

ZEF ANNUAL REPORT 2021 A SYNOPSIS



zef
Center for
Development Research
University of Bonn



CONTENTS

Facts & Figures about ZEF	4
ZEF's Directorate and ZEF's International Advisory Board	5
1 RESEARCH	
1.1 Agriculture, Land use, Climate change	6
1.2 Water resources (management)	7
1.3 Markets and Services	8
1.4 Health	9
1.5 Gender	11
1.6 Innovation and Science policy (dialogue)	13
2 CAPACITY DEVELOPMENT	
2.1 Bonn International Graduate School for Development Research (BIGS-DR)	18
2.2 Doctoral degrees 2021	19
2.3 Our students: World map	20
2.4 Further Capacity Development programs run by ZEF	22
3 BUDGET 2020-2021: ZEF'S FUNDING PARTNERS	24
4 HIGHLIGHTS OUTREACH	26
5 ZEF PUBLICATIONS	27

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FACTS & FIGURES ABOUT ZEF

ZEF is part of **Bonn University** and works together closely with its Faculties and Transdisciplinary Research Areas (TRAs), i.e. **TRA 6** (Innovation and Technology for Sustainable Futures).

More than **50 senior** researchers are working with ZEF, running more than 30 research and development capacity development projects in more than **35 countries** in Africa, Asia and Latin America. In addition, more than **120 junior researchers** are pursuing their doctoral research in ZEF'S Bonn International Graduate School for Development Research.

Between January 2020 - December 2021, ZEF's researchers have published **227 peer-reviewed articles, 21 ZEF discussion papers, 21 ZEF working papers** (the two latter categories without project-related series), **11 books, 22 book chapters, and 16 policy briefs** (ZEF and PARI). In addition, **32 doctoral theses** were published in 2020-2021.

ZEF's research agenda is built on its strategy "Serving in new local and global contexts" (2021-2030) and focuses on **10 interdisciplinary**, interconnected research themes:

1) Agriculture, Land use, Climate change; 2) Water resources (management); 3) Biodiversity; 4) Food and Nutrition; 5) Health; 6) Gender; 7) Migration, Mobility, Urbanization; 8) Governance and conflict; 9) Markets and services and 10) Innovation and science policy.

ZEF has an **International Advisory Board**. Its members are experts from academia, policy, business and development practice from Africa, Europe, Asia and the Americas.



In the picture left: ZEF and Right Livelihood colleagues Till Stellmacher and Arthur Guischet at a workshop held in Nairobi, Kenya, in October 2021, in collaboration with Right Livelihood partner Biovision Africa Trust. The workshop was funded by Volkswagen Foundation.

ZEF'S DIRECTORATE



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MANAGEMENT (ZEF C)**



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Conservationist from Tanzania - National Geography Explorer and Professional in Wildlife photography and filming

Dr. Michael Rabbow

Senior Advisor - E&P Focus Africa Consulting GmbH, Hamburg, Germany

Maryam Rahmanian

Independent expert on food systems, with a focus on innovation, biodiversity and agroecology

Vera Stercken

Federal Ministry of Education and Research (BMBF), Ref. 723 Global Change; climate research, Germany

Professor Frances Stewart

Centre for Research on Inequality, Human Security and Ethnicity (CRISE) University of Oxford, United Kingdom

Professor Finn Tarp

Professor of Development Economics, Department of Economics, University of Copenhagen, Denmark

Professor Carolina Vera

Director of Centre de Inv. Del Mar y la Atmosfera (CIMA), Ciudad Universitaria, Buenos Aires, Argentina

1.1 AGRICULTURE, LAND USE, CLIMATE CHANGE

1.2 WATER RESOURCES (MANAGEMENT)

LAND USE SYNERGIES AND CONFLICTS WITHIN THE FRAMEWORK OF THE 2030 AGENDA

"We combine case studies on different SDG interactions with research on decision-making and science-policy interactions. By doing so we hope to support coherent land use decision making in the future".
[Lisa Biber-Freudenberger]

Members of the [LANUSYNCON](#) project look into interlinkages between SDGs in the land use context and how decision-making can utilize synergies and avoid conflicts. A case study on organic (certified and non-certified) and non-organic smallholder farms was conducted in Kenya (read publication by [Juliet Wanjuki Kamau](#) et al.: <https://bit.ly/3uROuuy>). In addition, a group of female LANUSYNCON researchers have studied the relation between gender and land-use science and submitted two papers that were recently approved for a special issue

entitled "[Women in Land Science](#)" in the [Journal of Land-Use Science](#), stressing the critical needs of female researchers in the field of land-use science.

Project lead and contact: [Lisa Biber-Freudenberger](#). **Project funded** by The German Federal Ministry of Education and Research ([BMBF](#)). More on **project website** <https://www.zef.de/lanusyncon.html>

LAND, CLIMATE, ENERGY, AGRICULTURE AND DEVELOPMENT IN THE SAHEL AND ECONOMICS OF THE SAHEL GREAT GREEN WALL

In-depth national studies on land, climate, energy, agriculture and development were conducted in the 11 Sahel countries in 2020-2021 by ZEF and national research institutes and universities in the Sahel region, and the [Agrhymet Regional Centre of the Permanent Interstate Committee for Drought Control in the Sahel \(CILSS\)](#) in Niger.

