UNIVERSITY OF HOHENHEIM

REPORT 2024

Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute)

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1. Welcome and overview of the Departments

Introduction to the Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute)

The *Hans-Ruthenberg-Institute* provides comprehensive capacity for research and education in the field of Tropical Agricultural Sciences. With 9 specialised working groups and more than 100 scientists, it offers profound empirical and theoretical knowledge covering the entire spectrum of tropical and subtropical agricultural systems. During the last decade we have been active in more than 200 research and educational projects across 50 countries of the Tropics.
All essential scientific disciplines of tropical agriculture, i.e., crop and animal sciences, agroecology, agricultural engineering as well as agricultural economics and social sciences, are united in one institute.
The Institute is well positioned to make a substantial contribution to tackle global scientific, environmental, economical and social challenges in order to ensure food security and develop sustainable agricultural systems. The Institute develops novel integrated strategies to address the challenges in global food and eco-systems related to the changing environment by bringing together natural and social sciences in innovative ways. The main areas of research at the institute are:

- Sustainable Agri-Food Systems
- Ecosystem Services & Agricultural Development
- Farming Systems Digital Age
- Food Security & Health

Dear Friends and Colleagues,

It is a great pleasure to present the 2024 Annual Report of the Hans-Ruthenberg-Institute for Tropical Agricultural Sciences. This report highlights the exceptional disciplinary and interdisciplinary research and teaching activities of the institute its numerous collaborations within the University of Hohenheim and with its many partners around the world

In a time of mounting global challenges—ranging from climate change and resource scarcity to the urgent need for sustainable food systems—our mission to contribute to feeding a growing population sustainably has never been more relevant. The projects, collaborations, and achievements featured in this report are a testament to the dedication and innovation of our researchers, educators, and students.

We remain committed to fostering impactful research, nurturing the next generation of scientists, and driving practical solutions that balance productivity with ecological and social sustainability. We hope this report inspires and informs, showcasing the breadth and depth of our endeavors over the past year.

Thank you for your continued support and interest in the work of the Hans-Ruthenberg-Institute. We look forward to engaging with you in the future as we strive toward our shared goal of sustainable agricultural development.

Warm regards,

Ingo Grass
Director, Hans-Ruthenberg-Institute for Tropical Agricultural Sciences

We wish you an interesting reading and look forward to continuous and new interactions in 2025.

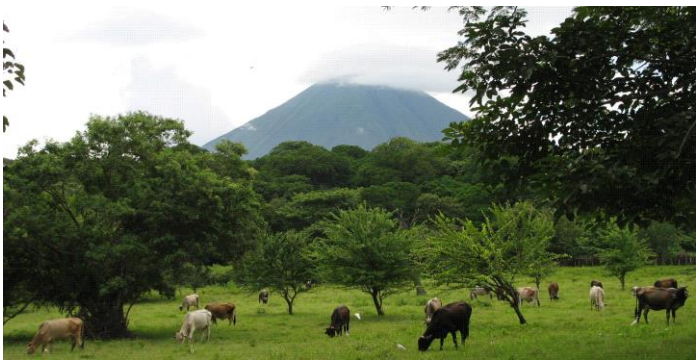
Competence of Working Groups

Rural Development Theory and Policy (490a)

Prof. Dr. Manfred Zeller

Our research activities mainly focus on the analysis of policies affecting the critical triangle of agricultural and rural development.

Through our research and teaching activities, we seek to contribute to an improved understanding of the trade-offs between and synergies among the three objectives equity, economic growth, and environmental sustain-ability.



Picture credit: Tim Loos

International Agricultural Trade and Food Security (490b)

Dr. Kirsten Boysen-Urban (Interim Chair) / Prof. Dr. Martina Brockmeier

The International Agricultural Trade and Food Security group aims to contribute to the ananalysis of different pathways and associated policies to support the sustainable transformation of agrifood-eco-systems. A particular focus is on trade-offs and syner-gies between sustainability objectives: economic and social, in particular food security, and environmental targets. We are particularly interested in…

… assessing the role of international trade and trade policies (including tariff and non-tariff measures such as regulation, standards and mirror clasues).

… investigating the resilience of agrifood-ecosystems to economic and physical shocks.

… exploring different sustainable pathways on the demand side (e.g., food waste reduction, changes in dietary behaviour) and on the supply side (e.g., expansion of irrigation, scarcity of natural resources such as phosphorus).

… analysing the effects of different policy options/ mix of policies such as different trade, climate and agricultural and food policies and how these policies need to be designed to ensure that they are target-oriented, sustainable and efficient.

Picture credit: Kirsten Boysen-Urban

For this purpose, we develop and apply global and single-country economic models and their underlying databases. These economic models are well suited to analysing the impact of different behavioural changes and policy instruments, taking into account potential repercussion and spill-over effects through markets to consider potential effects on by-standers. In addition, we use participatory approaches and co-creative methods to develop scenarios and simulation models, incorporating expert knowledge from different stakeholders in the respective area of interest. We also apply qualitative methods such as survey instruments and interviews.

Our research is policy-oriented, and we aim to understand how we can increase the uptake of evidence in policy making. The knowledge generated and the collaboration with different institutions that are active in the policy sphere ensure that we conduct and deliver research that is relevant to the transformation of agrifoode ecosystems at global, national and local levels.

Social and Institutional Change in Agricultural Development (490c)

Prof. Dr. Regina Birner

The goal of our Division is to contribute to agricultural development through research, teaching and policy dialogue on the social, institutional and political dimensions of agriculture in developing countries. Our focus is interdisciplinary, combining research approaches developed in agricultural and institutional economics, rural sociology and political science. Our work is guided by the vision of a future world agriculture that is able to feed a growing world population, to use its unique potential to contribute to poverty reduction and to provide environmental services instead of overusing natural resources.

Picture credit: Regina Birner

In our research, we focus on innovative approaches to support smallholder agricultural development, such as digital tools for smallholder farmers, agricultural carbon projects, and sustainability initiatives for agricultural value chains. Gender and climate change are cross-cutting topics of our research.

Land Use Economics (490d)

Prof. Dr. Thomas Berger

The Chair of Land Use Economics originates from a visiting professorship for development research that was endowed by Senator e.h. Dr. Dr. h.c. Eiselen until 2006. The chair is primarily concerned with human-environment interactions in the areas of land use, water resources and renewable energies. Possible consequences of environmental, structural and policy changes are evaluated with respect to resource protection and food security.

Methods from computer science are an integral part in research and teaching. These methods are used to analyze the environmental effects of policies on the agent level and the adaptive ranges of those agents. Furthermore, the distributive effects of policies on diverse segments of the population are made visible. A microeconomic and farm management foundation, together with a consideration of social networks and spatial environmental interactions forms the distinguishing characteristic.

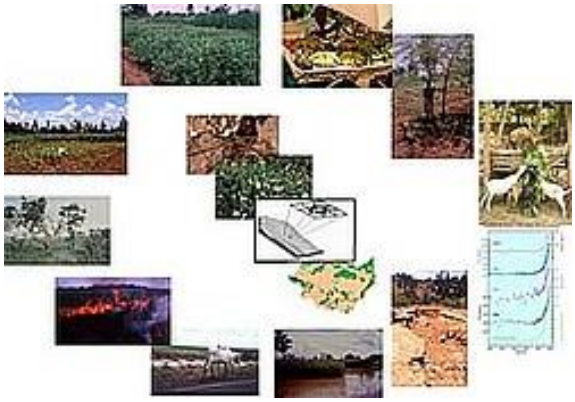
The chair currently deals with the following areas of emphasis:

- Climate change and climate variability, especially droughts
- Land and water use, decarbonization, ecosystem services
- Multi-agent systems, agent-based simulation
- Digital Agriculture, hybrid intelligence

Land Use Systems, Picture credit: Thomas Berger

Agronomy in the Tropics and Subtropics (490e)

Prof. Dr. Georg Cadisch (until 2023)



Meeting Future Challenges In times of Global Change and an increasing awareness of the negative impact of non-sustainable agriculture on the environment an isolated examination of crop or land use system is no longer meaningful. Crop production systems have to be assessed in a holistic way, considering production issues, people's livelihoods and environmental quality and biodiversity. Simultaneously, Global Climate Change feedbacks such as extreme weather conditions and elevated CO_2 in the atmosphere have a direct effect on crop production itself, as well as crop quality, competition and plant-soil-environmental interactions. Investigating trade-offs between different crop production methods and the environment is a challenging scientific task and demand new innovative and integrated approaches to design sustainable intensification strategies. In addition to ecophysiological research topics the Plant Production Section thus focuses on nutrient cycles, competition for resources, soil quality, carbon sequestration and environmental impact of plant-animal productions systems with specific consideration of N_2 fixing legume-based integrated (intercropping, agroforestry, agro-silvo-pastoral systems) approaches.

The research approach in the Plant Production Section is based on a theoretical analysis, i.e. dynamic process-based modelling (from soil aggregate to landscape) of agroecosystems in the tropics and subtropics, and a simultaneous experimental approach to improve our understanding of plant production and nutrient cycles in agroecosystems by using stable isotope (^{15}N, ^{13}C and ^{18}O), molecular and spectral methods. We are an international team and interested in interdisciplinary research approaches and strong collaborative partnerships.

Ecology of Tropical Agricultural Systems (490f)

Prof. Dr. Ingo Grass

The experimental research within Ecology of Tropical Agricultural Systems group focuses on patterns and dynamics of biodiversity and associated ecosystem services in agricultural landscapes. Research topics include multitrophic interactions (pollination, biological control), food webs and the relative importance of local vs. regional determinants for ecosystem functions in managed and (semi)natural ecosystems.

A major focus is on the agroecology of tropical and temperate land-use systems, including effects of land-use change, climate change and urbanization. We aim to develop farming practices at local and landscape scales that promote agricultural productivity while sustaining biodiversity, ecosystem functions and services.

Management of Crop Water Stress in the Tropics and Subtropics (490g)

Prof. Dr. Folkard Asch

Agricultural production systems in the Tropics and Subtropics are subject to rapidly changing basic para-meters induced by climate change, limited re-sources, fluctuation of prices for food and commodities and the world-wide increasing demand for biofuel and renewable resources. Sustainable manage-ment of water resource of these systems requires a compre-hensive analysis of factors contributing to the water balance on a local and regional scale.

The research activities of the Department of Management of Crop Water Stress in the Tropics and Subtropics (490g) consider the interactions between plants and crops and water availability and climatic conditions, soil fertility, and other abiotic stresses such as salinity and iron toxicity. Management options are evaluated in terms of adapting cropping calendars and resource input, and evaluating the potential of varietal differences. Resource use and efficiency in as well as plant responses to controlled environment farming are also a strong focus of the group. The work of our group combines research approaches from the field-scale to the plant's internal signaling.

Animal Breeding and Husbandry in the Tropics and Subtropics (490h)

Dr. Kristina Rösel (interim since 2024), Prof. Dr. Mizeck Chagunda (until 2024)

Agricultural systems are facing ever-increasing challenges, such as increasing global demand for livestock products involving intensification, conflicting de-mands on land and water resources, and climate change. All these challenges entail natural resource degradation inclu-ding loss of livestock genetic diversity, and some unprecedented trade-offs that can easily 'tip the balance' in the production systems.

The section of Animal Breeding and Husbandry in the Tropics and Subtropics aims to contribute to efficient and sustain-able livestock production systems and food and nutritional security. Therefore, we investigate efficient breeding approaches, livestock husbandry techniques, novel (information) technology, climate change mitigation and adaptation strategies in livestock systems, integrating socio-economic and biophysical determinants. We conduct basic and applied, inter- and transdisciplinary research using modelling and conventional approaches in both intensive and extensive (incl. organic) systems in temperate, tropical and sub-tropical environments.

Agricultural Engineering in the Tropics and Subtropics (440e)

Prof. Dr. Joachim Müller

PV-system for solar oil pressing, Picture credit: 440e

The increasing global scarcity of resources is the driving factor for research and teaching in the field of agricultural technology in the tropics and subtropics to ensure the efficient use of water, energy and agricultural resources. The focus is on the development of resource-saving irrigation technologies and the use of renewable energies. Since post-harvest processes - such as drying - are particularly energy-intensive, this area is a special research focus. The research is carried out on a fundamental basis in an interdisciplinary network with complementary research fields and external partners from industry and research. In order to ensure knowledge transfer, the basic knowledge gained is adapted to the requirements of practice in applied research. The feedback process with practice ensures that basic research is aimed at relevant and current problems. Additional research areas are the use of biogenic fuels as well as the implementation of photovoltaics and solar thermal energy to secure heat and electricity supplies in the rural tropics and subtropics. Both, conventional and highly innovative technologies are provided to sustainably solve problems in various areas of daily needs, from individual households to medium-sized companies. There is a particular focus on off-grid solutions and the direct use of electricity and process heat from renewable energy sources to optimize agricultural methods (irrigation) and post-harvest processes (drying, cooling).

Hohenheim Tropics (Hub-Management) (490)

Dr. Marcus Giese

The Hans-Ruthenberg-Institute is one of the main contributors to the "Hohenheim Tropics" network organised by the Hub-Management. The network provides access to various international partners and internal or associated scholarships, conferences, travel support for Master and PhD students as well as alumni networks. Among other activities to promote and support research and education in agricultural sciences in the Tropics, the Hub-Management coordinates access to

- Dr. Hermann Eiselen MSc-Scholarship Program supported by the *fiat panis* foundation
- ATSAF e.V. Academy (PhD, MSc scholarship program)
- Anton & Petra Ehrmann-Stiftung, “Water-People-Agriculture” PhD Graduate School
- DAAD Economy stipends, Summer / Winter Schools
- NatureLife International - Science Sustainability Price
- DAAD Agri-Alumni-Net: Research and Educational Network for African Alumni
- Agritropics: English Master Program for Tropical Agriculture
- “Hohenheim Tropics” seminar series
- Research Network Africa, Centre of Excellence for Sustainable Food Systems & Data Sci.
- Water Security Climate Change (WSCC) conference, World Food Day Events
- Networks: CGIAR++-Centres, Challenge Programs, ATSAF e.V. Junior Scientist Program
- “Tropentag” – Annual international conference on research in tropical and subtropical agriculture, natural resource management and rural development
- Student Excursions to the Tropics and Subtropics
- Baden-Württemberg Center for Brazil and LatinAmerica

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Agricultural Engineering in the Tropics and Subtropics (440e)

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3. Research

3.1. Ongoing research and educational projects

Flagship Projects

Agri-Alumni-Net (490 Hub-Management)

The Agri-Alumni Network together with the SDG Graduate School CLIFOOD at the combined project workshop in Hohenheim, September 2024. Picture credit: Agri-AlumniNet & CLIFOOD.

