F50 and F250, respectively. Comparable trends were found for the validation period with efficiencies slightly reduced in relation to those found during calibration. With this study, we demonstrate the value of crowdsourced water levels for rainfall-runoff-model calibration in data scarce regions. We emphasize the use of additional and easy to obtain spatial information on actual evapotranspiration to improve model credibility and the use of hydrological models to transfer crowdsourced water levels into a continuous discharge time series.

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ValueMeadow transdisciplinary workshop on mountain value chains

Held in Lienz, Austria: Searching for new projects, partners and approaches

The ValueMeadow workshop was held in East-Tyrolean Lienz (Austria) from 30th May to 1st June 2018. It was organized by ZEU together with local partners in Lienz. The main objective of this meeting was the exchange of ideas among the participants on the problems of mountain value chains and specifically of local value chain initiatives.

European mountain regions provide large cultural and biological diversity and thus a high recreation and tourism potential. At the same time, mountainous regions face strong challenges such as population decrease, biodiversity loss and landscape change. It is a vision of the Value-Meadow working group that the development of local and regional value chains in mountain regions has the potential to increase the value and, thus, the attractiveness of these regions. Therefore, we are interested in exploring such value chain options that would be based on biodiversity and would benefit from marketing strategies based on synergies with other local initiatives. The main workshop objective was to explore such initiatives and identify related challenges, opportunities, and alternatives.

The ValueMeadow workshop welcomed the participants from various fields of scientific research (marketing, agricultural economics and policy, governance and rural development, animal sciences and livestock management, landscape ecology, knowledge systems and innovation, etc.) as well as local actors involved in various regional value chains (farmers, local municipality, etc.). Thus, it was possible to ensure a transdisciplinary exchange of ideas within the workshop group. The following institutions and organizations took part at the ValueMeadow meeting in Lienz:

Researchers:

- ZEU - Justus Liebig University, Giessen, Germany;
- BOKU - the University of Natural Resources and Applied Life Sciences, Vienna, Austria;
- Free University of Bozen, Italy;
- Institute of Ecology of the Carpathians, NATIONAL Academy of Sciences, Lviv, Ukraine;
- CESAER - Center of Applied Economics and Sociology of Agriculture and Rural Areas, AgroSup Dijon, France;



Stakeholders:

- Agri Cultura Natura Transylvaniae Association - CAN, Miercurea Ciuc, Romania (work area of the NGO: farming advisory services, various projects in the field of agriculture, nature, and culture in Gymes, the Romanian Carpathians);
- City Marketing, Lienz, East Tyrol, Austria;
- Alpine Dairy Tauer, East Tyrol, Austria;
- District Chamber of Agriculture, East Tyrol, Austria;
- INNOS GmbH Lienz, East Tyrol, Austria.

Among the participants were also farmers as well as representatives of local and municipal authorities (mayor, Landtag deputy).

The expertise and the experience of the participants covered five mountain regions of interest: East Tyrol, the Alps (Austria); South Tyrol, the Alps (Italy); Gymes, the Carpathians (Romania); Kosiv, the Carpathians (Ukraine); Munster, the Vosges (France). Various practical experiences of the local actors offered a unique chance to exchange ideas and their perspective on the situation in the region, specifically in East Tyrol, regarding value chains and the conservation of the mountain landscape. The follow-up meetings and discussions have already been carried out or are also planned for other regions (e.g. in Ukraine, December 2018; in Romania, January 2019) in order to accommodate the visions of local actors from other areas.

Representative Market Survey of the Use of Iodized Salt in Processed Foods in Germany

Project Management: Prof. Dr. Roland Herrmann with Dr. Eleonore A. Heil and Dr. Irmgard Jordan; Center for international Development and Environmental Research (ZEU), Justus Liebig University, Senckenbergstr. 3, D-35390 Giessen, Germany

Team of Authors (in alphabetical order): Katharina Bissinger, M. Sc.; Laura Busl, B. Sc.; Christin Dudenhöfer, M. Sc.; Diana Fast, M. Sc.; Dr. Eleonore A. Heil; Prof. Dr. Roland Herrmann; Dr. Irmgard Jordan; Anna Pfisterer, M. Sc.