The national case studies and the regional synthesis paper provided up-to-date knowledge and critical insights on the nexus of land degradation, climate change and energy in the Sahel. They also identified policy entry points and investment opportunities that will help advance economic growth, food security, and job creation in the region. The major findings show that socio-economic solutions such as improving access to markets, strengthening social safety nets, increasing investments in transport

and energy infrastructures, promoting land tenure security, and expanding off-farm employment opportunities can significantly contribute to sustainable rural development in the Sahel, particularly by aiding climate change resilience and sustainable land management.

The synthesis paper <https://bit.ly/ZE-FWP204> and the country case studies from the Sahel region were supported by the German Federal Ministry for Development Cooperation ([BMZ](#)) under the Program of Accompanying Research for Agricultural Innovation ([PARI](#)).

Also on the topic: Kirui, O.K., Mirzabaev, A. & von Braun, J. Assessment of land degradation 'on the ground' and from 'above'. *SN Appl. Sci.* 3, 318 (2021). <https://doi.org/10.1007/s42452-021-04314-z>

Research lead: Alisher Mirzabaev

Another study by ZEF and the [United Nations Food and Agriculture Organization \(FAO\)](#) published in [Nature Sustainability](#) <https://go.nature.com/3dTQ1sp> in November 2021 by Alisher Mirzabaev et al. looked into the "[Economic efficiency and targeting of the African Great Green Wall](#)". The study, funded by the [European Union](#), showed that this ambitious program, initiated 15 years ago by the African Union with the goal to restore degraded ecosystems in parts of the Sahel in order to secure food for the people living there and to protect the soil against further degradation, also makes economic sense. But the study shows that this does not apply to all regions in the Sahel.

Research lead: [Alisher Mirzabaev](#). Press release by Bonn University: <https://www.uni-bonn.de/en/news/284-2021> and on ZEF website: <https://bit.ly/greenwall3G-KOscf>. More publications by [Mirzabaev](#): <https://bit.ly/mirzabaev>

WATER AND ENERGY SECURITY FOR AFRICA



water management considering the impacts of climate change. WESA's aim is to contribute to establishing PAUWES as a hub for a pan-African research.

Project coordinators [Bernhard Tischbein](#) and [Navneet Kumar](#). **Project funded** by German Federal Ministry of Education and Research ([BMBF](#)). More on **project website:** <https://www.zef.de/project/wesa>



ZEF is involved in and running research and capacity development collaboration projects in and with Niger and Algeria (PAUWES). Photos by Sarah Verleysdonk and Bernhard Tischbein.

Water and Energy Security for Africa ([WESA](#)) is a collaborative project with the Pan African University - Institute of Water and Energy Sciences, including climate change ([PAUWES](#)), and the [Abou Bakr Belkaid University of Tlemcen](#) (UoT), both in Tlemcen, Algeria, Institute for Technology and Resources Man-

agement in the Tropics and Subtropics ([ITT](#)) at the Technische Hochschule in Cologne, Germany, and the United Nations University, Institute for Environment and Human Security ([UNU-EHS](#)) in Bonn, Germany. The WESA project in Africa links water, energy and climate research. ZEF is involved in research on

1.3 MARKETS AND SERVICES

ANALYSIS AND IMPLEMENTATION OF MEASURES TO REDUCE PRICE VOLATILITY IN NATIONAL AND INTERNATIONAL MARKETS FOR IMPROVED FOOD SECURITY IN DEVELOPING COUNTRIES

This [research project](#) focuses on the developmental roles of markets and the political, infrastructure, and institutional constraints on access to public services by the rural and urban poor. The projects brings together partners from Africa, South Asia and other low and middle income regions to generate research based policy advice on issues related to agricultural and infrastructural investments, international and regional trade and trade agreements, national food and agricultural policy with the aim to reduce global hunger and to develop and stabilize food markets.

Specifically, the project aims at:

1. analyzing welfare implications of international trade agreements (AfCFTA, EU-Africa) and providing policy recommendation on how to design trade agreements to promote agricultural development in Africa and to improve market access for African agricultural exporters and to the EU;
2. demonstrating the consequences of market risks for poverty and food and nutrition security and highlighting investment options to improving well-being in low and middle income countries;
3. providing evidence-based empirical research from case studies in Africa and South Asia on how markets can improve food and nutrition security and



Link: <https://bit.ly/AfrPotentialsPARI>

2. Participation in [Investment Costs and Policy Action Opportunities for Reaching a World without Hunger](#) (SDG 2).

Link: <https://bit.ly/ZEFSE-WOH2021>

3. Scientific research on international trade, food security, sustainable intensification, and development aid presented at international academic conferences and published in peer-reviewed journals.

Project coordination and contact: [Lukas Kornher](#).

Project funded by: Federal Ministry for Economic Cooperation and Development (BMZ). More info on **project website** <https://www.zef.de/volatility.html>.

Publications on the topic: <https://bit.ly/ZEFPubVolatility>.