Short description: Since 2022 the DAAD-supported alumni network "Agri-Alumni-Net" aims to expand the development-relevant competencies of African Germany alumni in the field of tropical agricultural sciences and to improve the necessary network-supporting structures.
The partner countries for this network are Kenya and Ethiopia, where the long-standing partner institutions, the University of Nairobi and Hawassa University were established as an alumni hub for regional and supra-regional partners from neighbouring countries. The network is addressing current agro-ecological challenges in food security, climate change and environmental protection. The project took an innovative approach by organising "travelling workshops" in Kenya and Ethiopia.
In total, more than 100 alumni directly benefited from the support measures in Kenya, Ethiopia, and Germany. More than 60 alumni were invited to workshops and training sessions in Germany, usually including the Tropentag conferences to provide the best opportunities for networking and further education. Beside this, the number of alumni activated through the network was significantly increased, especially through the open webinars, the optimised networking platforms and the social media activities. In the meantime, more than 750 alumni are linked in our Agri-Alumni Network.
The project "Agri-Alumni-Net" thus takes into account the overarching programme objectives in several ways and makes a targeted contribution to the professional development of alumni, supports and promotes the engagement of alumni in the provided networks, increases the visibility and competence of the participating institutions in the field of development cooperation and thus promotes the long-term commitment of alumni to the German partner institutions.

Person involved: Dr. Marcus Giese, Katrin Winkler, Maria Oguche, Kwamboka Tirimba, Andrea Zipp
Partner: Agri-Alumni-Net (University of Nairobi, Hawassa University)
Funding: DAAD (BMZ) 2022 – 2025, > 500.000,00 Euro
Duration: Phase 1: 2022 - 2023 in cooperation with University of Nairobi, Kenya
Phase 2: 2024 - 2025 in cooperation with Hawassa University, Ethiopia.
Location: Kenya, Ethiopia, Germany

Minding women's time: Does time saving technology and behavioural interventions change the margins (490a)

This research project is funded by the Center for Effective Global Action at UC Berkeley, the University of Hohenheim and the Baden-Württemberg Stiftung. The project is implemented by the Chair of Rural Development Theory and Policy in collaboration with the University of San Francisco and Hawassa University.

Short description: The aim of the project is to identify and test the effectiveness of time saving and behavioral interventions that save women's time, increase their participation in paid work, and ultimately economically empower women. The project has three phases: Phase I focuses on understanding the sociocultural context and time use pattern to come up with interventions that will be tested and evaluated in subsequent phases. Phase II and Phase III focuses on designing and evaluating the intervention.

Person involved: Dr. Bezawit Bahru
Funding: Baden-Württemberg Stiftung, Center for Effective Global Action, University of Hohenheim
Duration: 2023-2026
Location: Ethiopia

Strengthening Evidence-Based Policy and Practice for Sustainable Food Systems Under the EU-AU Partnership (StEPPFoS) (490b)

Short description: The project "Strengthening Evidence-Based Policy Practice for Sustainable Food Systems under the EU-AU Partnership" (StEPPFoS) supported by the African Union Commission and the European Commission aims to promote policy coherence and alignment across the Pan-African Network for economic Analysis of Policies (PANAP) and for Food and Nutrition Security and Sustainable Agriculture (FNSSA) to help minimise the fragmentation of agri-food policy initiatives at national and regional levels. The goal is to promote science-based decision-making processes and the exchange of experiences in support of agricultural, food and trade policies and the integrative sustainable transformation of agrifood systems in Africa.
The project is funded by the European Commission's Horizon Europe funding programme for the period 2024-2027 and is coordinated by the Forum for Agricultural Research in Africa (FARA).
The International Agricultural Trade and Food Security group (490b) of the University of Hohenheim participates in the StEPPFoS project together with seventeen other research institutes and organisations in Europe and Africa. The group leads/co-leads three work packages and several activities such as assessing barriers and facilitators of policy-research interaction, providing capacity building in computable general equilibrium modelling and analysis, supporting policy impact assessments and developing scenarios for agrifood system transformation in Africa.
https://steppfos.faraafrica.org/

Person involved: Dr. Kirsten Boysen-Urban, Dr. Dorothee Flaig, Dr. Christine Bosch, M.Sc. Emmanuel Namwanja
Partner: Coordinator: Forum for Agricultural Research in Africa (FARA), CSIR, CORAF, EDCPM, FANRPAN, RUFORUM, Agrinatura, KIPPRA, Wageningen University and Research, AFAAS, EAFF, Universita Ca' Foscari in Venice, Université Félix Houphouët-Boigny, LifeWatch ERIC, EAFF, ASARECA, ACU, EC JRC
Funding: European Commission, Horizon Europe
Duration: 2024-2027
Location: Africa

StEPPFoS inception meeting, February 2024, Picture credit: FARA

Program of Accompanying Research for Agricultural Innovation (PARI) (490c)

Picture credit: Regina Birner

Short description: PARI aims to contribute to sustainable agricultural growth and food and nutrition security in Africa and India as part of the "One World, No Hunger" Initiative of the German government. PARI accompanies development efforts with research on the opportunities and challenges of different agricultural innovations and with research on how to strengthen the framework conditions for the generation and dissemination of promising innovations. The Division 490C has been leading PARI's research activities on agricultural mechanization, livestock development, agro-biodiversity, agrochemical use, and digital agriculture in several African countries and in India. PARI's research on mechanization identified promising business models that enable smallholder farmers to access mechanization services. Experimental research was conducted in Zambia to analyse the economics of mechanized conservation farming. The TimeTracker App, an award-winning digital tool for measuring time use in smallholder farming systems, was developed with PARI funding, as well. PARI's research also analyzed digital tools for livestock farming, such as iCow in Kenya and Herdman in India. With regard to crop protection, research funded by PARI focused problems associated with pesticide application in smallholder farms in Kenya, Tanzania and Zambia. Research on trends in agro-biodiversity was conducted in Ghana and Burkina Faso.

Persons involved: Prof. Dr. Regina Birner, Ferdinand Adu-Baffour, Dr. Thomas Daum, Dr. Juliet Kariuki, Dr. Viviane Yameogo
Partners: Helmut Anschütz, Zambian German Agricultural Knowledge and Training Centre (AKTC), Prof. Dr. Christogonus Daudu, Ahmadu Bello University, Prof. Dr. Felix Asante, University of Ghana, Legon; Chance Kabaghe, Indaba Agricultural Policy Research Institute (IAPRI), Zambia, Prof. Dr. John Mburu, University of Nairobi, Kenya; Dr. Wellington Mulinge, Kenya Agricultural and Livestock Research Organization (KALRO), Kenya
Funding: 1,745,000 Euro
Duration: 2014-2024
Location: Burkina Faso, Benin, Ghana, Kenya Nigeria, Zambia, India

SimLearn - Completing Training Data by Iteratively Learning Simulation (490d)

Short description: Machine learning methods based on existing training data have proven to be very effective in identifying patterns and implicit dependencies in complex situations with many parameters and in providing classification, prediction and decision support with the models learned. In practice, however, the large amounts of correctly labeled training data required for such approaches are often not available.

Based on actual application examples from the agricultural sector, SimLearn examines the suitability of a new approach in which existing operative knowledge codified in simulation models is combined iteratively with the increasing insights of learned models: Extensive synthetic training data sets are generated by existing simulation models. A learning system initiated on such data will then be extended and improved by empirical data collected of actual farms. This combination fills gaps in the existing database and enables improved training. The result is a learned, more powerful model of the observed reality with improved usage potentials.

SimLearn exemplary considers the operational decisions in crop production on operational and tactical level with regard to income and environmental effects. The bioeconomic modeling system MPMAS_XN of Hohenheim University (UHOH) allows initial simulations of the effects of fertilization and cultivation decisions both from a biological (plant growth) and an economic (expected revenue) point of view. This information is combined and compared with the results of cooperating experimental farms and with standard and average values from the databases of the Kuratorium für Technologie und Bauwesen in der Landwirtschaft (KTBL). Using those generated data collections, DFKI iteratively trains a suitable learning system which enables an improved prediction and assessment of alternative courses of action.

Person involved: Prof. Dr. Thomas Berger, Prof. Dr. Thilo Streck
Partner: Deutsches Forschungszentrum für Künstliche Intelligenz GmbH (DFKI), Kuratorium für Technologie und Bauwesen in der Landwirtschaft e.V. (KTBL)
Funding: BMBF / DLR-Projektträger
Duration: 01.01.2020 - 30.06.2023
Location: Germany

SustainSAHEL: Synergetic use and protection of natural resources for rural livelihoods through systematic integration of crops, shrubs and livestock in the Sahel (490e)

Short description: SustainSAHEL's overall goal is to promote practices that enhance soil quality and yields, build resilience to climate change, and contribute to food security and better livelihoods in the West African Sahel (Burkina Faso, Mali and Senegal). The project's approach is embedded within the themes of agroecology, organic agriculture, and elements of conservation agriculture. The Department of Agronomy in the Tropics and Subtropics (490e) at the University of Hohenheim is participating in the SustainSAHEL collaborative project through work package 7 (WP7), which focuses on geo-statistical and scenario modelling of crop, shrub, and livestock (CSL) systems. WP7 will be the nexus for all spatially resolved data included in the landscape-scale analysis. WP7 will connect socio-ecological knowledge from WP2 with state-of-the-art remote sensing data and climate change observations and projections. Based on this information and measured data on soils, crops and livestock, representative scenarios of integrated CSL systems will be modelled for contrasting agroecological zones using our own developed land use change impact assessment (LUCIA, https://lucia.uni-hohenheim.de) model. Impact on system productivity, ecosystem functions and services, scaling potential and system resilience will be assessed. Scenarios will be developed, and model outputs validated by stakeholders in an iterative multi-step procedure with WP2 through Inovation Platforms. Stakeholder scenarios will be modelled at the respective sites for long-term assessment regarding climate change resilience, productivity and environmental impacts. Further, scenarios will be applied across sites to test scaling potentials.

Person involved: Prof. Dr. Georg Cadisch, Dr. Carsten Marohn and Dr. Eric Koomson
Partner: FIBLE (Switzerland), Univ. Kassel (Germany), IRD (France), CIRAD (France), ISRA (Senegal), INERA (Burkina Faso), Univ. Nazi Boni (Burkina Faso), IPR (Mali), Access Agriculture (Belgium), AFAAS (Burkina Faso), AOPP (Mali), CSE (Senegal), IER (Mali), IITA (Kenya), CPF (Burkina Faso) and CNCR (Senegal).
Funding: EU 2020, H2020-SFS-2018-2020,
Duration: 01.09.2020 – 30.08.2025
Location: Burkina Faso, Mali and Senegal

CRC 990, "Ecological and Socioeconomic Functions of Tropical Lowland Rainforest Transformation Systems", Subprojects B09 "Aboveground biodiversity patterns and processes across rainforest transformation systems" and C11 "Integrated analyses of policies for sustainable rural economies" (490f)

Short description: In subproject B09 we investigate patterns and dynamics of aboveground biodiversity and associated ecosystem functions in rainforest transformation systems. Here we compare rainforests with smallholder land-use systems (rubber, oil palm) on Sumatra, Indonesia. In two large-scale experiments, we also investigate 1) whether biodiversity enrichment with planted tree islands and 2) avoiding herbicides and reducing fertilizers increase the biodiversity and functions of oil palm plantations - without compromising their productivity. In further investigations, we explore the role of the landscape context (composition, configuration) for local ecosystem processes and socio-economic trade-offs and synergies.

In subproject C11 we perform an integrated analysis of socio-economic and ecosystem functions, aggregated at the scale of the local rural economy. We establish an Environmental and Social Accounting Matrix (ESAMs) to aggregate and link existing and future EFForTS data on socio-economic and ecosystem functions. Based on this accounting framework the project evaluates the effects of land-use change scenarios and policies (e.g. certifications schemes, land management regulations) on ecological and socio-economic functions. The project extends the socio-economic analyses to include large-scale plantations and integrates the plantation-based experiments.

Person involved: Prof. Dr. Ingo Grass
Partner: University of Göttingen, Indonesia: IPB Bogor, University of Jambi, University of Taduloko, LIPI
Funding: DFG
Duration: 2016 – 2023
Location: Asia, Indonesia

EXALT—Coupling Thermal Desalination and Extraction of Dewatered Salt with Hydroponic Greenhouse (490g)

Short description: Freshwater is a severely limited resource, especially in the Near and Middle East, and therefore there are increasing attempts to incorporate saline or brackish water into crop production processes. Under intense solar radiation, ventilation to cool greenhouses also allows moisture in the air to escape, resulting in significant water loss. In a closed system, this loss can be avoided via active cooling and condensation to recover the water, while the heat extracted from the greenhouse can be further used as process heat. By coupling desalination and greenhouse air conditioning via heat pumps, the partners in the EXALT collaborative project are developing an energy-efficient process to reduce both the water requirements for plant production in the greenhouse and the energy requirements for desalination. With the objective of removing dehydrated salt, a problem of conventional desalination processes is also addressed. The EXALT project is jointly supported by the German Federal Ministry of Education and Research (BMBF) and the Israeli Ministry of Science and Technology (MOST) within the Middle East Regional Water Research Cooperation Program (MEWAC). 2022-2025

Test setup to investigate the optimum growth conditions depending on nutrient solution salt concentration levels at the Hohenheim University Phytotechnical Center

Person involved: Prof. Dr. Folkard Asch, Dr. Jörn Germer, Julia Asch, Hemanth Kumar Puppala
Partner: University of Hohenheim, Fraunhofer-Institute for Solar Energy Systems ISE, EcoPeace Middle East – Jordan, The Hebrew University of Jerusalem
Funding: German Federal Ministry of Education and Research (BMBF), Israeli Ministry of Science and Technology (MOST), Middle East Regional Water Research Cooperation Program (MEWAC)
Duration: 01.01.2022 - 31.12.2025
Location: Near and Middle East

WertKalb - Innovative strategies for the ethical value creation of calves from organic dairy farming (490h)

Short description: In cooperation with the project partners we will investigate the potential of the strategies described above to reduce the calf problem and further develop them. Therefore, we will evaluate quantitatively and qualitatively:

Picture credit: www.wertkalb.de

- the adoption potential (including implementation, acceptance, and barriers) of the strategies for animal husbandry and breeding in organic farming
- the market potential (including consumer acceptance, purchasing behavior and volume of sales) of ethically produced organic products.

Scientific, technical, practical, economic and political aspects of the solution strategies are taken into account. For the participatory development of strategies with farmers, consumers and market actors, the project will be conducted in the organic model regions of Ravensburg, Biberach, Hohenlohe and Freiburg. The expected results should provide answers to the pressing question of how to design an ethically acceptable strategy for sustainable development of the sector in line with the principles of organic farming. Thus, the project will help to reduce the “calf problem” and to support the further development and strengthening of organic farming as well as the agricultural and social transformation towards sustainability and increased consumption of organic products.

Person involved: Prof. Dr. Mizeck Chagunda, Dr. Christoph Reiber and Josephine Gresham
Partner: Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen (HfWU), Institut für Angewandte Agrarforschung (IAAF): Prof. Dr. Jürgen Braun, Dr.sc.agr. Angelika Thomas, Fachgebiet Angewandte Ernährungspsychologie (180d), Institut für Ernährungsmedizin: Prof. Dr. Nanette Ströbele-Benschop; Landesamt für Geoinformation und Landentwicklung Baden-Württemberg (LGL), Zuchtwertschätzteam Baden-Württemberg / Landesverband Baden-Württemberg für Leistungs- und Qualitätsprüfungen in der Tierzucht e.V. (LKV) / Rinderunion Baden-Württemberg, RBW / Bioland, Demeter, Naturland, Edeka, u.v.m.
Funding: Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg
Duration: 2020-2023
Location: Baden-Württemberg, Germany

Biostar - Sustainable bioenergies for food processing SMEs in rural areas of West Africa (440e)

Short description: The overall aim is to contribute to energy and food security through the development of a bioenergy sector that responds to the needs of food processing SMEs. Specifically, BioStar aims to promote the sustainable development of food processing SMEs in rural areas through innovation in sustainable bioenergy production and opti-mization of food processing. BioStar also aims to contribute to the emergence of a bioenergy supported industry by stimulating its organi-zation and advisory framework.