The largest part of iodized salt in human food consumption is provided by processed foods. Hence, it was the objective of this research project to investigate the use of iodized salt in processed foods within a representative market survey for Germany. Representativeness was to be achieved with regard to foods in three important product groups: Bread and bakery products, meat and meat products, and milk and dairy products. A full census of manufactured food products for these three product groups was conducted in selected grocery stores in the cities Hannover, Dresden, Stuttgart, and Düsseldorf, respectively. Those survey data were analyzed statistically, and logistic regression methods were used to elaborate determinants of a differential use of iodized salt across product groups. In a second part of the study, a number of expert interviews were carried out among selected representatives of the food industry, small companies as well as small-scale entrepreneurs producing bread and

meat products. The interviews were transcribed and evaluated with qualitative research methods in order to capture and to explain the use of iodized salt in those firms. The results were used to design and to implement an online survey among bakeries and butchers. Patterns of behavior with regard to the use of salt in bakeries and among butchers had been unexplored in the literature. Methodologically, a multiphase-mixed-methods approach was utilized that integrates quantitative as well as qualitative methods.

The basic principle "If salt, then iodized salt!", stated by the Federal Ministry of Food and Agriculture (BMEL), is implemented to a very limited extent only for the analyzed processed foods. The statistical market survey covered 30,345 food products, and salt was added to 68% of the products. In the group of processed foods, to which salt was added, iodized salt was used in only 28.5% of products. This share varied very strongly across product groups with, e.g., 41% in

the category meat and meat products and only 10% in the category bread and bakery products. The share of products with iodized salt varies across grocery stores, too. In the categories meat and meat products and bread and bakery products the likelihood of finding foods with iodized salt increases if the basic price of the product falls and if the salt content in a product rises.

According to the online surveys among bakeries and butchers, 44% of the participating firms used iodized salt with a higher share in the craft butcher's sector (49%) than in the baker's trade (39%). There is a declining share of foods that contain iodized salt. One reason stated by firms is that advantages of iodized salt in human nutrition are no longer communicated actively in the public discussion. Although most consumers may perceive iodized salt as the normal salt that is health-promoting, they rarely exhibit their views as customers. As awareness-raising campaigns also took place some time ago, bakeries and butchers are rather left alone with arguments by opponents of iodized salt. This background is a rationale why some entrepreneurs in the sector state they do not use iodized salt anymore or do not advertise the use of iodized salt. They see a need for food and health policy to stress the health benefits of iodine fortification but do not regard it as their task as entrepreneurs to engage in this debate. The analysis of primary data on the online market for table salt reveals additionally that iodine fortification of table salt does not induce a significantly higher market price. Iodine fortification is prevailing on the mass market of table salt, but it is unimportant in the premium market niches of the differentiated salt market.

Perceptions of processors on iodized salt vary strongly and their information on the role of

iodine for nutrition and health is often incomplete. Thus, processors decide differently on the use of iodized salt as the clusters of bakeries reveal. Our results suggest that the image of iodized salt amongst consumers and processors should be improved. In order to revise a downward trend in the use of iodized salt in bread and bakery products as well as meat and meat products, information campaigns seem necessary. An analysis of costs and benefits for different instruments of regulation of iodine fortification is lacking. Such analysis could help to choose an optimal mix of governmental regulation in the trade-off between a reduction of salt consumption on the one hand, and a higher share of iodized salt in salt consumption on the other hand.

Funding

The project was carried out from February 2017 to April 2018 and financially supported by the German Ministry of Food and Agriculture (BMEL) through the Federal Office for Agriculture and Food (BLE), grant number 2815HS023.

Publication

Bissinger, K.; Busl, L.; Dudenhöfer, C.; Fast, D.; Heil, E. A.; Herrmann, R.; Jordan, I. und Pfisterer, A. (2018): Repräsentative Markterhebung zur Verwendung von Jodsalz in handwerklich und industriell gefertigten Lebensmitteln, Schlussbericht zum Forschungsprojekt für das Bundesministerium für Ernährung und Landwirtschaft (BMEL), Gießen. Online verfügbar: https://www.bmel.de/DE/Ernaehrung/GesundeErnaehrung/_Texte/DEGS_JodStudie.html

First International TANNRE Workshop

In cooperation with ZEU, the TANNRE project led by Prof. Dr. Helmut Breitmeier and Dr. Sandra Schwindenhammer hosted its first international workshop on November 8 and 9, 2018. Twenty experts from various fields such as political science, environmental politics and nutritional science came to Giessen to discuss the topic "Sustainability at the Crossroads? Norm Contestation in the Global Regime Complex for Food".