Photo by Till Ludwig

how policies can address market imperfections.

Research outcomes in 2020/2021

1. Contributions to [From Potentials to Reality: Transforming Africa's Food Production](#) (German and English) on infrastructure, markets, and trade.

1.4 HEALTH

ONE HEALTH AND URBAN TRANSFORMATION

The **NRW Forschungskolleg One Health and Urban Transformation** – identifying risks and developing sustainable solutions is a transdisciplinary graduate school seeking integrated interventions to attain optimal health for humans, animals, plants and the environment. It is hosted by ZEF in cooperation with multiple institutes of the University of Bonn, the International Centre for Sustainable Development (IZNE) of the University of Applied Science Bonn Rhein-Sieg (HBRS), and the United Nations University - Institute for Environment and Human Security (UNU-EHS). In phase 1 (May 2016 – December 2020, project coordination: [Timo Falkenberg](#)) **13 PhD candidates** have been conducting research in **4 metropolitan regions**: the Ruhr Metropolis (Germany); Ahmedabad (India), Accra (Ghana), and São Paulo (Brazil). In Phase 2 (January 2021 June 2024, project coordination: [Ana Maria Perez Arredondo](#)) this research will be continued.

One Health and Urban Transformation is funded by the Ministry of Culture and Science of the State government of North Rhine-Westphalia ([MKW](#))

Animal health and welfare is not a major issue considered within the food system. Livestock is regarded mainly a product and productivity has a priority over animal welfare. In Germany, this attitude has started to change as an increasing number of consumers have been demanding a higher standard of animal welfare. Overall, consumer awareness in industrialized countries

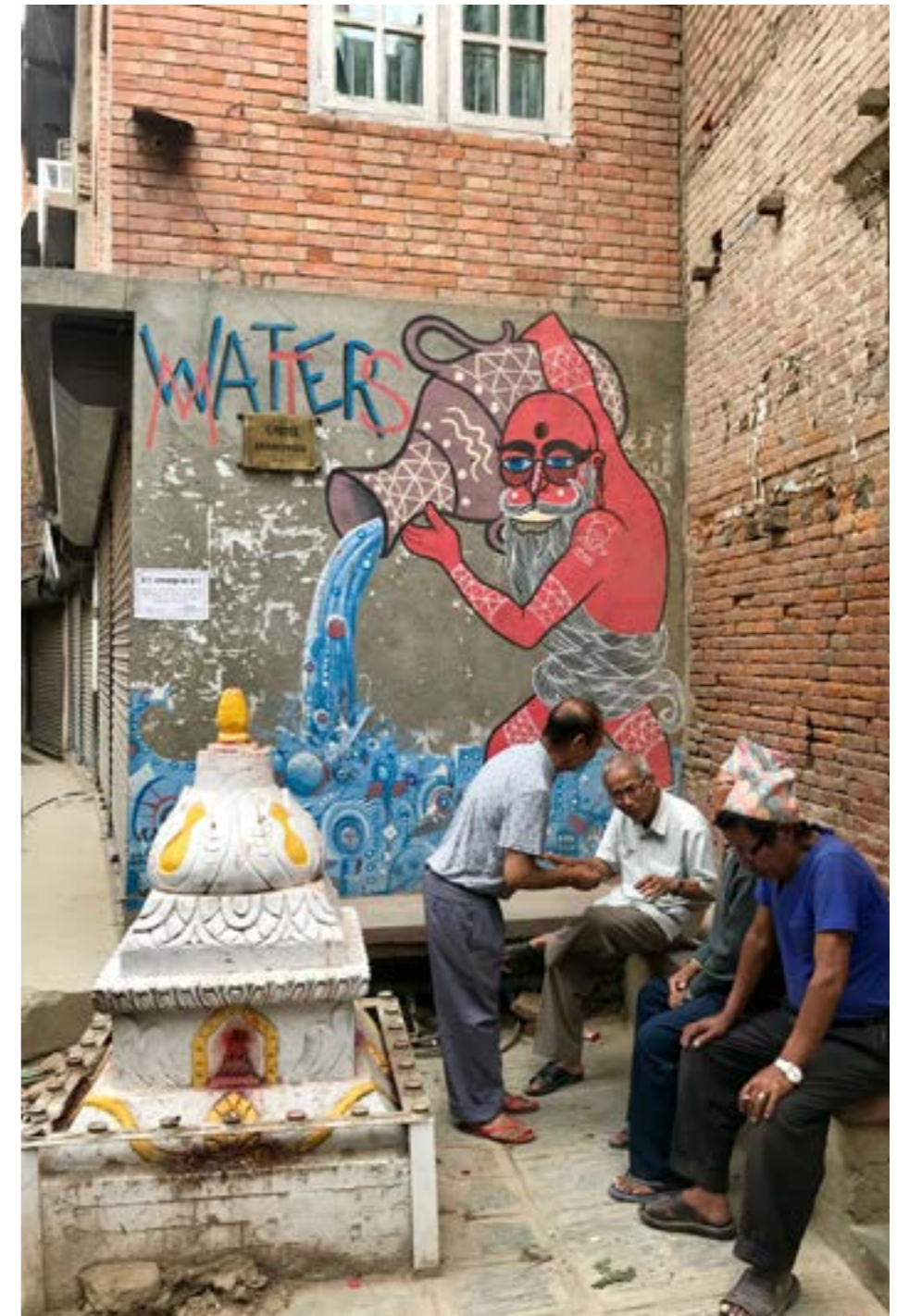


Photo by Anna Brückner

1.5 GENDER

has increased over the fact that animal-based food consumption is a key contributor to climate change. Adopting a One Health approach and therefore placing a higher value on animal health and welfare can thus contribute to building more health-sensitive food systems.