Specifically, BioStar focuses on supporting technical and organizational innovations and multidisciplinary knowledge management through the following:

Testing innovative pilot systems in the area of food processing companies to improve energy efficiency,

Promoting innovation platforms for the use of renewable energy sources in food processing SMEs

Organizing a bioenergy sector through capacity building of energy experts and equipment suppliers to ensure audit, installation and maintenance service.

Crushing of biomass to determine energy content, Picture credit: 440e

Person involved: Prof. Dr. Joachim Müller, Dr. Klaus Meissner, Dr. Sebastian Romuli, Janvier Ntwali

Partner: Institut für Agrartechnik, FG Tropen und Subtropen (440e), Landesanstalt für Agrartechnik und Bioenergie (740), CIRAD (French Agricultural Research Centre for International Development), 12 weitere Partner in Europa and, West Afrika

Funding: EU Commission (FOOD 2018 / 041-107)

Duration: Oktober 2019 – Februar 2025

Location: Senegal, Burkina Faso (Afrika)

Projects

Rural Development Theory and Policy (490a)

Minding Women's time: Does time-saving and behavioral interventions change the margins?

Keywords:	Women's economic empowerment, Time-saving technology, Housework
Funding, Duration:	BW-Stiftung, 01.04.2023 - 31.03.2026
Location, Partners:	Ethiopia

International Agricultural Trade and Food Security (490b)

Application and further development of tool kit to assess the impacts of implementation of response measures for Maldives

Keywords:	Global climate policies, Nationally determined contributions (NDCs), socio-economic policy analysis, future emission pathways, modelling of SDG indicators, capacity building, Small Island Developing State.
Funding, Duration:	UNFCCC mitigation division, 14.07.2022 - 14.10.2023
Location, Partners:	Maldives (South Asia), UNFCCC

Enhance the modelling of inter-regional migration in the DEMETRA model

Keywords:	Internal migration flows, empirically based migration framework, model development, dynamic single country CGE model.
Funding, Duration:	EU-JRC, 2022 - 2023
Location, Partners:	Ethiopia (Africa)

Sino-German International Research Training Group - Adaptation of maize-based food-feed-energy systems to limited phosphate resources (AMAIZE-P) – Research Subject 4.3 - Economic assessment of future phosphorus availability: Impacts on agricultural and food markets at farm, national and global levels

Keywords:	Phosphorus availability, CGE modelling, international trade, food security
Funding, Duration:	Deutsche Forschungsgemeinschaft (DFG) – 328017493/GRK 2366 (01.10.2024-30.09.2027)
Location, Partners:	China, Germany, World, Coordinator/Speaker: Prof. Dr. Torsten Müller (340i) University of Hohenheim, several departments of the University of Hohenheim, and China Agricultural University

Welchen Beitrag können die "Farm to Fork" – Strategie und die neu ausgerichtete gemeinsame Agrarpolitik zur Abfederung multipler Schocks leisten? / Impact of the Farm to Fork strategy and the EU's Common Agricultural Policy on the ability of the food system to cushion against multiple shocks

Keywords:	Food system resilience, agricultural and food policy, computable general equilirium modelling and simulation, economic and physical shocks.
Funding, Duration:	Edmund Rehwinkel-Stiftung (April 2023 - Januar 2024)

Location, Partners:	European Union, University College Dublin

Social and Institutional Change in Agricultural Development (490c)

Agricultural development pathways for nutrition-sensitive and biodiversity-smart landscapes in Africa

Keywords:	Agro-ecological innovations; sustainable intensification; nutrition-sensitive and biodiversity-smart landscapes; bright spots analysis; cost-benefit and trade-off analysis
Funding, Duration:	Special Funding for Research on Improving World Nutrition, Foundation fiat panis, 01.03.2023 - 31.12.2024
Location, Partners:	Zambia, Indaba Agricultural Policy Research Institute (IAPRI), Zambia, Ass.Prof. Dr. Thomas Daum, University of Gothenburg

Fostering innovations to reduce livestock's long shadow in Africa

Keywords:	Innovations, livestock development, cattle breeding, chicken farming systems, Kenya
Funding, Duration:	BW-i: Eliteprogramm für Postdoktorandinnen und Postdoktoranden, Baden-Württemberg-Stiftung, 01.05.2022 - 01.05.2025
Location, Partners:	Kenya, Prof. Dr. John Mburu, University of Nairobi, Kenya, Ass. Prof. Dr. Thomas Daum, University of Gothenburg, Louis Schwarze

Land Use Economics (490d)

Biodiversity in agriculture: Data and models to support pesticide reduction

Keywords:	Biodiversity, pesticide reduction, agricultural prodictivity
Funding, Duration:	MLR - Ministerium für Ernährung, Ländlichen Raum und Verbraucherschutz Baden-Württemberg Sonderprogramm zur Stärkung der biologischen Vielfalt, Bereich „Biodiversität in der Landwirtschaft“, 01.12.2022 - 30.06.2025
Location, Partners:	Germany, LTZ Augustenberg

Clifood Phase 2: German-Ethiopian SDG Graduate School “Climate Change Effects on Food Security (CLIFOOD)" – Subproject: Climate change and intergenerational persistence of poverty and malnutrition

Keywords:	Adaptation, climate change, social networks
Funding, Duration:	DAAD, BMZ, 01/2021-12/2025
Location, Partners:	Ethiopia (Africa), Hawassa University

Agronomy in the Tropics and Subtropics (490e)

AcroAlliance - A Brazilian-German Vision to Foster the Sustainable Use of Local Biodiversity in the Bioeconomy

Keywords:	Macaúba palm, *Acrocomia aculeata*, biorefinery, oils, proteins and fibres, modelling
Funding, Duration:	BMLE via FNR and FINEP (Brazil), 2021 - 2025

Location, Partners:	Brasilien, Federal Univ. Vicosa, Agronomic Institute of Campinas, Frauenhofer Institute

Leg4Dev - Legume-based agroecological intensification of maize and cassava cropping systems in Sub-Saharan Africa for water-food-energy nexus sustainability, nutritional security & livelihood resilience

Keywords:	Intercropping, Agroforestry, Climate Change, Model comparison
Funding, Duration:	EU-DESIRA, 2021-2025
Location, Partners:	Ethiopia, Malawi, Tansania, Univ. Galway, Univ. Wageningen, Swedish Univ. Agric., IITA, CYMMIT, ILRI

NAPERDIV - Nature-based perennial grain cropping as a model to safeguard functional biodiversity towards future-proof agriculture

Keywords:	Kernza®, *Thinopyrum intermedium L.* , intermediate Wheatgrass, microbiome, soil fauna
Funding, Duration:	DFG, H2020 ERA-Net cofund scheme "BiodivERsA3", 2021 - 2025
Location, Partners:	France, Belgium, Sweden, Gembloux AgroBio-Tech, University of Graz, University of Liège, University of Trier, Nicolaus Copernicus University of Torun, Swedish University of Agricultural sciences

Ecology of Tropical Agricultural Systems (490f)

Agricultural development pathways for nutrition-sensitive and biodiversity-smart landscapes in Africa

Keywords:	Food security, land-sharing vs. land-sparing, ecological-economic trade-offs and synergies
Funding, Duration:	Stiftung fiat panis, 01.03.2023 - 31.12.2024
Location, Partners:	Zambia, University of Gothenburg, IAPRI

BRIGHT-Futures: Bright spots in agriculture - learning from today's role models for a sustainable future

Keywords:	Sustainability, agricultural transformation, trandisciplinarity
Funding, Duration:	Anton & Petra Ehrmann Foundation, 2024-2027
Location, Partners:	Kenya, Mexico, India, Germany

Fitness consequences of trait-mediated interactions between the invasive plant Impatiens glandulifera, native plants and their pollinators (P2 zu PP FLINT)

Keywords:	Eco-evolutionary biodiversity dynamics, plant-pollinator interactions, invasive species, biodiversity
Funding, Duration:	DFG, 01.01.2024 - 31.12.2026
Location, Partners:	Germany

HABIT - Cooperative doctoral college: Leverage points for a Transformation of Agricultural Landscapes - from Biodiversity Loss to Biodiversity Enhancement

Keywords:	Landscape design, agricultural transformation, biodiversity conservation

Funding, Duration:	Ministry of Science, Research and Arts Baden-Württemberg, 2022-2027
Location, Partners:	Germany, Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen (HfWU)

Spatial scaling of biodiversity and ecosystem functions in rainforest transformation landscapes

Keywords:	Smallhoder agriculture, ecological-economic trade-offs and synergies, landscape effects, scaling
Funding, Duration:	DFG, 2024-2027
Location, Partners:	Indonesia, University of Göttingen

NOcsPS: Agriculture 4.0 without chemical-synthetic plant protection

Keywords:	Novel farming systems, biodiversity-friendly agriculture
Funding, Duration:	BMBF, 2022-2024
Location, Partners:	Germany

Management of Crop Water Stress in the Tropics and Subtropics (490g)

EXALT - Coupling thermal desalination and dewatered salt discharge with hydroponic crop production using heat pumps

Keywords:	Genotypic responses of horticultural crops to variable root zone salinity, illumination, and atmospheric vapor deficit in hydroponical systems. Modelling of water, energy, and electric flux dynamics in controlled environment farming.
Funding, Duration:	BMBF and MOST, 07.2021 - 06. 2025
Location, Partners:	Germany, Jordan, and Israel. University of Hohenheim, Frauenhofer ISE, EcoPeace Jordan, Hebrew University of Jerusalem.

HypoWave+ - Implementation of a hydroponic system for sustainable water re-use in agriculture

Keywords:	Tomato production with marginal waters (pretreated municipal water water), monitoring of nitrogen loads to ensure enironmentally safe nutrient levels through depletion via plant uptake
Funding, Duration:	BMBF, 02. 2021 – 04. 2025
Location, Partners:	Hohenheim und Weißenberge, Universität Hohenheim, TU Braunschweig, Frauenhofer IGB, Huber, ISE Bauern, ISOE, INTEGAR, Ankermann GmbH & CoKG, XYLEM.

INNUWA - Intelligent nutrient management for irrigation with marginal waters

Keywords:	Real time electrophoretic monitoring of nutrient concentrations to manage nutrient dynamics in annual and perennial plants hydroponically grown with marginal waters.
Funding, Duration:	BMBF, 12. 2024 - 11. 2027
Location, Partners:	Hohenheim, Tel Aviv. Universität Hohenheim, STEP Systems GmbH, Agricultural Research Organisation, Israel

PureCircles - PRIMA Project: Maximizing Resource Use Efficiency in the Water-Nutrient-Energy Nexus for Sustainable Agriculture in Marginal Lands

Keywords:	Closing water -, energy-, and nutrient cycles by AI-assisted integration of high-end solar technology, hydroponic systems, climate resilient crops, and smart agrotechnical management strategies
Funding, Duration:	Germany (Federal Ministry of Education and Research - BMBF), Portugal (Fundação para a Ciência e a Tecnologia (FCT)), France (The French National Research Agency (ANR)), Italy (MUR – Ministry of Universities and Research) , Egypt (Science, Technology & Innovation Funding Authority (STDF)), Tunisia (Ministry of Higher Education and Scientific Research) and Morocco (Ministry of Higher Education, Scientific Research and Innovation – Morocco (MHESRI-Ma)) in the framework of the Partnership for Research and Innovation in the Mediterranean Area (PRIMA). The PRIMA program is supported by the European Union's Framework for Research and Innovation under Horizon 2020. Duration of the project: June 2023 - November 2026
Location, Partners:	12 partner institutions from five European and three Maghreb countries build a strong R&I partnership to implement a systemic approach for sustainable agricultural practices that prevent and reduce land/ water salinization and pollution

The role of micro-organisms in mitigating iron toxicity in rice (*Oryza sativa*)

Keywords:	Rice genotypes, Iron toxicity endophytic bacteria and fungi, mode of action
Funding, Duration:	DFG, Aufbau internationaler Kooperationen, 28.08.2023 - 31.12.2025 Ministry of Arts and Science, BW, Afrikaintiative Tübingen-Hohenheim, 2022-2025
Location, Partners:	Madagascar - LRI, Uni Hohenheim, Uni Tübingen

RiSaWa - Rice production caught between salinity and drought – future options for sustainable use of water in the Mekong Delta region

Keywords:	Mekong Delta, rice production, climate change, sea level rise, salt intrusion, greenhouse gas emissions, rice genotypes, AWD, salt tolerance, salinity mapping, early warning systems, willingness to pay.
Funding, Duration:	BMBF 2019 - 2023
Location, Partners:	Vietnam, Germany, University of Hohenheim, University of Kien Giang, University of An Giang

Water - People - Agriculture (Anton & Petra Ehrmann-Stiftung Research Training Group), Integrative solutions to water issues and conflicts

Keywords:	Scholarships fo PhD research projects, study program “water for life”, seminars & excursions, world water day symposium. Topics: Water as resource, water and climate, water productivity, water and health, water as societal challenge.
Funding, Duration:	Anton & Petra Ehrmann-Stiftung, 01.09.2013 - 31.12.2025
Location, Partners:	Projects in Europe, Africa, South America, and Asia, various partners

Animal Breeding and Husbandry in the Tropics and Subtropics (490h)

ASSET - Agroecology and Safe food System Transitions in South-East Asia

Keywords:	Nutrition, Health, Agroecology, Food safety
Funding, Duration:	EU and AFD (Agence Francaise de Developpment), 2020-2025

Location, Partners:	Vietnam & Cambodia & Laos (South East Asia), AGENCE FRANCAISE DE DEVELOPPEMENT, Asia-Pacific Association of Agricultural Research Institutions (APAARI), Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), and more …

African Dairy Genetics Phase III - Sustainable Animal Productivity for Improved Livelihoods, Nutrition and Gender Inclusion

Keywords:	Animal Breeding, Livestock, Research
Funding, Duration:	International Livestock Research Institute, 01.01.2023 - 31.12.2023
Location, Partners:	Africa, International Livestock Research Institute (ILRI)

Genomic selection for functional and production traits in indigenous chicken breeding programme

Keywords:	Indigenous chicken, Selection strategy, Dual-purpose breed, Specialized breed
Funding, Duration:	DAAD Scholarship PhD Thesis, 2021-2023
Location, Partners:	Kenya (Africa)

Auf dem Weg zu einem besseren Verständnis der Genotyp-Resilienz einheimischer Rinder in der sich verändernden klimatischen Umgebung und in den intensivierten Nutztierproduktionssystemen in Afrika südlich der Sahara (Anbahnung/initiation)

Keywords:	Climate change adaptation, Local breeds, Resilience, Genotyping
Funding, Duration:	Aufbau internationaler Kooperationen, 01.01.2024 - 31.12.2024
Location, Partners:	Africa, Deutsche Forschungsgemeinschaft

EIP ZweiWert - Aufbau von Wertschöpfungsketten für regionale Zweinutzungshühner in Baden-Württemberg