The three-year research project "The Transformation Potential of Inter-institutional Arrangements and the Norm of Sustainability in the Global Regime Complex for Food" (TANNRE) is funded by the German Federal Ministry of Education and Research (BMBF) and has started in August 2017. TANNRE analyzes the normative foundations of the global regime complex for food. It focuses on the conditions and regulatory mechanisms for managing fundamental norm

conflicts between the norm of sustainability, food security, food safety and food sovereignty.

The TANNRE workshop started with a keynote lecture by Dr. Matias Margulis (University of Edinburgh) on politics and agency in the global regime complex for food security. The lecture was followed by the roundtable "Towards Sustainability? The Transformation of the Global Food System", chaired by Dr. Sandra Schwindenhammer (JLU Giessen). Prof. Dr. Helmut Breitmeier (JLU Giessen) and Dr. Sabine Weiland (Lille Catholic University) discussed the theses of the keynote together with Dr. Matias Margulis. At the end of the day, the participants visited the Liebig Museum, where they witnessed some of Justus Liebig's original experiments.

On the second day, Andrés Checa, Jacob Manderbach and Magdalena Tanzer (all JLU Giessen) presented the design and current state

of the TANNRE research project. Afterwards, the TANNRE team pointed out some key aspects and analytical questions to the workshop participants. In small groups, the participants were asked to work on the conceptualization and operationalization of the three independent variables interplay management, resources and authority pooling, and knowledge.

After each group had presented and discussed their results, the last working session dealt with actors in the global regime complex for food. To this end, actors were collected and clustered in a stakeholder analysis.

The TANNRE team thanks all the participants for their constructive work and helpful comments. The valuable feedback will be reflected in the project's future research steps. A second workshop will be held at the end of the research process.

Management of Water Supply, Sanitation and Hygiene linked with Nutrition Security for Sustainable Development (WASH-NUT)

International German Alumni Expert Seminar in Pokhara, Nepal
3rd September 2018 – 14th September 2018

Dr. Irmgard Jordan and Tina Koch, both from the ZEU, cooperated with Ruger Winnege from the Centre for International Capacity Development at the University of Siegen to implement a DAAD Alumni Expert Seminar in Pokhara, Nepal. The seminar was jointly organized and implemented in cooperation with the Department of Water Supply and Sewerage (DWSS) / Ministry of Water Supply and Sanitation, Nepal, and Deutsche Welthungerhilfe, Country Office in Nepal. Further collaborating partners were the College of Applied Sciences, Tribhuvan University Kathmandu and the Lekhnath Small Town Water Supply and Sanitation User Committee.

Twenty Alumni from Bangladesh, Bhutan, India, Indonesia and Nepal participated in this applied research seminar in Pokhara, Kaski District. Among the participants were also former students from Justus Liebig University. Academic discussion was led by the College of Applied Science, Tribhuvan University, with contributions from Professor em. Johannes Fritsch, an expert from Hochschule Ravensburg-Weingarten and Dr.

Irmgard Jordan from ZEU, as well as from the other aforementioned organising institutions.

The seminar was officially opened by the Chief Minister of Kaski District, in presence of the Minister for Planning of Kaski District, and the Mayor of the Metropolitan area Pokhara-Lekhnath. Officers from the District Public Health Office, District Technical Office/DCC Kaski, Pokhara Metropolitan City, Members of the Lekhnath Small Town Water Supply and Sanitation user Committee, Pokhara University - Public Health and Nutrition joined the seminar for the whole time.

Besides technical discussions amongst participants and officials, they also worked in thematic groups, which was additionally complemented with two practical field days, visiting the Lekhnath Water Supply and Sanitation Committee. Possible interventions were identified during the excursion to Lekhnath, which is part of the newly formed greater metropolitan area of Pokhara-Lekhnath. Interviews were held with public and private water users and Lekhnath project staff.



Impressions from field visit days at the Lekhnath Small Town Water Supply and Sanitation project.

The objectives of the proposed interventions are to improve, enlarge and maintain the water sources, the distribution scheme, the cooperation with the water users, and the waste water treatment, which has so far completely been left out at household level. All these areas have relevant links to nutrition aspects. It was noticed that awareness creation for a more holistic view is needed at all levels.