Read the publication by [Juliana Minetto Gellert](#) et al. on "[Changing dietary patterns is necessary to improve the sustainability of Western diets from a One Health perspective](#)" (see <https://bit.ly/ElsevierDietParis>), the [press release](#) by Bonn University here: <https://www.uni-bonn.de/en/news/305-2021> and [news item](#) on ZEF's website here: <https://bit.ly/Study-DietaryPatterns-ZEF>.

At the start of the program, One Health was still a peripheral topic that most stakeholders had not heard much about. Throughout the project period, this has changed drastically and implementing **One Health has become a global priority** – especially in the context of the **Covid-19** pandemic. However, how to operationalize One Health and create effective **One Health Governance systems** has not been worked out yet.

While the increasing global momentum of One Health has certainly increased political will as well as resource allocation, a lot of **capacity building** is still required. Especially on the working-level, community health workers and health practitioners from both human and veterinary medicine need to be trained in One Health methods and understand what type of information sharing creates mutual benefits.

At the same time **infrastructure for data sharing and joint interventions** need to be created. An important first

step to implement One Health is the formation of **intersectoral networks** that jointly prioritize the One Health topics to address. These could include specific zoonotic diseases, antimicrobial resistance, or food safety.

Another important finding of the research has been that **One Health collaboration works well in an acute outbreak and case of emergency**, but often fails to sustain during non-outbreak periods. Developing a third-party interdisciplinary institution or group, such as the One Health Technical Working Group in Ghana, could be an important and sustainable mechanism.

Read the publication "[Intersectoral collaboration shaping One Health in the policy agenda: A comparative analysis of Ghana and India](#)" by [Ana Maria Perez Arredondo](#) et al. (see: <https://bit.ly/perezonehealthelsevier>). As One Health implementation is still very new, there are no **best practice cases or specific guidelines** on how to operationalize One Health on the regional or national level. Therefore, this topic is a research priority of the second phase of the One Health project at ZEF.

Water is considered a central medium of transmission in [PhD research](#) (see <https://bit.ly/ntajalonehealthwebsite>) that examined water-borne diseases in Accra, Ghana. The research focused on the **neglected tropical disease Schistosomiasis** and revealed that lacking sewage treatment exposes large populations to water-borne diseases in peri-urban Accra.

Read the publication "[Influence of human-surface water interactions on the transmission of urinary schistosomiasis in the Lower Densu River basin](#)", Ghana by [Joshua Ntajal](#) et al. See <https://bit.ly/ntajalonehealthelsevier>

Additionally, water contact occurs as a side effect of occupation (fishing and irrigation) or domestic activities (primarily washing). It is therefore nearly impossible to avoid water contact in these peri-urban communities. It would therefore be recommendable to focus on ensuring adequate sanitation and sewage treatment to halt the vicious cycle of water-borne disease transmission. Beyond the role water plays in transmitting water-borne diseases, research in Germany has illustrated that water is also a medium that spreads antimicrobial resistance. Sewage water hosts a multitude of resistant and multi-resistant pathogens. Sewage water monitoring can therefore play a crucial role in the surveillance of antimicrobial resistance.

Project coordination and contact: [Timo Falkenberg](#) (until December 2021) and successor [Ana Maria Perez Arrendondo](#)

One Health doctoral research(ers) and **publications** on the [One Health Website](#): <https://www.zef.de/onehealth.html> and [here: https://bit.ly/onehealthstudents](https://bit.ly/onehealthstudents).

ZEF's [Gender Group](#) was established in early 2020 by a group of senior and junior researchers at ZEF with expertise in gender analysis from different academic disciplines. The group shares the interest and commitment to advance a gender-sensitive agenda in development research.

In the Sustainable Development Goals (SDG5), gender equality and women's empowerment have been defined as a fundamental human right and a key aspect of a prosperous and sustainable world. Despite improvements in gender-related indicators during the last decade, there are still pervasive social norms in place that prevent women from executing their full potential and consequently hinder social progress. Moreover, women's experiences and particular vulnerabilities tend to be invisible and excluded from research and policy implementation.

Academia has a relevant role to play in the transformative process of achieving a world where access to rights and opportunities is independent of one's gender (gender equality). It is important, for example, to avoid reproducing stereotypes that portray women as either saviors or victims based on claims that are rarely grounded on data and even more rarely generalizable. Reproducing them can hinder the design of policies that effectively reduce poverty and improve food security. What is more, women and men are not universal groups, but live individually-based experiences crossed by race, class, age and other context-related differences that position them into fluid relations of power. Gender-sensitive research acknowledges these differences and the fact that gender influences every aspect of social, economic, political, and personal life as well as power structures and relations.