Keywords:	Communication structure, value chain of dual-purpose chickens, actor and potential analysis, education, breeding
Funding, Duration:	EIP-AGRI , 01.01.2022 - 31.12.2024
Location, Partners:	Germany, Regierungspräsidium Stuttgart, demeter Gärtnerei Großhöchberg, Martin Bauer, Monika Makary, Ökologische Landwirtschaft, Naturland Baden-Württemberg e.V., Öko-Beratungsgesellschaft mbH, Reyerhof KG, Scheunenwirtin GbR

Gender-dynamik in westafrikanischen familiengeführten Geflügelproduktionssystemen und Auswirkungen auf die Intensivierung (Anbahnung/initiation)

Keywords:	Poultry, Food security, Gender inequity, Women farmers
Funding, Duration:	DFG, Aufbau internationaler Kooperationen, 01.11.2023 - 31.10.2024 (terminated)
Location, Partners:	West Africa, Deutsche Forschungsgemeinschaft

Öko2Huhn - Dual-purpose chickens in organic farming: Breeding and determination of potentially suitable origins and implementation in practice

Keywords:	dual-purpose chicken; regional-, organic-, practical chicken breeding; biodiversity; small breeds
Funding, Duration:	BMEL (BLE: BÖLN), 18.02.2020 - 31.12.2026

Location, Partners: Baden-Württemberg (Germany), Bioland Beratung GmbH, Hochschule für nachhaltige Entwicklung Eberswalde, Ökologische Tierzucht gGmbH, Hochschule Weihenstephan-Triesdorf

Bio- und Geosphäre in Afrika: Vielfalt, Wandel und Chance als Erweiterung der Regionalen Forschungsallianz Ertragsstabilität in dynamischen Umwelten

Keywords: Ernährungssicherung, erneuerbare Energien

Funding, Duration: Kooperation Uni Tübingen und Uni Hohenheim, 2020-2023

Location, Partners: Ethiopia (Africa), Uni Tübingen, Addis Abeba Institut of Technologie (AAiT)

EIP KlimaFit: Züchtungsstrategien für eine standortangepasste Milchviehhaltung in Baden-Württemberg

Keywords: Robustness, Heat stress, Dairy, Climate change adaptation

Funding, Duration: 2021 - 2024

Location, Partners: Germany, Rinderunion Baden-Württemberg, Landesverband Baden-Württemberg für Leistungs- und Qualitätsprüfungen in der Tierzucht e.V., Förderverein Bioökonomieforschung e.V., Landesamt für Geoinformation und Landentwicklung Baden-Württemberg, Landwirtchafliches Zentrum Baden-Württemberg, Rinder Daten Verbund, Bayerische Landesanstalt für Landwirtschaft, Vereinigte Informationssysteme Tierhaltung w.V.

Agricultural Engineering in the Tropics and Subtropics (440e)

Anwendung von solaren Kühlgeräten für ein besseres Qualitäts- und Sicherheitsmanagement verderblicher Lebensmittel in Westafrika

Keywords: Solare Kühlung, landwirtschaftliche Produkte (Meeresfrüchte), Ernährungssicherung, Optimierung der Wertschöpfungskette

Funding, Duration: soCo Westafrika, 2023-2024

Location, Partners: Benin (Cotonou) (Africa), Faculty of Agronomic Sciences, Benin

Bioenergies for small-scale agrifood and forestry enterprises in rural parts of West Africa

Keywords: Bioenergie, Ölpressen, Photovoltaik

Funding, Duration: Biostar-Cirad, 2021-2025

Location, Partners: Burkina Faso & Sénégal & Côte D'Ivoire & Mali & Niger (Africa), CIRAD, UGB, UCL, 2IE, NITIDAE, UNI Rom

Bio- und Geosphäre in Afrika: Vielfalt, Wandel und Chance als Erweiterung der Regionalen Forschungsallianz Ertragsstabilität in dynamischen Umwelten

Keywords: Ernährungssicherung, erneuerbare Energien

Funding, Duration: Kooperation Uni Tübingen und Uni Hohenheim, 2020-2023

Location, Partners: Ethiopia (Africa), UNI Tübingen, Addis Abeba Institut of Technologie (AAiT)

Design, construction and on-site optimization of a solar-biomas hybrid flated dryer for drying maize cobs in Rwanda

Keywords: Nacherntetechnologie, erneuerbare Energie

Funding, Duration: Stiftung Lengerich, 2022-2023

Location, Partners: Rwanda (Africa)

Development and testing of a humidity control system for the storage of tomatoes in a solar cold room in Nigeria

Keywords: Solare Kühlung, Kontrolle der Luftfeuchtigkeit, Lagerfähigkeit von landwirtschaftlichen Produkten, Optimierung der Wertschöpfungskette

Funding, Duration: Fiat Panis, 2023

Location, Partners: Nigeria (Africa)

Economics feasibility and user acceptability study on a solar-biomass hybrid flatbed dryer to dry maize cobs in Rwanda

Keywords: Nacherntetechnologie, erneuerbare Energie

Funding, Duration: Fiat Panis, 2023

Location, Partners: Rwanda (Africa)

Laserbasierte Bildgebung zur optichen Erfassung der Wasserverteilung von Sportplatzregnern

Keywords: Wasserverteilung, Sportplatzregnern, laserbasierte Bildgebung

Funding, Duration: FLSF-Laserbasierte Bildgebung, 2023

Location, Partners: Hohenheim (Germany)

Science to Field - Optimierte Produktion von Arznei- und Gewürzpflanzen in Albanien

Keywords: Medizinpflanzen, optimale Bewässerung, Workshop

Funding, Duration: DLR, 2021-2024

Location, Partners: Albania (Tirana), Agro-Map, UNI Tirana, PIKT

Strengthening farmer cooperatives in Rwanda through participartory development of PV-powered postharvest processing of maize (

Keywords: Nacherntetechnologie, erneuerbare Energie

Funding, Duration: Stiftung Lengerich, 2024-2025

Location, Partners: Rwanda (Africa)

UAV-basiertes Monitoringsystem für Spinnmilben im Unterglasanbau- TP1 Bilderfassung und Projektkoordination

Keywords: UAV-basierendes Monitoringsystem, Spinnmilben

Funding, Duration: PTBLE, 1.2.2020 - 31.3.2023

Location, Partners: China (Asia), LTZ Augustenberg, LVG Heidelberg, Multikopter.de, Wolution GmbH & Co KG, Ingenieurbüro Bauer GmbH, Hochschule Karlsruhe

3.2. Ongoing Dissertation Projects

Rural Development Theory and Policy (490a)

Name: **Jacob Asravor**
Topic: Integrated soil fertility management, farm performance and household welfare: Evidence from mmallholder farmers in Ghana and Mozambique
Keywords: Agronomic practices, improved seeds, integrated soil fertility management, productivity, technical efficiency, Mozambique, Ghana

Name: **Nandar Aye Chan**
Topic: Determinants of agricultural technology adoption and technical efficiency of rice and mungbean production in Myanmar
Keywords: Gender, decomposition, rice productivity, domestic resource costs (DRC), cost efficiency, competitiveness, mediation analysis, shock, happiness, Myanmar

Name: **Yovita Dewi**
Topic: Economic analysis of rice smallholder farming in Indonesia: Technical and institutional options for the agricultural development
Keywords: Smallholder farmers, agricultural extension agents, technical efficiency, institutional arrangement

Name: **Duong Thanh**
Topic: Poverty analysis and assessment among ethnic minorities in rural Vietnam
Keywords: Poverty targeting, poverty scorecard, poverty assessment tool

Name: **Emmanuel Leetaa**
Topic: Gender equality attitudes and women's economic empowerment: Evidence from Uganda
Keywords: Gender attitudes, time use, Uganda

International Agricultural Trade and Food Security (490b)

Name: **Vladimir Korovin**
Topic: Scenario Analysis of Global food Security within CGE Models: The Role of Caloric Eqivalents
Keywords: Computable general equilibrium modelling, baseline development, nutrition

Name: **Simon Ehjeij**
Topic: Assessing irrigation expansion in Ethiopia: A nationwide analysis
Keywords: Ethiopia, irrigation, food security, computable general equilibrium modeling

Name: **Mamadou Jallow**
Topic: Assessing the implications of future P availability for global agri-food markets using a computable general equilibrium approach
Keywords: Phosphorus availability, international trade, food security, computable general equilibrium modeling

Name: **Emmanuel Namwanja**
Topic: Policies for the sustainability tranformation of food systems in Africa – exploring participatory and co-creative apporaches to improve uptake of scientific evidence in policy-making
Keywords: research-policy interaction, participatory methods, food system sustainability

Name: **Abdeljalil Takhim**
Topic: Sustainability Transformations in Global Food Systems: Analyzing the Role of International Trade
Keywords: Sustainability, international trade, trade policy, computable general equilibrium modeling

Social and Institutional Change in Agricultural Development (490c)

Name: **Ferdinand Adu-Baffour**
Topic: Governance of land rehabilitation and remediation: Case studies of Ghana's small-scale mining sector
Keywords: Small-scale gold mining; governance and regulation of mining; land rehabilitation; phytoremediation; Ghana

Name: **Usman Angara**
Topic: The impact of agricultural mechanization services on sustainable pesticide use: A case study of smallholder potato farmers in Tanzania
Keywords: Potato farming; crop protection; integrated pest management; mechanization service providers; sustainability; Tanzania

Name: **Prapti Barooah**
Topic: Innovative extension approaches for climate-smart agriculture
Keywords: Direct seeded rice; video-extension; gender; labour; India

Name: **Nikola Blaschke**
Topic: Governance, food sovereignty and food security
Keywords: Food security during the COVID-19 crisis; food sovereignty; discourse analysis; La Via Campesina; World Farmers Organization

Name: **Erich Friol Gimenes**
Topic: Sustainable land management practices in Brazil
Keywords: Agroecology; collective action; forest conservation policies; non-timber forest products; Brazil

Name: **Bisrat Getnet Awoke**
Topic: Performance evaluation of tractors and planters for small-scale conservation tillage and crop protection systems in Eastern Africa
Keywords: Conservation farming; agronomic experiments; economic analysis; Ethiopia; Kenya

Name: **Denise Güttler**
Topic: The role of livestock farmers and animal health workers in managing zoonotic diseases in Africa
Keywords: Zoonotic diseases; ethno-veterinary practices; livestock disease management; Kenya

Name: **Francisco Hidalgo**
Topic: Digital agriculture: socio-technical-physical interactions and the transformation of the rural world(s)
Keywords: Digital tools; coffee farming; socio-technical systems; rural transformation; critical theory

Name: **Linda Isuyi**
Topic: Digital technologies and services in African agriculture focusing on livestock value chains in Nigeria
Keywords: Digital tools; livestock value chains; digital finance; content analysis of social media; Nigeria

Name: **Roseline Katusiime**
Topic: Dietary patterns and micronutrient deficiencies in Western Uganda
Keywords: Micro-nutrient deficiency; Calculator for inadequate micronutrient intake (CIMI); dietary patterns; economic analysis; Uganda

Name: **Sakiratou Karimou**
Topic: Innovations for sustainable farming in Benin
Keywords: Sustainable farming practices; innovations; Benin

Name: **Kartik Khera**
Topic: Governance challenges of innovations in the horticultural sector in India
Keywords: Cooling; apples; cooperatives; Himanchal Pradesh; India

Name: **Vida Mantey**
Topic: Opportunities and challenges of smallholder agricultural carbon projects in Kenya
Keywords: Agricultural carbon projects; governance challenges; institutional analysis; efficiency analysis; Kenya Agricultural Carbon Project (KACP), Livelihoods Mt Elgon project, Kenya

Name: **Josephine Montford**
Topic: Land tenure, cocoa farming and gold mining in Ghana
Keywords: Small-scale gold mining; land tenure; land acquisition; bargaining theory; fairness of land deals; traditional authorities; sustainability; Ghana

Name: **Melissa Cristina Morcote Martínez**
Topic: Resilience pathways for cocoa farmers in Alto Beni, Bolivia
Keywords: Cooperatives; climate changes; water; integrated protected areas; Bolivia

Name: **Evelyne Wairimu Njuguna**
Topic: Exploring the potential of digital tools as a catalyst to agricultural transformation in Kenya
Keywords: Digital tools for smallholder farmers; review; AgroCares soil scanner; soil fertility management; governance challenges; Kenya

Name: **Esther Ogbole**
Topic: An Institutional Analysis of Rangeland Carbon Projects in Kenya and South Africa
Keywords: Rangeland carbon projects; governance challenges; collective action; Northern Kenya Rangelands Carbon Project; Kenya

Name: **Mellyne Atieno Ongango**
Topic: Fostering policy reforms in the agriculture sector: A case study of AGRA
Keywords: Village-based advisors (VBAs); regenerative agriculture; environmental and sustainable management systems (ESMS); seed policy reform; AGRA; Ghana; Kenya

Name: **Rashid Parvez Khan**
Topic: Innovation in smallholder agriculture: Case studies from India and Uganda
Keywords: Review of extension services; climate-smart agriculture; extension and gender; start-ups; India; Uganda

Name: **Louis Schwarze**
Topic: Fostering innovations to reduce livestock's long shadow in Kenya
Keywords: Innovations, livestock development, cattle breeding, chicken farming systems, Kenya

Name: **Tatjana Rojas Rueda**
Topic: Non-timber forest bioeconomy governance on biodiversity-based value webs: a study case of *Bactris guineensis* in Colombia
Keywords: Bioeconomic; Non-timber forest products; biodiversity; value webs;

Name: **Anna Seidel**
Topic: Risk management in pastoral livestock systems in Kenya
Keywords: Risk management; pastoral livestock systems; camels; food security; Northern Kenya

Name: **George Woode**
Topic: Governance challenges of nutrition programs in Ghana
Keywords: Micronutrient deficiences; nutrition programs; governance challenges; Process Net-Map; Ghana

Land Use Economics (490d)

Name: **Samuel Elias Kayamo**
Topic: Modeling the linkage between climate change, inter-generational persistence of poverty and malnutrition: The case of Sidama, Ethiopia
Keywords: Climate change adaption, poverty, food security

Name: **Abebe Teshome Gurmu**
Topic: Comparative Analysis of Productivity and Profitability of Cluster and Non-cluster Based Wheat Farming: Evidence from ex-ante analysis in Arsi zone of Oromia Regional State, Ethiopia
Keywords: Agricultural productivity, poverty, food security

Name: **Asmera Adicha Adala**
Topic: Irrigation-based improved forage technology diffusion and its effectiveness in enhancing agro-pastoral household income in Southern Ethiopia
Keywords: Agro-pastoral systems, poverty, food security

Agronomy in the Tropics and Subtropics (490e)

Name: **Adam M. Adam**
Topic: Potential of grain legume diversification options for African smallholder farms in a changing climate: Evidence from meta-analytic approaches and crop models
Keywords: Crop models, Grain legumes, African smallholder farms and climate change

Name: **Mekuria Wolde Assena**
Topic: Ecological interactions of cereals, Striga hermonthica and plant-associated microbial biocontrol agents
Keywords: Striga hermonthica, Fusarium oxysporum f.sp. strigae, bacterial lipopeptide, phenolic acids, integrated Striga management, biological control, mycoherbicide