Discussions and ideas for future activities to meet these challenges have been condensed in five posters that visualize objectives, a work plan for major activities and the respective conclusions. The first three posters focus on the water supply system itself:

- Water Sources and Climate Change Effect in Lekhnath
- Operation and Maintenance Mechanism for Lekhnath
- Public Wastewater Treatment Plant for Water and Nutrient Reuse

In two posters, special attention has been drawn to the linkages between nutrition and WASH Projects, reflecting the Multi-Sector Nutrition Plan of Nepal (MSNP) by visualizing possible linkages with WASH and feasible entry points for social behaviour change communication (SBCC) to improve relevant behaviours at household level

towards food and nutrition security. The two posters focusing on nutrition were:

- Multisector Approach for Nutrition Security
- Improve nutrition through social behaviour change communication

At the moment, organisational structures are undergoing a decentralisation program in Nepal. This process has not yet come to completion. Responsibilities and roles are still about to be defined. This situation can be taken as an opportunity to implement the recently formulated Multi-Sector Approach for Nutrition Security in line with the extension and improvement of existing water supply and sanitation projects.

Framework conditions are well defined especially at the Lekhnath Small Town Water Supply and Sanitation User Committee. It is a good chance to establish a best practice example in waste water treatment and reuse along with a program on food and nutrition security. A water safety plan with a component of climate change adaptation may be integrated as well.

All results have been presented to the Mayor of the Metropolitan area Pokhara-Lekhnath and his engineering team and have been officially handed over to the Lekhnath Small Town Water Supply and Sanitation User Committee.

Energy Transition and Energy System Modelling

In 2018, a new module 'Renewable Energy Transition' has been introduced in the Master Programme "Transition Management" and a PhD project on energy system modelling was started

at ZEU, strengthening the activities on renewable and sustainable energies. These activities follow previous involvements which had a focus on Africa 'SEPA' (Solar Energy Partnership Africa), 'DUN'

(DESERTEC University Network), 'GESEREN' (German Senegalese Renewable Energy) and 'SE4A' (Sustainable Energies for Africa).

As part of the new research activities, we are developing a new generation, open energy system model which covers Europe, Northern Africa and the Western Asian countries around the Mediterranean Sea (EU-WANA). The model will allow us to explore scenarios for future energy systems. It can provide insight into the structure of future energy systems with different shares of renewable energy sources, their technical feasibility and economic costs. One important aspect we wish to study with the model concerns the benefit of an international energy cooperation between the countries of the EU and the WANA region: Which benefits are involved with increasing bilateral energy exchange between these countries? Which scenarios of energy exchange and cooperation are the most economical ones? How do today's and tomorrow's technologies behave in such a large system? In the grand picture such a model advances our understanding on 'if and how' cross-continental energy initiatives like DESERTEC can bring benefits to all shareholders.

Energy transitions worldwide

Countries all around the globe are currently pursuing energy transitions. Drivers for these transitions are among others the attempt to decarbonise the energy system, rocketing energy demands and energy security.

An essential tool to investigate and compare future energy systems and transitions are energy system models. Such models are being developed worldwide to assist on all scales, be it off-grid models for small villages or long-term scenario planning for billion-inhabitant countries. In addition to this traditional use of energy models, opening the models and results to the public can have positive results, as it increases transparency, mutual understanding and ultimately public acceptance.

In our model we consider technologies available today and in the foreseeable future as the basis for a future energy system. This basis is extended in the model with requirements from different fields, for example economic viability or geostrategic considerations, as stakeholders of

many fields influence the transition towards the future energy system.

Sharing and Open Science

Sharing and knowledge transfer are an essential part of scientific activities. With a new dedicated lecture on 'Renewable Energy Transition' in the 'Transition Management' master studies, students are provided with a basic understanding of the many dimension on energy transitions.

To foster scientific exchange, we create our energy model and results with open standards in mind and will release them under such standards, i.e. as open source and open data. As a part of an initiative of energy system modelers pursuing openness in their field (<http://openmod-initiative.org>), we share the opinion that open science does not only provide more insight and higher reproducibility, but also increases the quality and efficiency of the scientific work as a community.