Talking about gender is talking about a system of relationships that affects both men and women. Therefore, gender is as much about women empowerment as it is about concepts of masculinity. There is a need for research that informs on the intricacies of gender relationships and produces solid empirical evidence on how to eliminate gender inequalities and transform social norms. Only then, we can contribute to policies that consider men's and women's situations in different societies and foster equal gender relationships.

Contact and coordination:
[Dennis Aviles](#) and [Tina Beuchelt](#).

[More information on the Gender Group's website](#) <https://www.zef.de/gender-group.html>.

Check our latest virtual event "[Gender-based Violence and Rural Development Outcomes](#)" on the occasion of the [UN International Day for the Elimination of Violence against Women](#) on November 25, 2021 here: <https://bit.ly/ZEFGender-eventNov25>



Photo by Tina Beuchelt

SOIL BIODIVERSITY GOVERNING TIPPING POINTS IN THE AMAZON (PRODIGY)



Photo by Johannes Schielein

The main interest of this project is to generate knowledge base for a more sustainable land-use management based on the functional biodiversity of the soil ecosystem and its relationship with social-ecological systems resilience. In order to generate and provide such knowledge, PRODIGY aims at:

1. generating a better understanding of the mechanisms leading to tipping points in social-ecological systems,
2. raising the awareness of severe impacts of rapid system shifts, and
3. developing viable management options to avoid the crossing of tipping points.

PRODIGY's research approach is framed within a cascade in which interrelated tipping points in four elements: (1) the soil ecosystem, (2) the economic livelihood, (3) social cohesion, and (4) the regional climate, are assessed.

The project research area is located where the Amazon regions of Peru, Brazil and Bolivia meet, in the so called MAP region (Madre de Dios in Peru, Acre in Brazil and Pando in Bolivia).

Research Methodology: (1) Assessing the diversity of functional genes in the soil biota; (2) Valuing the contribution of soil biodiversity on economic livelihoods; (3) Assessing the effect of biophysical, social and economic shocks on social cohesion and land-use decisions; (4) Modeling the potential effects of social-ecological system changes on the regional climate.

Project coordination and contact: [Jan Börner \(https://bit.ly/BoernerZEF\)](https://bit.ly/BoernerZEF).
Project funder: German Federal Ministry of Education and Research (BMBF).
Project website <https://www.zef.de/project/PRODIGY>
Publications on Biodiversity: <https://bit.ly/PublBiodivZEF>

1.6 INNOVATION AND SCIENCE POLICY (DIALOGUE)

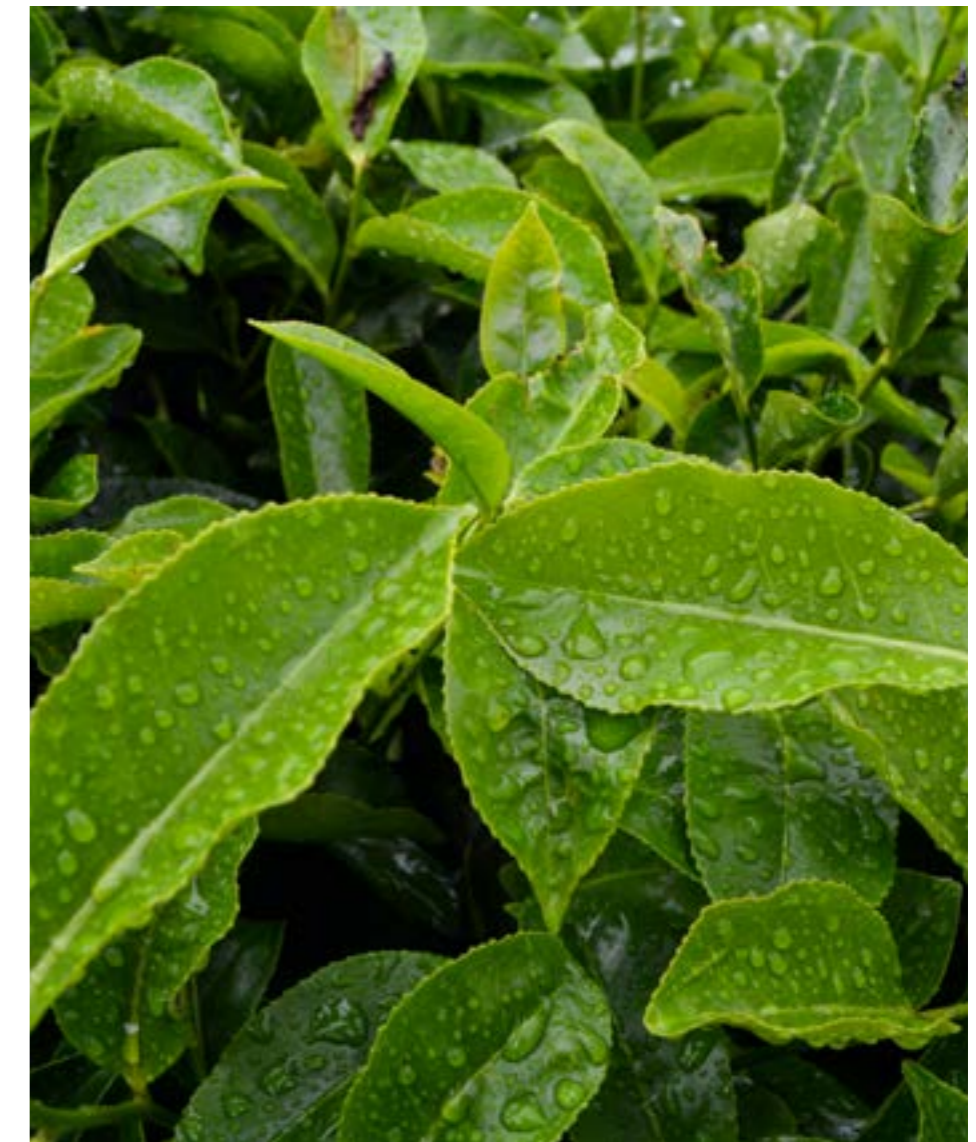
TRANSFORMATION AND SUSTAINABILITY GOVERNANCE OF SOUTH AMERICAN BIOECONOMIES (SABIO)