Name: **Alena Förster**
Topic: Perennial grain cultivation as a nature-based solution for resilient agriculture suggested by soil bioindicator species analysis
Keywords: Perennial intermediate wheatgrass (Kernza), earthworms, nematodes, plant microbiome, soil biodiversity, resilient agriculture

Name: **Sulemana Issifu**
Topic: Assessing the microbial diversity and biological nitrification inhibition potential of Thinopyrum intermedium
Keywords: BNI, Kernza®, ammonia oxidizing bacteria and archaea, metabolome, nitrification

Name: **Catherine Meyer**
Topic: Influence of Climate on Variation of Inflorescence Traits in the Neotropical Oilseed Palm *Acrocomia aculeata*
Keywords: *Acrocomia* Mart., Oilseed palm, Flower Biometry, Phenological Pattern, Yield Formation, Ecotype Comparison, Ex-Situ Germplasm Collection, Brazil

Name: **Enoch Opoku**
Topic: Restoration of degraded Gold mined sites for Agricultural Production in Ghana
Keywords: Restoration, degraded mined sites, soil health and productivity, perennial legumes,revegetation, biological nitrogen fixation, soil organic amendments

Name: **Lisa Pataczek**
Topic: Combining improved mungbean cultivars with plant growth promoting rhizobacteria inoculation and regulated deficit irrigation to increase crop productivity
Keywords: Mungbean, *Vigna radiata*, improved genotypes, bacterial inoculation, regulated deficit irrigation, yield, productivity, biological nitrogen fixation

Ecology of Tropical Agricultural Systems (490f)

Name: **Mina Anders**
Topic: Effects of climate and land-use change on pollinator diversity and pollination services in South African macadamia orchards
Keywords: land-use, climate change, pollination, biocontrol, plantation design, landscape effects

Name: **Sabine Baumgartner**
Topic: Resilience of semi-arid rangelands towards high grazing and rainfall variability
Keywords: resilience, rangelands, Africa

Name: **David Becker**
Topic: Fitness effects of invasive plants on pollinators
Keywords: plant-pollinator interaction networks, functional diversity, fitness, Himalayan balsam (*Impatiens glandulifera*), invasive species

Name: **Klara Dietrich**
Topic: Agroecological management of olive orchards
Keywords: Agroecology, olives, med. agroecosystems, climate change, cultural landscapes

Name: **Marit Kasten**
Topic: Participatory landscape design for biodiversity and multifunctionality
Keywords: Landscape design, participartory approaches, biodiversity conservation, landscape composition and configuration

Name: **Lena Michler**
Topic: Biological and cultural diversity in the Dzungarian Gobi desert in Mongolia
Keywords: Pastoralism, socio-ecological systems, Asia

Name: **Sara Tassoni**
Topic: Multitrophic interactions in a landscape context
Keywords: Multitrophic interactions, host-parasitoids interactions, bees, wasps, parasitoids, landscape heterogeneity

Name: **Aaron Willmott**
Topic: Integrating biodiversity and ecosystem services in tropical plantations
Keywords: Ivory Coast, plantations, agroforestry, birds

Management of Crop Water Stress in the Tropics and Subtropics (490g)

Name: **Geckem Dambo**
Topic: Remote sensing of photo protective pigments in climate change adapted wheat
Keywords: Wheat improvement, photo-protective pigments, adaptation, cross tolerance, heat, drought, radiation stress, genotypic variation

Name: **Theresa Detering**
Topic: Nutrient uptake, growth, transpiration of hydroponically grown tomato genotypes under variable environmental conditions.
Keywords: Genotypic responses, root zone temp., nutrient concentration, VPD effluents, waste water treatment plants, water purification, nutrient uptake, transpiration.

Name: **Hemanth Kumar Pupalla**
Topic: Salinity effects on nutrient uptake dynamics in hydroponically grown crops
Keywords: Cucumber, Tomato, Quinoa, nutrient uptake, root zone salinity, hydroponics, water purification, water recovery, plant growth, transpiration, genotypic responses, VPD

Name: **Johanna Volk**
Topic: Modelling of sweet potato responses to salinity
Keywords: Genotypic responses, soil salinity, field trials, Mozambique, greenhouse trials, mechnisms, hormesis, tolerance traits, modelling, breeding

Animal Breeding and Husbandry in the Tropics and Subtropics (490h)

Name: **Richard Oloo**
Topic: Resilience of Dairy Cattle in Sub-Saharan Africa
Keywords: Resilience, Fertility, Milk yield, Crossbred dairy cattle, Kenya

Name: **Josephine Gresham**
Topic: Extended lactation as a strategy for developing optimal fertility in organic dairy farming
Keywords: Extended Lactation, Organic Dairy Farming, Fertility in Dairy Cows, Dairy Calf management, Optimal Lactation Length in Dairy Cows, Sustainable Dairy Farming

Name: **David Kohnke**
Topic: Breeding und potential evaluation of suitable origins of dual purpose chickens in organic farmingmi
Keywords: Chicken breeding, dual purpose breeds, native breeds, Sundheimer Huhn

Name: **Miguel Leandro**
Topic: Dairy cattle robustness to heat stress in Baden-Württemberg
Keywords: Robustness, Heat stress, Dairy cattle

Name: **Maria Oguche**
Topic: Implications and trade-offs of livestock intensification in Sub-Saharan Africa – Case of Nigeria
Keywords: Neglected livestock species, Food security, Nigeria, Sustainable livestock production, Rural households

Name: **Kwamboka Tirimba**
Topic: Interactions between environmental footprint and socio-economic factors and their impact on dairy productivity in India and Malawi
Keywords: Methane, dairy nutrition, indigenous breeds, sustainable dairy production, socio-economic factors, India, Malawi

Name: **Sophie Miyumo**
Topic: Genetics and Breeding for Humoral Immunity and Feed Efficiency in Indigenous Chicken Population in Kenya
Keywords: Poultry, Resilience, Indigenous breeds, Immunity

Agricultural Engineering in the Tropics and Subtropics (440e)

Name: **Joevin Bonzi**
Topic: Development of efficient and viable small-scale solar powered plant oil production in West Africa
Keywords: Mechanical oil extraction, photovoltaic system, simulation model, Reinforcement learning, energy efficiency

Name: **Sawittree Chai Areekitwat**
Topic: Optimization of harvest and post-harvest technologies for cassava leaves with respect to human nutrition
Keywords: Post-Harvest Processing, Cassava Leaf Optimization, Protein Extraction

Name: **Selamawit Debelle**
Topic: Development of food products based on cassava leaves
Keywords: Cassava Leaves, Food product development, Nutritional value, Cyanide content

Name: **Esther Ekeledo**
Topic: Analysis of Nigerian yellow-fleshed cassava root and residues: Their nutritional and bioweb potentials.
Keywords: Cassava By-products, Nutritional Composition, Yellow-Fleshed Cassava

Name: **Philipgi Kanatt**

Topic: Effect of post harvest operations on quality attributes of mace, shell and kernel of nutmeg (Myristica fragrans Houtt.),
Keywords: Nutmeg, Mace, Aflatoxin, Antioxidants, Drying temperature, Sorption isotherm

Name: **Boris Mandrapa**
Topic: Optical detection of spider mites in greenhouse cultivation
Keywords: spider mite, greenhouse, hyperspectral imaging, machine learning

Name: **Farah Mrabet**
Topic: Development of solar milk cooling systems for rural areas
Keywords: Milk, solar energy, technology, innovation, cooling

Name: **Janvier Ntwali**
Topic: Evaluation of mycotoxins and methods of reducing mycotoxins in staple crops grown in Rwanda
Keywords: Maize, Postharvest, Mycotoxin contamination, Aflatoxins, Water activity, ELISA test, Mycotoxins control, Rwanda

Name: **Leon Oehme**
Topic: High throughput phenotyping of maize based on computer vision
Keywords: HTP, AI, Computer Vision, UAV, Maize, 3D

Name: **Iris Ramaj**
Topic: Monitoring and optimization of aeration process in cereal storage bins based on theoretical modelling and practical approaches
Keywords: Postharvest technology, grain storage systems, low-temperature drying, aeration and cooling of grain bulks, sorption isotherms, bulk compressibility, self-compaction behaviour, mathematical modelling, discrete element modelling (DEM)

Name: **Alice-Jaqueline Reineke**
Topic: In situ detection of phosphorus status in soil by hyperspectral imaging
Keywords: HIS, spectroscopy, phosphate, soil nutrients

Name: **Steffen Schock**
Topic: Optimierung der Steuerung des Durchlüftungs- und Kühlungsprozesses von Schüttgütern, insbesondere Getreide
Keywords: C02, Sensor, Isotherme, Lagerung

Name: **Yang Zhang**
Topic: Nitrogen management on maize and cotton based on unmanned aerial vehicle
Keywords: UAV, cotton, nitrogen balance

4. Peer-reviewed Publications

Rural Development Theory and Policy (490a)

(1) **Sariyev, O.**, & **Zeller, M.** (2023). Crossbred poultry adoption and impact. *Social Sciences & Humanities Open*, 7(1), 1–13. doi:10.1016/j.ssaho.2022.100394

(2) Adetoyinbo, A., **Asravor, J.**, Olaleye, S. A., & Owusu, V. (2024). Food quality and supply chain networks in dynamic business environments: evidence from the Nigerian shrimp subsector. *British Food Journal*, 26(3), 995–1013. doi:10.1108/BFJ-02-2023-0171

(3) **Dewi, Y. A.**, **Bahru, B. A.**, & **Zeller, M.** (2024). Performance of agricultural extension agents in Indonesia: evidence from a nationally representative survey. *The Journal of Agricultural Education and Extension*, 1–27. doi:10.1080/1389224X.2024.2407178

(4) **Asravor, J.**, Tsiboe, F., Asravor, R. K., Wiredu, A. N., & **Zeller, M.** (2024). Technology and managerial performance of farm operators by age in Ghana. *Journal of Productivity Analysis*, 61(3), 279–303. doi:10.1007/s11123-023-00679-y

(5) Aung, Y. M., Khor, L. Y., Tran, N., Akester, M., & **Zeller, M.** (2023). The impact of sustainable aquaculture technologies on the welfare of small-scale fish farming households in Myanmar. *Aquaculture Economics & Management*, 27(1), 66–95. doi:10.1080/13657305.2021.2011988

International Agricultural Trade and Food Security (490b)

(1) Sartori,M., Ferrari,E., M'Barek,R., Philippidis,G., **Boysen-Urban,K**., Borrelli,P., Montanarella,L., Panagos, P., (2024) Remaining Loyal to Our Soil: A Prospective Integrated Assessment of Soil Erosion on Global Food Security, *Ecological Economics*, https://doi.org/10.1016/j.ecolecon.2023.108103.

(2) Philippidis, G., M'Barek, R., **Boysen-Urban, K.**, & Van Zeist, W.-J. (2023). Exploring economy-wide sustainable conditions for EU bio-chemical activities. *Ecological Economics*, *210*, 1–12. doi:10.1016/j.ecolecon.2023.107857

Science for Policy Reports

(3) **Flaig, D**., Shutes, L., and A. Mainar-Causapé (forthcoming). Application and further development of tool kit to assess the impacts of implementation of response measures for Maldives. UNFCCC – Mitigation Programme.

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Management of Crop Water Stress in the Tropics and Subtropics (490g)

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5. Knowledge transfer

5.1. Distinctions

Dr. Kirsten Boysen-Urban was appointed as a Global Trade Analysis Project (GTAP) Research Fellow for the period 2024-2027. The GTAP Network awards the GTAP Research Fellow distinction to individuals for a 3-year term in recognition of their significant contributions to the development of the GTAP model, database and network.

5.2. Media coverage

(1) University of Hohenheim (2023). **Africa and Europe together for scientific research: The University of Hohenheim is among the key players of the new Clusters of Research Excellence / Cluster will be focused on Sustainable Food Systems.** Pressemitteilung. https://www.uni-hohenheim.de/en/press-release?tx_ttnews%5Btt_news%5D=59339&cHash=6d818f30f731316fa39889c1e9cc948d

(2) Stuttgarter Zeitung (2024). **Besondere Pflanzaktion in Der Wilhelma: Wo in Stuttgart Wieder Reis Wächst.** *stuttgarter-zeitung.de.* https://www.stuttgarter-zeitung.de/inhalt.besondere-pflanzaktion-in-der-wilhelma-wo-in-stuttgart-wieder-reis-waechst.2f5ddaf9-985e-4af2-9890-608a683b8282.html.

(3) top agar (2024). **Landwirtschaft im Krisengewitter – Wie stellt sich die Branche besser auf?** top agar, https://www.topagrar.com/betriebsleitung/news/landwirtschaft-im-krisengewitter-wie-stellt-sich-die-branche-besser-auf-20004051.html

5.3. Conferences, Colloquia, Seminars

Tropentag (Vienna)

Picture credit: www.tropentag.de

The annual interdisciplinary conference on research in tropical and subtropical agriculture, natural resource management and rural development (Tropentag) is jointly organised by the universities of Berlin, Bonn, Göttingen, Hohenheim, Kassel-Witzenhausen, Leibniz Centre for Agricultural Landscape Research ZALF e.V. (all Germany), Czech University of Life Sciences Prague (Czech Republic), BOKU Vienna (Austria), and the Council for Tropical and Subtropical Research (ATSAF e.V.) in co-operation with the GIZ Fund International Agricultural Research (FIA). As every year, the "Hohenheim Tropics" Hub-Management together with the Research Centre for Global Food Security and Ecosystems (GFE) was presenting activities of the University of Hohenheim and the Hans-Ruthenberg-Institute related to agricultural research and education in the tropics to more than 800 visitors from all over the world.

World Food Day Event

The World Food Day is celebrated worldwide on October 16 to promote action for global food security. It marks the day on which in 1947, the Food and Agriculture Organization (FAO) of the United Nations was founded.

The topic of the World food Day Event 2024, Picture credit: University of Hohenheim.

The University of Hohenheim has a long-term commitment to research and teaching on food and nutrition security in the Global South. Therefore, the University celebrates the World Food Day with a public event, which was organized in 2024 by the Hans-Ruthenberg-Institute (Regina Birner, Kirsten Boysen-Urban, Marcus Giese and Andrea Zipp) with support by the Foundation Fiat Panis and more than 100 visitors came to join the ceremony and program at the Hohenheim Castle.

At the event, internationally renowned speakers addressed the question how sustainable and resilient agricultural and food systems can be promoted. The non-governmental organization Welthungerhilfe presented the "Global Hunger Index 2024," highlighting current trends in the global food security situation. Young voices also shared their perspectives on the future of agricultural and food systems. A special highlight of the 2024 World Food Day Event was the presentation of the Justus von Liebig Award for World Nutrition, bestowed by the Fiat Panis Foundation represented by Dr. Andrea Fadani, to Dr. Agnes Kalibata, President of the renowned African agricultural development organization AGRA. The laudatio was given by Prof. (em.) Joachim von Braun (former Director of the Centre for Development Research ZEF, Bonn).

The award ceremony with Prof. Joachim von Braun and Dr. Andrea Fadani. Justus von Liebig Award for World Nutrition to Dr. Agnes Kalibata, Picture credit: M. Giese

World Water Day

Topic of 2024 World Water Day. Picture credit: UN-Water.