DESERTEC

The idea of the nearly 20-year old DESERTEC concept is to form an energy relationship between Europe, Northern Africa and Western Asia (WANA). This would allow Europe to access vast solar resources and the WANA region in return technology, foreign currency and jobs. While in the eyes of the German public, the DESERTEC ideas are often regarded as having failed, it can be observed that an increasing number of parts of 'DESERTEC' are being implemented today especially in the WANA region. In the 2000s, many studies that evaluated the DESERTEC idea used closed energy models. These models were neither adjusted to the rapid development in technology and modelling techniques, nor taking into account the political changes of the last 10 years. The new conditions as of today are a justification for us to reevaluate the historic results.

Education and Training for Sustainable Agriculture and Nutrition in East Africa (EaTSANE)

The EaTSANE project started in October 2018 with a kick-off workshop in Bari, Italy. The project is funded by the BMEL/ BLE within the LEAP-Agri initiative which "is a joint Europe Africa Research and Innovation (R&I) initiative related to Food and Nutrition Security and Sustainable Agriculture (FNSSA). 30 partners, including 24 Ministries and Funding Agencies (Group of Funders) from 18 European and African countries decide(d) to join their forces and funding to build an ERA-Net Cofund project with a financial support of the European Commission." [<http://www.leap-agri.com>] In total 27 projects involving 250 African and European teams are funded for three years under LEAP-Agri.

Shortly after the official start in Bari, EaTSANE started its work with a kick-off workshop in Busia, Kenya. The project builds on experiences and findings of the HealthyLAND project and operates in East Africa, particularly in the districts Teso South in Kenya and Kapchorwa in Uganda. At both sites, HealthyLAND conducted a final survey in December 2018. Data analysis is ongoing.

The EaTSANE project consortium approaches the challenge of improving food systems through understanding and addressing the interlinkages between production strategies, consumption patterns and contextual conditions along value chains. The improvement of knowledge on these complex dynamics contributes with scientific outputs to the research community, advancing contemporary food systems research. It also has an impact on local communities in context of their food production and consumption. Science-based policy dialogue on a national level facilitates change in governance by decision makers. Bringing the issue of diversified food systems into school curricula, mass media communication, and carrying out action research in communities will reach farmers and consumers directly, increase knowledge on sustainable farming practices and diversified diets, hence contribute to sustainable food and nutrition security.

EaTSANE aims at diversifying farming systems for better soils in a work package on diversified farming. Based on conservation agriculture, crop

diversification and low-cost concepts for expanding kitchen garden area and their impact on soil fertility, nutrient uptake and provision by crops.

In a work package on value chains, the project will identify enabling environments for diversified food systems based on action research at household, food systems and value chain levels. Appropriate postharvest practices and value chain activities will be promoted through multi-stakeholder innovation platforms, focusing on contextual conditions and behavioural incentives for smallholder farmers to integrate in nutritious value chains.

In a work package on food culture and nutrition (WP 3), led by Dr. Irmgard Jordan from the ZEU, the project explores food culture and nutrition by assessing current feeding, eating and food preparation practices. The team is currently planning next steps which include Trials of Improved Practices, a formative research approach, which will be conducted to identify "what works" to improve the food safety, the kitchen environment as well as dietary behaviour of the farm families living in the respective areas. Participatory cooking and field demonstrations will be conducted to identify options and barriers for change in crop production as well as food consumption. This will be based on farmers' knowledge, attitudes and perceptions on legumes, vegetables and fruits in terms of taste, health benefits, preparation options and conservation strategies.



Drying beans in front garden, Uganda, Dec. 2018

Methods of cross-cultural research and structural equation modeling

Prof. Peter Schmidt published a special issue on Sociological Methods and Research. Using the example of the PISA study, the measurement of values and requirements of nationality in the National Identity module of the International Social Survey Program (ISSP) presented new methods of checking the equivalence of measurements in international comparative studies.

Another focus was the application of the new meta-analytical structural equation modeling (MET) techniques implemented in the "R" software. A corresponding meta-analysis with planned behavioral theory data was completed and presented at an international conference on new developments in meta-analysis. These analyses were also presented at the Leibniz

Institute for Psychology in Trier. The main content of Prof. Schmidt's work was the explanation of attitudes to migration. Being a member of a team led by A. Heath of the University of Oxford, which also developed the module "Migration Attitudes" for the European Social Survey (ESS) 2014, was a special issue which resulted in 10 papers of international comparative studies being published in the "Journal of Ethnic and Migration Studies (JEMS)".