The Southern Cone of South America is one of the most important world regions for the provision of bio-based feedstock worldwide with many countries in the region currently undergoing dynamic changes in various bio-economic sectors. Despite the region's enormous potential for sustainable bio-based transformation, promoting environmentally responsible and equitable bioeconomic change remains a major governance challenge.

This project focuses on the emergence and sustainability performance of the bioeconomies from Argentina, Brazil, and Uruguay and aims to analyze bio-based initiatives from a political sciences and agricultural economics perspective.

The planned research seeks to inform governmental and non-governmental, including private, decision-makers in South America and beyond about entry points for action towards promoting climate smart bio-based innovation processes that safeguard rural employment and the equitable distribution of the benefits and costs of bio-based transformation. Through strong partnerships with Universities in the Southern Cone and engagement at the science-policy interface, the project will strengthen international collaboration and its impact in the study regions.

Project coordination and contact: [Jorge Sellare \(https://bit.ly/SellareZEF\)](https://bit.ly/SellareZEF).
Project funder: German Federal Ministry of Food and Agriculture (BMEL). SA-Bio project [website: https://sabio-project.org/](https://sabio-project.org/). Project **publications:** <https://sabio-project.org/home/publications/>.



PROGRAM OF ACCOMPANYING RESEARCH FOR AGRICULTURAL INNOVATION (PARI)

The **Program of Accompanying Research for Agricultural Innovation (PARI)**, see: <https://research4agrinnovation.org/>) is funded by Federal Ministry for Economic Cooperation and Development (BMZ) as part of the One world, No Hunger Initiative (SEWOH).

PARI brings together partners from Africa, India and Germany to contribute to sustainable agricultural growth and food and nutrition security in Africa and India.

The research-based information generated in PARI serves to strengthen the integration of the [Green Innovation Centers](#) into national, regional and continental institutional partner settings, in order to enhance value chains contributing to rural and agricultural development.

PARI's research foci are:

1. Innovation investments to improve the productivity and resilience of agricultural and food systems;
2. Employment and income opportunities in rural areas, especially for youth and women;
3. Engaging with food and agriculture policy making to enhance food and nutrition security.

Research outcome:

Mechanization: Research partners in four countries (Nigeria, Kenya, Benin and Mali) launched a **new research project in 2020**, which assesses the opportunities and challenges for local manufacturers of machinery. [Another study \(https://bit.ly/ZEFDP297\)](https://bit.ly/ZEFDP297) published in 2020 highlights the progress made in advancing farm mechanization in India, especially by using of tractors. [Another study](#), conducted in Nigeria and India, provides further insights on the use of digital platforms to share farm machinery (also referred to as 'uberization'). Link: <https://research4agrinnovation.org/publication/uber-for-tractors/>

[uber-for-tractors/](https://bit.ly/ZEFDP205)

Digitalization in food and agriculture: Drawing on research conducted in Kenya, Nigeria and Ghana in 2019 in collaboration with local partners, a cross-country analysis outlines necessary elements of an enabling environment to scale digital solutions in African food systems. The study highlights large-scale investments in mobile connectivity to ensure fast, stable and affordable access to mobile networks as one of the key priorities. Read studies (published by partner [FARA](#)) on [Nigeria](#), [Kenya](#), and [Ghana](#).

Socio-economic aspects of animal husbandry: [A study of the African livestock sector \(https://bit.ly/ZEFWP194\)](https://bit.ly/ZEFWP194) analyses the patterns and changing structures of the sector, identifies high-potential countries for future development and explores innovations that can help address the complex trade-offs to ensure a sustainable livestock sector.

Employment opportunities: Research investigates where and under what conditions mechanization and automation in the African food and beverage industry will generate employment and lead to equitable income gains. With a focus on South Africa, Nigeria, Kenya and Ethiopia the study assesses the status and potential of mechanization and automation in the African food and beverage industry.