On the occasion of the World Water Day 2024, the Research Training Group „Water-People Agriculture“ supported by the Anton & Petra Ehrmann-Stiftung invited to a Symposium in the Balcony Hall of the Castle in Hohenheim.
Three invited speakers and scholarship holders of the Anton & Petra Ehrmann-Stiftung Research Training Group “Water – People – Agriculture” contributed to this year's colloquium to celebrate the UN World Water Day 2024. The event provided an opportunity for networking and exchange with speakers and fellows on water-related topics.
When water is scarce or polluted, or when people have unequal or no access, tensions can rise between communities and countries. As climate change impacts increase, and the global population grows, we must unite around protecting and conserving our most precious resource.
By working together to balance everyone’s human rights and needs, water can be a stabilizing force and a catalyst for sustainable development. World Water Day is a United Nations (UN) observance coordinated by UN-Water. Every year, it raises awareness of a major water-related issue and inspires action to tackle the water and sanitation crisis.
This year we listened to contributions from

- *Annabelle Houdret*, research associate “Environmental Governance and Transformation towards Sustainability"– German Institute of Development and Sustainability (IDOS), Bonn with the topic. “Local Water Conflicts – Improving Governance to Strengthen Cooperation.”
- *Tobias von Lossow*, research Fellow at Clingendael’s EU and Global Affairs Research Unit and Lecturer at at the Freie Universität Berlin (FU), Netherlands Institute of International Relations (Clingendael), Wassenaar with the topic: “Hotspot Middle East – Water and Conflicts”,
- *Janina Moschner*, Research Center for Interdisciplinary Risk and Innovation Studies, University of Stuttgart, ”Future water conflicts in Germany”.

Our PhD candidates presented their ongoing projects at the “Water – People – Agriculture” Research Training Group. *Vinzent Leyrer*, Institute of Soil Science and Land Evaluation, “Carbon Cycling in a Future Agroecosystem” and *Abbas Syed Saqlain*, Institute of Physics and Meteorology, “Study of the Relationship Between Surface Fluxes and Convective Boundary Layer Dynamics with Lidars”.
The Symposium is annually organized since 2015 by the Research Training Group „Water-People-Agriculture”: Theresa Detering, Marcus Giese and Folkard Asch.

German Brazilian Symposium

Simpósio Brasil-Alemanha
Deutsch-Brasilianisches Symposium
Desenvolvimento **Sustentável**
Nachhaltige Entwicklung

German Brazilian Symposium, Picture credit: Friedhelm Albrecht/University of Tübingen

The 11th edition of the German-Brazilian Symposium for Sustainable Development has the motto "Towards a Resilient and Safe Future". The primary aim of the event, which is held alternately in Brazil and Germany, is to provide a platform for inter- and transdisciplinary exchange. In this edition, the focus is particularly on issues of resilience, value creation, food security and equitable access to water. The 11th Symposium was held in Germany at the University of Tübingen (Baden-Württemberg Center for Brazil and LatinAmerica) from March 20 to 23, 2024. The event is being organized by the Baden-Württemberg Center for Brazil and Latin America, assisted by the University of Hohenheim and the Leuphana University (Lüneburg). The program encompasses plenary lectures, thematic sessions, a poster session, and interactive workshops and open debates. The four main topics of the event were:

A: Resilience and Adaptation for Sustainable Agri-Food Systems,
organized by Marcus Giese, Thomas Hilger, Georg Cadisch (Hans-Ruthenberg-Institute, Hohenheim Tropics) and Birgit Hoinle (Institute of Social Sciences)
B: Strengthening Resilience by Drug Development and Innovative Medical Treatments
C: Green Innovation and Circular Economy for Life and Food
D: Human Resilience and Climate Justice

Water Security Climate Change Conference

Water Security and Climate Change Conference, Giessen 2024, Picture credit: University of Giessen

The Water Security and Climate Change Conference (WSCC) is an annual event supported by the German academic exchange Service (DAAD) where scientists, policy makers, and stakeholders from various sectors discuss the diverse facets of water security and its relationship to climate variability and climate change. This year the conference was hosted by University of Gießen from October 9-11. Maintaining this scientific network resulting from the former DAAD exceed initiatives (Hohenheim was hosting one of the projects, the Food Security Centre), the Hans-Ruthenberg-Institute is in the meantime co-organizing this conference and providing the expertise to agricultural topics. In total three thematic ssessions, keynotes speeches, and workshops are chaired and organized by representatives of the Hans-Ruthenberg-Institue and Hub-Management (Dr. Marcus Giese & Dr. Alejandro Pieters).

The conference strives to go beyond science and build bridges between the state-of-the-art in multiple disciplines and different groups of stakeholders and practitioners. The WSCC aims to provide a platform for discussions on water and food secure societies, by creating a stimulating environment that produces innovative ideas and clear pathways towards their implementation. This successful conference has already taken place in Thailand, Germany, Kenya, Mexico, Vietnam, and Ecuador.

Research seminar „Hohenheim Tropics“ (WS2024)

The interdisciplinary 'Hohenheim Tropics Seminar' with a focus on research in the Global South was successfully launched in the winter semester of 2024. Regina Birner, Kirsten Boysen-Urban, Marcus Giese and Ingo Grass organise the ‘Hohenheim Tropics Seminar’ in order to create a forum for exchange and networking and to promote interdisciplinary research in Hohenheim.

6. Teaching

Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute) (490)

4907-490 Excursion to the Tropics and Subtropics

Rural Development Theory and Policy (490a)

4901-811 Interdisciplinary Aspects of Food Security (Lecture with seminar, WS)
4901-421 Poverty and Development Strategies (Lecture, WS)
4901-471 Quantitative Methods in Economics (Lecture with exercise, WS)
A029 Rural Development Seminar for PhD and M.Sc. students (Seminar, WS/SS)
4901-481 Monitoring and Evaluation of Rural Development Projects (Lecture with exercise/seminar, SS)
4901-431 Rural Development Policies and Institutions (Lecture with seminar, SS)

International Agricultural Trade and Food Security (490b)

4902-441 Basic Microeconomics (Lecture, WS)
4902-443 Exercises to Basic Microeconomics (optional) (Exercise, WS)
4902-431 Food and Nutrition Security (Lecture, WS)
A077 Seminar on Global Trade and Food Security (for M.Sc. and Ph.D. Students) (Seminar, WS, SS)
4902-211 Internationale Wirtschaft, globaler Wandel und Ernährungssicherung (Lecture with seminar, SS)
4902-421 International Food and Agricultural Trade (Lecture with exercise, SS)
A087 Tutorial International Food and Agricultural Trade (Exercise, SS)
A039 Hohenheim Tropics Seminar (Seminar, WS/SS)

Social and Institutional Change in Agricultural Development (490c)

4903-521 Governance of Sustainable Agri-Food Systems (Lecture with exercise, WS)
4903-461 Methods in Interdisciplinary Collaboration (Lecture with exercise, WS)
4903-501 Policy Processes in Agriculture and Natural Resource Management (Lecture, WS)
4903-511 Innovations for Sustainable Agri-Food Systems (Lecture with seminar, SS)
4903-471 Qualitative Research Methods in Rural Development Studies (Lecture with exercise and practical training, SS)
A068 Research Colloquium Institute 430 and 490c (Colloquium, WS, SS)
A068 Research Colloquium Institute 430 and 490c (Colloquium, WS)
Guest lecture: Is plant-based meat good for human and planetary health? (Guest lecture, WS)
Seminar "Storyboard telling" Inst. 490c (Non-Lecture, SS))
Field work preparation PhD students 490c (Non-Lecture, SS)

Land Use Economics (490d)

4904-411 Agricultural Economics Seminar (Lecture with exercise, WS/SS)
4904-431 Land Use Economics (Lecture with exercise, WS)
4904-461 Farm System Modelling (Lecture, WS)
4904-462 Modelling of Land Use Decisions with Mathematical Programming (Exercise, WS)
4904-463 Introduction to Excel Spreadsheet Models (voluntary) (Exercise, WS)
4904-471 Farm System Modelling - Applications (Lecture with exercise, SS)
4904-820 Land Use Economics – Empirical Applications (Seminar with exercise, WS/SS)

Agronomy in the Tropics and Subtropics (490e)

4905-421 Crop Production Systems (Lecture with exercise and seminar, WS)
A039 Hohenheim Tropics Seminar (Seminar, WS/SS)
4905-211 Ökozonen und Kulturpflanzen der Tropen (Lecture, WS)
4905-411 Weltwirtschaftspflanzen und Weidewirtschaft in den Tropen und Subtropen (Lecture with seminar, WS)
4905-471 Biodiversity and Genetic Resources (Lecture with seminar and excursion, SS)
4905-430 Integrated Agricultural Production Systems (Lecture with seminar, SS)
4905-461 Modeling of Agroecosystems (Lecture with exercise and practical training, SS)
4905-471 Biodiversity and Genetic Resources (Lecture with seminar and excursion, SS)
Research Proposal Writing ((Other event (Non-Lecture, WS)
Modellierungskurs ((Other event (Non-Lecture, WS)

Ecology of Tropical Agricultural Systems (490f)

3201-022 Agrarökologie (Lecture, WS)
4906-411 Ecology and Agroecosystems (Lecture with seminar, WS)
4906-211 Landwirtschaft und Naturschutz (Lecture with seminar, WS)
4906-441 Agroecology and Biotic Resource Conservation (Lecture with exercise and seminar, SS)
4906-431 Field Course Agroecology and Biodiversity (Lecture with exercise and seminar, SS)
4907-410 Natural Resource Use and Conservation in the Tropica and Subtropics
A059 Ecology Colloquium (Colloquium, WS/SS)

Management of Crop Water Stress in the Tropics and Subtropics (490g)

A038 Graduiertenseminar Plant Production and Agroecology in the Tropics and Subtropics (Seminar, WS)
3000-821 Methods of Scientific Working (Lecture with seminar, WS)
4907-411 Natural Resource Use and Conservation in the Tropics and Subtropics (Lecture, WS)
4907-211 Reaktionen und Anpassungen von Pflanzen unter Wasserstress (Lecture, WS)
3000-811 Spezialkurs: "Water for life" (PhD) (Lecture, WS)
4907-811 Water - People - Agriculture (Seminar, WS/SS)
4907-421 Ecophysiology of Crops in the Tropics and Subtropics (Lecture with exercise, SS)
4907-431 Crop Production Affecting the Hydrological Cycle (Lecture with exercise, SS)
A038 Graduierten(Seminar) Plant Production and Agroecology in the Tropics and Subtropics (Seminar, SS)
4907-441 Interdisciplinary Practical Science Training (Practical training with exercises, SS)
WorldWaterDay Colloquium 2024 (Other event (Non-Lecture, SS))
Agri-Alumni Net Workshop (Other event (Non-Lecture, WS))
World Food Day Symposium 2024 (Other event (Non-Lecture, SS))

Animal Breeding and Husbandry in the Tropics and Subtropics (490h)

A001 490h (Seminar) for PhD and Master students (Seminar, WS)
A013 Anleitung zum wissenschaftlichen Arbeiten (Anleitung, WS/SS)
4908-441 Livestock Production Systems and Development (Lecture with seminar, WS)
4908-451 Organic Livestock Farming and Products (Lecture with seminar, WS)
A001 490h (Seminar) for PhD and Master students (Seminar, SS)
4908-481 Animal Breeding for Sustainable Development (Lecture with excursion, SS)
4908-421 Promotion of Livestock in Tropical Environments (Lecture with exercise and seminar, SS)
4908-210 Tiererhaltung im Ökologischen Landbau (Ring-Lecture, SS)
4908-220 Tierhaltung in den Tropen (Lecture, SS)
Workshop Gender dynamics in West African I (Working group (Non-Lecture, SS))
Workshop Gender dynamics in West African II (Other event (Non-Lecture, SS))

Agricultural Engineering in the Tropics and Subtropics (440e)

4403-561 Bewässerungstechnik für Nahrungs- und Energiepflanzen (Lecture with exercise, WS)
4403-421 Erneuerbare Energieträger (Lecture with exercise, WS)
4403-441 Irrigation and Drainage Technology (Lecture with exercise and excursion, WS)
4403-521 Nacherntetechnologie (Lecture with exercise, WS)
4403-451 Projektierung von Anlagen zur Nutzung von nachwachsenden Rohstoffen, Neben- und Abfallprodukten (Lecture, WS)
4403-011 Verfahrenstechnik biogener Brenn- und Kraftstoffe (Lecture, WS)
4403-231 Wissenschaftliches Arbeiten, Projektmanagement und Kommunikation (Lecture with exercise, WS)
4403-431 Biomasse als Energieträger (Lecture with exercise, SS)
4403-221 Nachhaltige Ressourcennutzung in den Tropen (Lecture, SS)
4403-551 Post-Harvest Technology of Food and Bio-Based Products (Lecture with exercise and excursion, SS)
4403-471 Renewable Energy for Rural Areas (Lecture, SS)

7. Graduation theses

Rural Development Theory and Policy (490a)

Dissertations

Name: **Richard Alioma** (2024)
Topic: Prices, governance challenges and contracts in scaling of biofortification
Description: Micronutrient deficiency remains a major health issue, especially in developing countries, despite programs like fortification, biofortification, and supplementation. The first paper shows that micronutrient-dense foods have higher prices and greater volatility than staple foods. The second paper highlights governance issues in Uganda, such as information gaps and low consumer willingness to pay premiums. The third paper finds that in Nigeria, contracts improve performance in the value chain despite limited impact from infrastructure or supply factors. Policy recommendations include promoting nutrition-sensitive interventions, subsidizing biofortified crops, and improving conditions for contracts in food value chains.

Bachelor and Master Theses

Name: **Fatma Bircan Bodur** (2024)
Topic: An empirical analysis of couples' time allocation with a focus on its labor market implicatios for Germany (Unpublished master's thesis). (M.Sc.)

Name: **Silvan Vollmer** (2024)
Topic: Time use and life achievement: A quantitative analysis using the Young Lives Cohort Study (M.Sc.)

Name: **Nafisat Abdulsalam** (2024)
Topic: Relationship between women time allocation and household food insecurity in Nigeria (M.Sc.)

Name: **Evren Can Sari** (2024)
Topic: Conflict & household nonfarm enterprises - *A panel study of rural households in Nigeria* (M.Sc.)

Name: **Liudmila Itskova** (2024)
Topic: Towards women's economic empowerment: Policy lessons from a comparative study of Ethiopia and Germany (M.Sc.)

Name: **Matthias Finckh** (2023)
Topic: Livelihood diversity, dietary diversity and resilience - A case study from rural households in the Bolivian Amazon (M.Sc.)

Name: **Isaac Acheampong** (2023)
Topic: Income diversification and agricultural technology adoption in Ethiopia. (M.Sc.)

Name: **A.N. Qasim** (2023)
Topic: Financial and social performance of Microfinance Plus: A quantitative analysis (M.Sc.)

Name: **Isaac Acheampong** (2023)
Topic: Income diversification and agricultural technology adoption in Ethiopia. (M.Sc.)

Name: **A.N. Qasim** (2023)
Topic: Financial and Social Performance of Microfinance Plus: A Quantitative Analysis (M.Sc.)

International Agricultural Trade and Food Security (490b)

Bachelor and Master Theses

Name: **Janina Bäurle (2024)**
Topic: How can we measure food system resilience? A systematic review of literature, conceptual frameworks and prevailingapproaches (M.Sc.)