Prof. Schmidt's four-year honorary Humboldt fellowship in Poland ended in 2018. The outcome of his activities in Warsaw is documented by several peer-reviewed articles with Polish colleagues.

The Mediterranean Hot-Spot: Challenges and Responses in a Changing Environment

Modern societies are facing severe environmental, political, demographic and economic challenges that demand for holistic solutions. Such solutions should be sought outside the conventional boundaries of natural sciences, economics, technology, cultural understanding, design, branding and IT, among others.

The Aristotle University of Thessaloniki (AUTH) and the Justus Liebig University of Giessen (JLU) have partnered to work towards solutions to the challenges of our time and initiated the joint research project "The Mediterranean Hot-Spot: Challenges and Responses in a Changing Environment". In the frame of its goals, the second year of the project, 2018, has been a successful year, enriched with a multitude of activities, new faces, new courses, new joint paper collaborations established, one poster award and a large number of scientific staff and student mobilities. Our vision is to strengthen the interaction between the different disciplines and combine the most advanced knowledge within natural sciences with aspects from humanities and social sciences.

We are looking forward to future interdisciplinary research that aims at exploring, optimizing, and solving the complex environmental problems that the Mediterranean societies are facing.

"COSMO/CLM/ART Training - course"

In March, two M.Sc. students from the School of Physics, Department of Environmental Physics, AUTH, visited Giessen and presented their M.Sc. dissertations and exchanged ideas with colleagues from the Group of Climatology, Climate Dynamics and Climate Change of JLU. Both students had in addition the opportunity to attend the COSMO/CLM /ART Training course that took place at the "Deutsche Wetterdienst" Training Center in Langen, Germany. The course of one week provided basic education on the theory and use of the COSMO - CLM model in numerical weather prediction and regional climate modelling.

Block course "Introduction to climate change methods"

In May, seven M.Sc. students from AUTH's Schools of Agriculture, Geology and Laboratory of Atmospheric Physics visited Giessen and

participated in the methodological course "Introduction to climate change methods", which took place from May 2 to 7 in four 5-hour sessions. The students attended the introductory lectures on the use of the linux operating system, Climate Data Operators (CDO) and the Grid Analysis and Display System (GrADS). The theoretical part was accompanied by specific exercises and hands-on applications. The participants were introduced to the structure of gridded datasets, the use of large datasets, global gridded atmospheric and climatological variables, observational datasets and model outputs.

Finally, the participants were trained on plotting climatological maps and time series and were introduced to the concepts of absolute values and anomalies/deviations from selected reference periods and to teleconnections.

Block course "Climate modeling, Evaluation and Downscaling methods"

A block seminar on "Climate modeling, Evaluation and Downscaling methods" was held at the Department of Geography of JLU from June 19th to 21st, 2018. The block seminar was focused on the climate system and its components, climate models, model equation numerics, parameterization schemes and model forcing uncertainties. During the seminar, four M.Sc. students from AUTH learned how to evaluate model performance using statistical methods and tools (bias, Brier skill scores, Taylor's diagram) by utilizing regional climate model outputs. Further, practical hands-on training on R programming language was included. Finally, the course provided a state-of-the-art introduction to statistical and dynamical downscaling.

Block course "Past Climate Variability and Dendro-climatology"

Each tree has its own story! Dendro-climatology is the study of natural and human processes that are imprinted on the tree-ring record for reconstructing past climate. The Department of Geography in JLU offered a three days block course on "Past climate variability and Dendro-climatology" from June 21st to 23rd, 2018.

Six M.Sc. students from AUTH were taught an overall introduction to theory, laboratory and field techniques and current research issues.

Emphasis was placed on hands-on practical skills and project development in combination with theory. More specifically, the course gave an overview of the natural and forced climate variability, drivers and mechanisms from millennial to interdecadal and interannual scales. Then, students in groups took a multi-day trip to Oberhof, Giessen for data collection (tree-ring sampling). On the last day, students visited the Tree Ring Lab at the University of Mainz and along with colleagues from JLU, received training on the analysis of tree-ring samples, measurements and the production of tree-ring chronologies for climate reconstructions.