Political and institutional framework conditions: PARI research also focuses on the role of farmer organizations as one promising institutional innovation to boost agricultural productivity, link farmers to markets and ensure that the interests of farmers are represented in policy processes. A comparative analysis in Senegal, Uganda and Zambia shows that Farmer Organizations are more or less well-structured, but a sizeable majority of small-scale producers is

yet to be part of the organized Farmer Organizations. Read full publication here: <https://bit.ly/ZEFDP205>

PARI research also investigates how to minimize negative impacts of Covid-19-related containment measures on food security. [One study highlights](#) the dramatic dilemma between lockdowns and food security in five African countries (<https://research4agrinnovation.org/publication/covid19/>)

Youth Agripreneurs

Youth Agripreneurs is a project undertaken under the umbrella of the PARI program, specifically its Youth Employment cluster. This research seeks a better understanding of the challenges and opportunities of youth employment in rural Africa. It looks at selected aspects related to youth employment and, more broadly, youth's livelihoods. In line with the inherent interest in food and agriculture within the PARI framework, this research looks at youth engaged in farming and off-farm agribusiness activities, with a focus on young entrepreneurs (also called agripreneurs). The research has several objectives. First, to identify which factors can make youth in farming and off-farm agribusiness successful. Second, to analyze the main barriers or challenges encountered by youth in this sector. Third, to advise which policy interventions can be most relevant to enhance youth taking up farming and agribusiness as commercial activities, and could thus boost productivity of young farmers and agripreneurs. Importantly, the research undertaken by PARI and its partners seek to adopt the perspective of the youth, largely disregarded in the literature and policy alike.

PARI project coordination and contact: [Heike Baumüller \(https://bit.ly/ZEFBaumueller\)](https://bit.ly/ZEFBaumueller)

Coordination and contact Youth Agripreneurs: [Zaneta Kubik \(https://bit.ly/ZEFKubik\)](https://bit.ly/ZEFKubik)

PARI publications

All PARI publications: <https://bit.ly/PARIpubl>

PARI policy briefs: <https://bit.ly/PARIpolicybriefs>

PARI external publications: <https://bit.ly/PARltextpubl>

PARI project website: <https://research4agrinnovation.org/>



FROM THEORY TO POLICY: BRINGING THE MESSAGE ACROSS

FACILITATING MUTUAL LEARNING AND COLLABORATION BETWEEN AFRICA AND INDIA

In November 2021, a virtual event [Africa and India: Experiences with Transformation of Food and Agriculture and Opportunities for learning and collaboration](https://bit.ly/AfricaandIndia2021) (see <https://bit.ly/AfricaandIndia2021>) was organized by the Indian Council for Research on International Economic Relations (ICRIER), the Forum for Agricultural Research in Africa (FARA) and ZEF/PARI to discuss opportunities for fostering India-Africa learning and collaboration to promote food and nutrition security in the two global regions.

GERMANY'S FEDERAL MINISTER GERD MÜLLER RECEIVES REPORT ON TRANSFORMING AFRICA'S FOOD PRODUCTION

In 2020, PARI published the study Baumüller et al., 2020. [From Potentials to Reality: Transforming Africa's Food Production](https://bit.ly/AfrPotentialsPARI) (German and English, see: <https://bit.ly/AfrPotentialsPARI>). The study offered an opportunity to distill key findings from PARI research and complement them with state-of-the-art literature to provide a comprehensive analysis of the investment and policy priorities that could help Africa increase food production from the use of its own resources. The study was presented to Germany's Federal Minister for Economic Cooperation and Development (BMZ) Gerd Müller during the Ministry's online event "One World No Hunger is possible" on October 13, 2020. The report attracted widespread attention among policy makers, researchers and civil society groups. Read more about the report and event on ZEF's website here: <https://bit.ly/Potentialsnews>

UN FOOD SYSTEMS SUMMIT (UNFSS)

Read and learn more about the work of the Scientific Group of the [UN Food Systems Summit 2021](https://www.unfss2021.org/), which was chaired by former ZEF director [Joachim von Braun](https://www.unfss2021.org/) on the website of the Scientific Group <https://www.unfss2021.org/>

[Scientific Group Reports: https://www.unfss2021.org/materials/scientific-group-reports-and-briefs/](https://www.unfss2021.org/materials/scientific-group-reports-and-briefs/).

[FSS Briefs by Partners of Scientific Group: https://www.unfss2021.org/materials/scientific-group-reports-and-briefs/](https://www.unfss2021.org/materials/scientific-group-reports-and-briefs/)

[Evaluation, Peer-review and Science Advisory: https://www.unfss2021.org/evaluation-peer-review-and-science-advisory/](https://www.unfss2021.org/evaluation-peer-review-and-science-advisory/)

ACHIEVING SDG2: REPORT ON INVESTMENT NEEDS HANDED TO GERMANY'S FEDERAL MINISTRY

During the hybrid conference "A world without hunger is possible" by the German Federal Ministry for Economic Cooperation and Development (BMZ) on October 13, 2020, ZEF handed the report '[Investment Needs and Policy Action Opportunities for Reaching a World without Hunger \(SDG 2\)](https://www.unfss2021.org/materials/scientific-group-reports-and-briefs/)' to BMZ minister Gerd Müller. The report was written in cooperation with the Food and Agriculture Organization of the United Nations (FAO). Find also more information about (ZEF's part in) the event on our website here: <https://bit.ly/Potentialsnews>.