Name: **Maximilian Tangorra (2023)**
Topic: Auswirkungen des afrikanischen Freihandelsabkommen (AfCFTA) auf die Ernährungssicherheit in Afrika (B.Sc.)

Name: **Louisa Nawrot (2023)**
Topic: Analyse von Urbanisierung und Ernährungssicherheit: Eine Fallstudie zu Südafrika (B.Sc.)

Name: **Leonie Restle (2023)**
Topic: Die deutsche Entwicklungspolitik der letzten 20 Jahre. Eine Analyse der Wirksamkeit (B.Sc.)

Name: **Nidhi Kaveri (2023)**
Topic: Impacts of Ukraine invasion by Russia on food security of vulnerable countries (M.Sc.)

Name: **Mae Tan (2023)**
Topic: The Impact of Rice Trade Liberalization on Food Security in the Philippines (M.Sc.)

Social and Institutional Change in Agricultural Development (490c)

Dissertations

Name: **Christine Veh** (2023)
Topic: Landwirtschaft im Wandel - wie innovativ war die württembergische Landwirtschaft in den Jahren 1818 - 1877? [Agricultural Change: How Innovative was Württemberg's Agriculture in the years of 1818 – 1877]
Description: This dissertation examines agricultural innovations in 19th-century Wuerttemberg. The study focuses on pre-1877 patent systems, highlighting Wuerttemberg's strategic use of high fees and delays to protect local inventors while fostering innovation through imitation of foreign technology. Despite patents playing a limited role in agriculture, Wuerttemberg emerged as a leader in patent activity and innovation, with government policies driving economic growth. The dissertation underscores patents as indicators of the region's economic and inventive capabilities.

Name: **Fatema Sarker** (2023)
Topic: Livestock, gender, food security and nutrition: A case study from Bangladesh
Description: This dissertation focuses on the links between livestock, gender, and food security, taking Bangladesh as an example. The study comprises of three papers. The first concerns the effects of livestock interventions in the Global South on women's empowerment and food security for different household members, including children. The second paper examines the linkages between livestock interventions, women's empowerment, and food security. The third paper assesses whether women's empowerment affects the intrahousehold allocation of nutritious food in livestock farming communities in Bangladesh.

Name: **Godfrey Omulo** (2023)
Topic: Utilizing sustainable agricultural mechanization to unlock the potential of conservation agriculture in Zambia
Description: This thesis deals the role that agricultural mechanization can play in promoting conservation agriculture, using Zambia as an example. The thesis consists of three papers that focus on the following topics: (1) an analysis of the perceptions of 'emergent farmers' towards mechanized conservation agriculture in Zambia; (2) a discourse analysis of conservation agriculture narratives in Zambia; and (3) a comparison of mechanized conservation agriculture and conventional tillage in Zambia, which covers both economic and agronomic aspects.

Bachelor and Master Theses

Name: **Anne Drescher** (2023)
Topic: Trees or no trees? Exploring the relationship between production systems and food security in Bolivia (B.Sc.)

Name: **Esther Amankwah** (2023)
Topic: Exploring the knowledge, perceptions, and responses of smallholder farmers to the Living Income Differential in Ghana's Cocoa Sector (M.Sc.)

Name: **Hamzah Imram** (2023)
Topic: Use of digital tools for plant protection: Insights from Pakistan (M.Sc.)

Name: **Garima Joshi** (2023)
Topic: Identifying financing opportunities for the adoption of climate-smart agriculture in India (M.Sc.)

Name: **Innocent Maphango** and **Abdi Girma Debel** (2023) (combined M.Sc. thesis)
Topic: Mechanization of forage production: A comparative study of Kenya and Zambia (M.Sc.)

Name: **Melissa Cristina Morcote Martinez** (2023)
Topic: Water management practices and adaptation to climate change – microclimatic data and cocoa farmers perceptions in Alto Beni, Bolivia (M.Sc.)

Name: **Olabis Agboola** (2023)
Topic: Economics of mechanized chemical crop protection – A case study in Kenya (M.Sc.)

Name: **Paul Effah** (2023)
Topic: Agrobiodiversity, risks, and resilience: Insights from Ghana and Burkina Faso (M.Sc.)

Name: **Kathleen Heinzel** (2023)
Topic: (M.Sc.)

Name: **Kushala Elgiriya Witharanage** (2023)
Topic: An intersectional analysis of caste and gender in organic cotton in Madhya Pradesh, India (M.Sc.)

Name: **Manuel Diaz Baca** (2024)
Topic: Unraveling the governance challenges in the provision of extension services for agricultural carbon projects: Evidence from Western Kenya (M.Sc.)

Name: **Michael Ademilola** (2024)
Topic: Crop and genetic diversity – A comparative case study of Ghana and Burkina Faso (M.Sc.)

Name: **Nadia Ntaconayigize** (2024)
Topic: How to make farmer-led seed banks a success? Lessons learned from African case studies (M.Sc.)

Name: **Benadette Ayebare** (2024)
Topic: Advancing cattle genetics: A comparative exploration of innovation systems in Kenya and Uganda (M.Sc.)

Name: **Nane Hummel** (2024)
Topic: Enabling and hindering factors in enhancing market access: A study of a Participatory Guarantee System (PGS) in Indonesia (M.Sc.)

Name: **Laura Melosu** (2024)
Topic: Beyond the surface: unraveling watershed governance challenges in Laguna Verde, El Salvador (M.Sc.)

Name: **Radip Tandukar** (2024)
Topic: How are farmers getting information digitally? Understanding mobile-based plant protection apps ecosystem in Nepal (M.Sc.)

Name: **Steffen Kümmerer** (2024)
Topic: Akzeptanz digitaler Technologien in der Landwirtschaft - Vergleich zweier Technologien (M.Sc.) [Acceptance of digital technologies in agriculture: a comparison between two technologies]

Name: **Alvaro Andres Irazoque Soria Galvarro** (2024)
Topic: Potentials of carbon projects in agroforestry systems: a comparative analysis (M.Sc.)

Name: **Peter Reutter** (2024)
Topic: Participatory Guarantee Systems and market access for organic products: A mixed-method case study in Lusaka Province, Zambia (M.Sc.)

Land Use Economics (490d)

Dissertations

Name: **Alemu Tolemariam Ejeta** (2023)
Topic: Extreme Climate Shock and Locust Infestation Impacts in Ethiopia: Farm-level Agent-based Simulation of Adaptation and Policy Options
Description: Extreme climate shocks, such as droughts and locust invasions, have posed significant challenges for smallholder farmers in Ethiopia over the past decade. These compounding issues threaten crop yields and increase economic instability for resource-poor households. To cope, farmers are employing various risk management strategies, supported by government initiatives aimed at climate adaptation and locust relief. This thesis utilizes the MPMAS agent-based simulation model to evaluate the effects of climate shocks and relief policies on farmers in the Central Rift Valley. The model integrates real-world data to analyze decision-making dynamics and assess the impacts of different climate and locust scenarios.

Name: **Lutz-Heiner Otto** (2023)
Topic: A financial analysis of tree windbreaks as climate smart management strategies for farms in South Africa
Description: Over the past 60 years, South Africa has experienced a significant rise in average temperatures, more than 1.5°C above pre-industrial levels, particularly in its western regions, leading to increased droughts and stronger winds. This climate change necessitates agricultural adaptations, with windbreaks identified as crucial in preserving ecosystem services, including crop protection and carbon sequestration. However, the economic viability of tree-based windbreaks remains unclear, with no prior studies on their profitability in South African fruit and wine farming. This thesis conducts a financial comparison of windbreak systems in vineyards and orchards, utilizing a stochastic investment simulation model

Bachelor and Master Theses

Name: **Josephine Platz** (2024)
Topic: Strukturwandel in der Landwirtschaft: Herausforderungen im Zusammenhang mit Klimawandel und Digitalisierung (B.Sc.)

Name: **Adam Pirzer** (2023)
Topic: Towards a 50% cut in Germany's agricultural pesticide use – a case study analysing the financial impacts using mathematical programming (M.Sc.)

Name: **Jonas Hoyer** (2023)
Topic: Mineral fertilizer tax or nitrogen surplus tax? A farm level policy analysis using mathematical programming (M.Sc.)

Name: **Oualid Oukettou** (2023)

Topic: Optimal adaptation to drought risk for sugar beet farmers in Germany (M.Sc.)

Name: **Ngoc Son Nguyen** (2023)
Topic: Estimating willingness to pay for a small-scaled community-based irrigation service of coffee farmers in vietnam using a secondary panel dataset (M.Sc.)

Name: **Jacinta Agu Amarachi** (2023)
Topic: What digital technologies can be employed by smallholder farmers in Nigeria for increased income and farm production? (M.Sc.)

Agronomy in the Tropics and Subtropics (490e)

Dissertations

Name: **Yaqin Guo** (2023)
Topic: Ecological and molecular characteristics of arbuscular mycorrhizal fungi (AMF) on mercury phytoremediation
Description: Environmental pollution caused by harmful chemicals represents a major challenge worldwide. Among these, heavy metals (HM) in soils are of particular concern due to their persistence, toxicity, and bioaccumulation which can significantly threaten human health, plant growth, and ecosystem integrity. Phytoremediation, which uses plants to extract pollutants from soils, has been recognized as a promising approach to remediate HM-contaminated soils. Arbuscular mycorrhizal fungi (AMF)-assisted phytoremediation has shown great potential to enhance plant growth and metal uptake by forming a mutual association between plant roots and AMF, which can improve nutrient uptake and …

Bachelor and Master Theses

Name: **Harika Reddy Kolli** (2023)
Topic: Factors affecting the impact of legume–based intercropping systems (M.Sc.)

Name: **Nick Lutz** (2024)
Topic: Assessing the soil carbon sequestration potential of *Piliostigma reticulatum* at varying planting

Name: **Sina Paula Lory** (2023)
Topic: Topsoil labile and stable carbon and nitrogen fractions as affected by organic and conventional cocoa production systems in Bolivia (M.Sc)

Ecology of Tropical Agricultural Systems (490f)

Dissertations

Name: **Felix Klaus** (2023)

Topic: Local and landscape threats to bee and wasp populations in agricultural landscapes

Description: Habitat loss, insecticides, neonicotinoids, calcareous grasslands, oilseed rape

Bachelor and Master Theses

Name: **Henrike Hartmann** (2024)
Topic: Impacts of agricultural development pathways on arthropod diversity on smallholder farms: A case study from Zambia (M.Sc.)

Name: **Katharina Heinrich** (2024)
Topic: Comparing bird identification from automated audio recordings: Is artificial intelligence an alternative to expert knowledge? (M.Sc.)

Name: **Eduardo Rodgríguez** (2024)
Topic: Assessing the impact of rainforest habitat fragmentation on bird populations in Costa Rica using automated acoustic monitoring (M.Sc.)

Name: **Niclas Magnussen** (2024)

Topic: Bedeutung der Landschaftsdiversität für die Populationsentwicklung von Singvögeln (B.Sc.)

Name: **Juliana Herran Garcia** (2024)
Topic: Influence of agricultural habitat transformation on bat biodiversity and activity in South Africa through acoustic monitoring (M.Sc.)

Name: **David Becker** (2024)
Topic: Effects of rainforest fragmentation on the resilience of trophic interaction networks between frugivorous birds and fruit-bearing trees (M.Sc.)

Name: **Moritz Landgraf** (2024)
Topic: Assessing and comparing the wild bee and butterfly diversity of regional crops (B.Sc.)

Name: **Klara Dietrich** (2024)
Topic: Management system to solve the trade-off between agricultural yields and biodiversity: an assessment in the mediterranean olive orchards (M.Sc.)

Name: **Haruto Honda** (2024)
Topic: The possibility of automated acoustic monitoring for avian species: A case from Indonesia (M.Sc.)

Name: **Valentin Bernhardt** (2024)
Topic: Einfluss des Wolfs auf Land- und Forstwirtschaft in Deutschland (B.Sc.)

Name: **Angelina Stockinger** (2024)
Topic: Effects of ecosystem restoration in Indonesian oil palm plantations on birds, bats and arthropods (M.Sc.)

Name: **Laura Störzer** (2024)
Topic: Biodiversity enrichment in Indonesian oil palm plantations is possible without compromising yields (M.Sc.)

Name: **María García Bianco** (2023)
Topic: Composition and diversity of bird communities in a South African farmland landscape (M.Sc.)

Name: **Marielena Margraf** (2023)
Topic: Evaluating the potential for airport bird strike risk from urban regeneration using nature-based solutions: a case study in London's Royal Docks (M.Sc.)

Name: **Carlos Gonzalez** (2023)
Topic: Effects of landscape composition on insect diversity across habitats (M.Sc.)

Name: **Rosalie Böhmer** (2023)
Topic: Influence of landscape structure on biodiversity - how do local and landscape characteristics determine bird species diversity? (M.Sc.)

Name: **Mark Chukwunwike Anwuluorah** (2023)
Topic: Fall armyworm in Nigeria: ecological and socio-economic dimensions (M.Sc.)

Name: **Bentje Boßert** (2023)
Topic: Blütenbesucher und Bestäuber von *Orchis militaris* (B.Sc.)

Name: **Katrin Beißert** (2023)
Topic: Körpergröße und Diversität von Laufkäfern in mineraldüngeroptimierten-pflanzenschutzfreien, konventionellen und ökologischen Anbausystemen (B.Sc.)

Name: **Katrin Uhlig** (2023)
Topic: Can Africa revive oil palm production? Ecological, economic and social dimensions: a systematic review (M.Sc.)

Name: **Marit Kasten** (2023)
Topic: Ecological and economic performance of conventional, organic and mineral-ecological cropping systems (M.Sc.)