Seminar "Python for environmental scientists"

The Institute of Landscape Ecology and Resources Management of JLU organized the course "Python in environmental scientists", from July 23 to August 10. Four M.Sc. students from AUTH, along with JLU students, were introduced to Python programming, basic programming concepts and Python syntax. During the course, the students were taught how to access, process and manipulate data (text files, databases, and other data storage technologies). Finally, students learned about Python's powerful libraries (specifically Matplotlib and Pandas) for data analysis and scientific computing.

The course was crowned with great success and due to the high number of applicants it is scheduled again for February 2019.

New collaboration in the climate field between JLU and AUTH

We are happy to announce two important new research collaborations between JLU and AUTH. Stella Dafka and colleagues of the Group of Climatology, Climate Dynamics and Climate Change of JLU and Ioannis Logothetis, Ph.D. student at the Laboratory of Atmospheric Physics, AUTH, strengthened their collaboration to promote the shared scientific interests by writing a joint paper on the variability of the Etesian winds during the last 100 years. In the same context, Dimitris Akritidis from the Department of Meteorology and Climatology, AUTH, visited Giessen on the 29th of June and presented his research "Tropopause folds and implications for

tropospheric ozone: Individual case studies and climatological analyses". Stella Dafka and colleagues from JLU had the opportunity to discuss and set a common vision for their future collaborative efforts, in order to produce a joint publication on the topic of "the Etesian winds and the Tropospheric Ozone over the Eastern Mediterranean".

The study presented on the poster on the impact of land cover changes on summer temperature over Europe - Mediterranean suggests that a potential deforestation would reduce the summer temperature due to a reduction in turbulent fluxes and net radiation. Overall, these results further enhance our scientific understanding on the role of vegetation in land-atmosphere interactions.

Block course "Climate modelling: from code to simulation"

Our climate consists of five major components, - atmosphere (the gaseous envelope surrounding the Earth), hydrosphere (e.g., ocean, lakes, underground water), biosphere (all living organisms), land surface (lithosphere) and cryosphere (e.g., sea ice, glaciers, ice sheets)- and their interactions. The climate system is powered by the solar radiation and its temporal and spatial evolution is affected by its own internal system dynamics and changing external factors (forcings, i.e., volcanic eruptions, solar variations and human-induced atmospheric composition changes) that influence the climate. The block course "Climate Modeling: from code to simulation" took place at the Department of Geography at JLU from the 19th to 23rd November 2018. Instructors were Dr. Elena Xoplaki from JLU and Dr. Sebastian Wagner, from the Institute for Coastal Research, Helmholtz-Zentrum Geesthacht. Students got a glimpse into the technical infrastructure of the respective model and had a look into the source codes.

Participants had a hands-on practice on a real climate model with their own selected configuration, model output analysis and visualization. Prior to the block course, participants had to provide their own input to the course by doing an extensive literature research on the different climate model types and presenting to the group.

Workshop "Towards an interdisciplinary approach" and Second Annual Meeting, @ Justus Liebig University of Giessen

Environmental and climate changes have led to an increasing demand for process understanding, improved scenarios, reduced uncertainties and more reliable data for impact studies, mitigation, adaptation. To meet this demand, fundamental interdisciplinary, collaborative research on relevant issues and their mutual interactions is pivotal. This requires a new generation of students and researchers who have strong in-depth knowledge in their specific parts of the scientific fields and at the same time are equipped with a broader knowledge that allows them to comprehend the overall picture of the coupled environment and climate system. Furthermore, the demand from society to be informed about changing environmental and climate conditions can only be met when researchers are able to communicate with experts from other disciplines.

The DAAD joint JLU-AUTH project "The Mediterranean Hot-Spot: Challenges and Responses in a Changing Environment" is dedicated to address these issues and contribute to the preparation of young researchers, that will work on the Mediterranean climate and environmental change impacts. The joint program led us this year to the workshop "Towards an interdisciplinary approach" that aimed at discussing our experiences in the first two years of the project and presenting the broader perspectives of our interdisciplinary approach. Scientists from different fields and disciplines such as human history, agriculture, forestry, plant sciences, climatology and geography brought their expertise and addressed challenges that the Mediterranean changing environment poses. Heatwaves and wild fires, climate change impacts on agriculture, society and economy and the recent migration patterns in the eastern Mediterranean composed the program of our workshop.