Management of Crop Water Stress in the Tropics and Subtropics (490g)

Dissertations

Name: **Julia Hölle** (2023)
Topic: Screening tools for late drought resistance in tropical potato
Description: Potato (Solanum tuberosum L.) is a drought sensitive crop, and even short drought spells or infrequent irrigation during stolon formation, tuber initiation, or tuber bulking reduces tuber yields. A number of morphological traits have been described that potentially improve genotypic performance of potato under moisture deficit conditions. In breeding processes, a large set of genotypes are tested at the same time and because the genotypes differ in their phenology, various phenological stages occur simultaneously in the field. Consequently, during a drought spell different varieties will be subjected to soil moisture deficit at different phenological stages. We tested thirteen contrasting genotypes under field conditions …

Name: **Shimul Mondal** (2023)
Topic: Physiological mechanisms and growth responses of sweet potato subjected to salinity
Description: For the development of salt-tolerant sweet potato varieties, either through breeding or biotechnology, an appropriate salinity screening tool is necessary for the identification of tolerant or sensitive genotype. Our overall objectives for this study were to develop a suitable, reliable and rapid salinity screening tool in view of salt tolerance mechanism in sweet potato under salinity. To better understand the tolerance mechanisms; leaf level ion uptake and distribution patterns by transpirational water loss and leaf level ROS scavenging antioxidant enzyme activities were evaluated under salinity. Additionally, different ion extraction methods were tested which will contribute to the development of reliable salinity screening tool …

Name: **Thi Bach Thuong Vo** (2023)
Topic: Greenhouse gas emissions from rice production in the Vietnamese Mekong River Delta as affected by varietal selection and water management
Description: The topic of this dissertation deals with rice production, the predominant source of daily nourishment for more than half of the worlds population. Rice production is directly affected by global climate change through aggravating climatic conditions, but is also one of the major sources of greenhouse gases (GHG) in the agricultural sector. The latter aspect is investigated in 4 publications by assessing the factors contributing to emissions, the quantification of GHG emissions across different scales, and possible mitigation of GHG emissions. In totality, these studies aim at bridging the gap between field measurements to national extrapolations in view of both GHG inventories and future mitigation programs…

Name: **Tanja Weinand** (2023)
Topic: Genotype specific responses to Bacillus spp. inoculation in lowland rice (Oryza sativa L.) under iron toxicity
Description: Amidst a growing global population, limited arable land, and higher pressure from both abiotic and biotic stressors in a shifting climate, there is a need for enhancing yields through sustainable agricultural practices, and new, more tolerant cultivars. In recent decades, employing microbial inoculants as biofertilizers and biopesticides has gained growing popularity. Yield reductions ranging from 16-78%, and sometimes complete crop failure, can occur in in lowland rice cultivation systems where high iron concentrations in the soil solution lead to excess iron uptake by the plants. Twenty to 60% of the rice growing area of sub-Saharan Africa is affected by iron toxicity. Development of iron-tolerant cultivars has …

Name: **Van Hong Nguyen** (2023)

Topic: Evaluation of geo-physics methods to study the effects of land use on salinity in rice production systems in the Vietnam Mekong Delta
Description: In the Vietnam Mekong Delta (VMD), salinity is a major concern for rice production, which is highly susceptible to saltwater intrusion due to its proximity to the sea and tidal influences. Climate change induced sea level rise, reduced upstream freshwater flows and land subsidence are exacerbating the problem. As a result, saltwater intrudes into the rivers, canals and aquifers of the VMD, reducing the availability of freshwater for irrigation and agricultural use. As the worlds largest rice exporter, the impacts of salinity on rice production in the VMD is significant and poses a serious threat to food security. Addressing the impact of salinity on rice production in the VMD requires a comprehensive approach to …

Name: **Kristian Philip Johnson** (2023)
Topic: Effects of salinity and alternate wetting and drying irrigation on genotypic performance of lowland rice in the Vietnamese Mekong Delta
Description: -

Name: **Markus Immanuel Frank** (2023)
Topic: Co-development of transition pathways towards agroecological farming and food systems
Description: -

Bachelor and Master Theses

Name: **Marc Münst** (2024)
Topic: Einfluss von Lichtqualität und Infrarotstrahlung auf die Nährstoffaufnahmeraten von hydroponisch wachsenden Tomaten (B.Sc.)

Name: **Felix Köhler** (2024)
Topic: Evaluating the influence of nutrient solution temperature on nutrient uptake, utilization, and biomass production of hydroponically-grown tomatoes (B.Sc.)

Name: **Ilaria Parente** (2024)
Topic: Genotype x Environment effects on pigment related traits for adaptation to stressed conditions in bread wheat (M.Sc.)

Name: **Magnus Kempfle** (2023)
Topic: Auswirkung saliner Bedingungen auf die Morphologie zweier Süßkartoffelgenotypen bei abgestufter Kaliumdüngung (B.Sc.)

Name: **Gabriel Ahlenstorf** (2023)
Topic: Einfluss von Luftfeuchtigkeit und Salzstress auf die Nährstoffaufnahmeraten von hydroponisch wachsender Quinoa (B.Sc.)

Name: **Helene Schwertheim** (2023)
Topic: Auswirkungen von VPD auf die Pigmentzusammensetzung, Biomasse, Transpirationsrate und fotosynthetische Aktivität bei suptropischen Weizengenotypen (B.Sc.)

Name: **Ann Sophie Bernhard** (2023)
Topic: Effekte der Lichtqualität auf die Wachstumsphysiologie von zwei Tomatensorten (B.Sc.)

Name: **Alexander Meierhöfer** (2023)
Topic: Effects of dynamic salinity on morphology, sodium and potassium uptake and distribution in two contrasting sweet potato cultivars (B.Sc.)

Name: **Noah Fleidl** (2023)
Topic: Effects of dynamic salinity on morphology, sodium and potassium uptake and distribution in two contrasting sweet potato cultivars (B.Sc.)

Name: **Tom Siegel** (2023)

Topic: Einfluss bodenbürtiger Dürre auf die Pigmentzusammensetzung und Lichtadaptation von Weizenblättern (B.Sc.)

Name: **Theresa Schilberth** (2023)
Topic: Effects of dynamic salinity on morphology, sodium and potassium uptake, and distribution of four contrasting sweet potato varieties under field conditions (M.Sc.)

Name: **Eugenio Giacopelli** (2023)
Topic: Effects of dynamic salinity on morphology, sodium and potassium uptake, and distribution of four contrasting sweet potato varieties under field conditions (M.Sc.)

Name: **Sebastian Heintze** (2023)
Topic: Evaluation of a low-tech approach to mobilize nutrients from organic residues for the production of a hydroponic nutrient solution (M.Sc.)

Name: **Graham Giesting** (2023)
Topic: Effects of microbial inoculants on growth and salinity tolerance of hydroponically-grown tomatoes (M.Sc.)

Name: **Srujana Yadati** (2023)
Topic: Optimization of far red light in a small scale vertical farming system for Basil and Lettuce (M.Sc.)

Name: **Daniel Welter** (2023)
Topic: Analyses of genotypic differences in content and composition of photo-protective pigments in wheat (M.Sc.)

Name: **Christian Büser** (2023)
Topic: Effects of drought, light intensity and leaf age on photosynthetic efficiency and pigment composition in sub-tropical bread wheat (M.Sc.)

Name: **Ravindra Reddy** (2023)
Topic: Effects of repeated dry-down treatments on the morphology and photosynthate partitioning of lowland rice (M.Sc.)

Animal Breeding and Husbandry in the Tropics and Subtropics (490h)

Bachelor and Master Theses

Name: **Vera Angele** (2023)
Topic: Zweinutzungshühner für den Ökolandbau: sensorische Vergleichsanalyse des Brustfleisches vom Südheimer Huhn mit ökologischem Broiler (B.Sc.)

Name: **Maximilian Krebs** (2023)
Topic: Untersuchungen zur Beurteilung der äußerlichen Merkmale des Sundheimer Huhn (B.Sc.)

Name: **Leonie Wankum** (2024)
Topic: Bedarfsgerechte Fütterung von extensiven Hühnerrassen – Untersuchungen zu alternativen Fütterungsmöglichkeiten (B.Sc.)

Name: **Natascha Zimmermann** (2023)
Topic: Mast- und Schlachtleistung sowie Parameter der Fleischqualität bei Merinolandschaftlämmer aus intensiver Stall- bzw. Weidemast (M.Sc.)

Name: **Immaculata Okeke** (2023)
Topic: Are animal breeding and digital technologies shifting gender norms and dynamics? The case of Tanzanian small-scale dairy farming household (M.Sc.)

Name: **Marnie Schmidt** (2023)

Topic: Life cycle assessment of a local and animal -friendly beet fattening system in Baden-Württemberg, Germany (M.Sc.)

Name: **Ekelemchi Umeha** (2024)
Topic: Impact of Agroecological Transition on Household Livelihoods in Crop-Livestock Systems in Southeast Asia: A Systematic Literature Review (M.Sc.)

Agricultural Engineering in the Tropics and Subtropics (440e)

Dissertations

Name: **Adnan Mukhtar** (2023)
Topic: Effect of convective air drying on the enzymatic activity of dried mango
Description: Mango (Mangifera indica L.) is a widely consumed tropical fruit known for its taste, aroma, color, and nutritional value. However, its high perishability limits shelf life, making it prone to rapid decay. Hot air convective drying is commonly used for preservation. While many studies have examined drying parameters on quality attributes, less is known about their impact on enzyme activity retention. This study investigates how temperature and air velocity affect enzyme activity retention in dried mango slices. Additionally, it explores catalase activity as a potential heat stress indicator for mango slices processed at different temperatures.

Name: **Sebastian Reyer** (2023)
Topic: Design, development and validation of laboratory test rigs for performing high-precision drying experiments
Description: A high-precision laboratory dryer (HPD TF1) was developed to achieve controlled climatic conditions during the drying of light bulk materials, producing drying curves with defined temperature, relative humidity, and air velocity. Laboratory dryers often compromise accuracy for the quantity of dried material. The HPD TF3+ overcomes this by incorporating three high precision drying columns (600 g each) and a flatbed dryer for up to 20 kg of fresh material. It ensures uniform airflow and measures airflow resistance, which is crucial for drying medicinal and aromatic plants, accounting for resistance changes due to shrinkage and self-compaction

Name: **Haimanot Hailegiorgis Ayele** (2023)
Topic: Cassava (Manihot esculenta Crantz) leaf processing for food and feed
Description: This dissertation explores cassava leaves as a protein source through various processing methods. Analysis of fractions from mechanical pressing and ultrafiltration shows the leaves, juice, and centrifugation sediment are suitable for food and feed, with the press cake ideal for ruminants due to its fiber content and low phenolic levels. A mild processing method was developed to remove cyanogenic compounds while preserving nutrients. The study also examines the effects of blanching and drying on four Ethiopian cassava varieties, emphasizing their nutritional potential in cereal-based diets.

Name: **Gregor Sailer** (2024)
Topic: Strategies to optimize the energetic and material utilization of the organic fraction of municipal solid waste by considering the entire value chain
Description: This dissertation focuses on optimizing the treatment of organic fraction of municipal solid waste (OFMSW) for bioeconomy applications. It examines the physico-chemical properties of OFMSW, the impact of storage conditions, and the energy potential of co-digestion with sewage sludge and wood ashes. The study suggests improvements to anaerobic digestion (AD) and composting processes, aiming for better waste volumes, energy yields, and product quality. It also explores future treatment concepts combining biochemical, thermochemical, and biotechnological approaches to fully utilize OFMSW's potential. The research is relevant for both practice and future studies.

Name: **Catalina Acuña-Gutiérrez** (2024)
Topic: Optical detection of microbial infestation and mycotoxins in beans (Phaseolus vulgaris L.)

Description: The common bean (Phaseolus vulgaris L.) is a nutritious pulse rich in protein and fiber. Despite its growing commercial importance, research on microbiological spoilage and mycotoxin buildup in beans is limited compared to cereals. Mycotoxins, produced by certain fungi, can pose health risks and are regulated in many countries. Traditional detection methods are time-consuming and require skilled personnel. This study explores optical detection methods to measure microbial infestation and mycotoxin contamination in common beans, focusing on Fusarium verticillioides and its mycotoxin fumonisin B1 in black beans.

Name: **Timur Nurgaliev** (2024)
Topic: Economic viability and risk of agricultural biogas production in Russia
Description: Biogas production generates electricity, heat, and biofertilizers, offering a green alternative to fossil fuels. However, it remains underdeveloped in Russia despite renewable energy legislation. This dissertation explores ways to stimulate biogas interest, including estimating biogas potential in agriculture, evaluating project profitability on Russian farms, and conducting risk analysis to attract investors. The study uses modeling techniques such as biogas potential estimation, project evaluation, and sensitivity analysis to assess biogas production and risks in Russian farms and municipalities.

Name: **Dinkler Konstantin** (2023)
Topic: Phosphate turnover during anaerobic digestion of chicken, pig and dairy manure
Description: Phosphate (P) is essential in agriculture, creating reliance on imports, but stricter EU regulations on fertilization highlight the need for nutrient recovery. Current methods focus on post-digestion treatments, neglecting phosphate behavior during anaerobic digestion (AD). This study evaluates P turnover in batch and continuous AD systems using pig, dairy, and chicken manure. Results show that AD mineralizes P, especially in the early stages. Organic loading rate (OLR) negatively impacts H2O-P, while temperature slightly influences P mineralization. The findings stress the importance of integrating AD with post-digestion treatments to optimize phosphate recovery and enhance biogas plant profitability.

Name: **Prinya Wongsa** (2024)
Topic: Effect of convective drying and storage on bioactive compounds of sliced garlic
Description: Garlic is of high quality for drying, with excellent solids, color, bioactive compounds, and antioxidant capacity. Dried garlic is used in meat products, soups, sauces, and supplements. It can be dried using methods such as air-drying, vacuum-drying, infrared hot-air drying, and freeze-drying, ensuring products meet quality and microbiological standards. However, research on the loss of health benefits, particularly bioactive compounds like allicin and phenolics, due to poor storage or drying conditions is limited. Proper hot-air drying and storage in developing countries can reduce post-harvest losses and preserve garlic's health benefits.

Name: **Zhangkai Wu** (2024)
Topic: Laser backscattering imaging in agriculture
Description: Laser backscattering imaging (LBI), a non-destructive optical sensor technology, is vital in agriculture for analyzing material properties, such as maturity and drying. This study refines LBI's theoretical framework and explores its applications. LBI was used to assess the effects of pore size, solutes, and concentrations in porous glass matrices, monitor sedimentation stages in crude sesame oil, and develop a semi-automatic system for measuring leaf wetness, achieving an R-squared value of 0.78. These findings highlight LBI's potential for improving agricultural monitoring and plant health management.

Bachelor and Master Theses

Name: **Aishwarya Rajedra Chettiar** (2023)
Topic: Techno-economic evaluation of a solar biomass hybrid flatbed dryer for maize cob drying in Rwanda (M.Sc.)

Name: **Cronos Craiss** (2023)

Topic: Performance evaluation of a modular dryer for medicinal and aromatic plants under practical conditions in Germany
(M.Sc.)

Name: **Bo Fang** (2023)
Topic: Utilizing photogrammetry for phenotypical analysis of maize under different phosphorus supplies (M.Sc.)

Name: **Constantin Pack** (2023)
Topic: Evaluation of the functionality of a solar powered hammer mill for maize flour production in Kenia
(M.Sc.)

Name: **Natalie Peters** (2023)
Topic: Application of solar tunnel dryer as a technology solution on agritourism-based cooperatives in central Vietnam
(M.Sc.)

Name: **Deborah Kaufmann** (2023)
Topic: Modellbasierte Entwicklung und Online-Monitoring einer solarbetriebenen Eismaschine (M.Sc.)

Name: **Tosin Bolanle** (2023)
Topic: Assessment of solar photovoltaic system for a rice processing unit in Senegal
(M.Sc.)

Name: **Anne Schönleber** (2024)
Topic: From waste to taste: Recycling of the coffee byproduct "fresh pulp"
(M.Sc.)

Name: **Kerstin Stadelmeyer** (2024)
Topic: Development and quality evaluation of pastries enriched with coffee flour produced from Costa Rican coffee cherries

Name: **Johanan Daniel** (2024)
Topic: Performance analysis of flatbed and belt dryers for chamomile drying in Croatia and identification of future improvement strategies (M.Sc.)

8. Contact

Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute) (490)

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Rural Development Theory and Policy (490a)

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International Agricultural Trade and Food Security (490b)

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Social and Institutional Change in Agricultural Development (490c)

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Land Use Economics (490d)

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Plant Production in the Tropics and Subtropics (490e)

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Ecology of Tropical Agricultural Systems (490f)

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Management of Crop Water Stress in the Tropics and Subtropics (490g)

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Animal Breeding and Husbandry in the Tropics and Subtropics (490h)

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Agricultural Engineering in the Tropics and Subtropics (440e)

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Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute) (490) – Hub – Management

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