At this online event, Minister Gerd Müller and a number of experts discussed what steps have to be taken to address hunger and malnutrition based on the findings of the two studies, among which the report by ZEF and FAO. The research teams outlined options for joint European action towards SDG 2 in a plan of action that was handed over to EU Commissioner Jutta Urpilainen during the event. [Find more information and event program here: https://www.unfss2021.org/materials/scientific-group-reports-and-briefs/](https://www.unfss2021.org/materials/scientific-group-reports-and-briefs/)

Selected publications: A Policy Brief. October 12, 2020. Ending Hunger by 2030 – policy actions and costs: https://www.zef.de/fileadmin/downloads/SDG2_policy-brief.pdf. INVESTMENT COSTS AND POLICY ACTION OPPORTUNITIES FOR REACHING A WORLD WITHOUT HUNGER (SDG 2): https://www.zef.de/fileadmin/downloads/ZEF_FAO_SDG2.pdf

Project funder: German Federal Ministry for Economic Cooperation and Development (BMZ). Project lead and contact: [Joachim von Braun](https://www.unfss2021.org/) and [Bezawit Beyene Chichaibelu](https://www.unfss2021.org/)

EXPERTISE FROM AND ON AFRICA: MALABO MONTPELLIER PANEL

The [Malabo Montpellier Panel](https://www.mamopanel.org/) is a group of international agriculture experts from Africa, Europe and Asia who guide policy choices that accelerate progress towards food security and improved nutrition in Africa. It provides high-quality research to equip decision makers to effectively implement policies and programs that benefit smallholder farmers, [The Malabo Declaration](https://www.mamopanel.org/), adopted by 54 African governments in 2014, commits signatory countries to halve the number of people in poverty by 2025 through inclusive agricultural growth that creates job opportunities for young people and women. It is facilitating dialogue between stakeholders. The annual Malabo Montpellier Forum convenes decision makers to assess strategies for meeting global agriculture and food security goals. Dialogue between the Panel, key stakeholders, NGOs and the private sector promotes the sharing of research across borders. [Source: [mamo website](https://www.mamopanel.org/)].

Panel members ([mamopanel.org](https://www.mamopanel.org/)): former ZEF-director [Joachim von Braun](https://www.unfss2021.org/) and [Ousmane Badiane](https://www.unfss2021.org/) (Director of [Akademiyu2063](https://www.unfss2021.org/), Rwanda) are Co-Chairs of the Panel. The Mamo Montpellier Panel is co-funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and the International Food Policy Research Institute (IFPRI). Publications Mamo Montpellier Panel: <https://www.mamopanel.org/resources/>

2 CAPACITY DEVELOPMENT

2.1 BIGS-DR

The Bonn International Graduate School for Development Research (BIGS-DR, see: <https://www.zef.de/doctoral-program.html>) is a structured doctoral program at ZEF and part of Bonn University's Bonn International Graduate Schools program. BIGS-DR enables doctoral studies in development research with attractive international collaborations and a tailored qualification program. BIGS-DR's main donors are: The German Federal Ministry of Economic Cooperation and Development (BMZ) via the German Academic Exchange Service (DAAD), the German Federal Ministry of Education and Research (BMBF), state funds of North Rhine-Westphalia, the Foundation *fiat panis* - added by financial support from many other organizations and governments.

2.2 DOCTORAL DEGREES 2021

Fifteen of our doctoral students completed their doctoral theses in 2021 and obtained their doctoral degree. Find a list of all published doctoral theses here: <https://bit.ly/zefdoctthesepublished>

Wenceslas	Somda	Burkina Faso	2013	Adaptation strategies to climate change in inland valleys in Dano, Burkina Faso
Alfonso Javier	Miranda Arana	Mexico	2014	Economic and policy mechanisms affecting land use decisions in the Brazilian agricultural frontier
Md. Fuad	Hassan	Bangladesh	2015	Interlinkage between food prices and agricultural wages and implications for farm mechanization in Bangladesh
Nino	Pkhikidze	Georgia	2015	Roads, geography, and connectivity: Economic impacts of road infrastructure in Georgia and Armenia
Rahel Deribe	Bekele	Ethiopia	2015	The economics of irrigation systems in Ethiopia: Technological and institutional analysis
Alfariyani Milati	Fatimah	Indonesia	2016	Intergenerational mobility of internal migrants' children in Indonesia
Annet	Adong	Uganda	2016	Armed conflicts and forced displacements - Incentives and consequences on consumption and social preferences
Elizabeth	Ekren	USA	2016	Agency, opportunity structure and empowerment in everyday refugee life: Enduring and overcoming challenges of daily living in Cologne refugee shelters
Isaac	Bonuedi	Ghana	2016	The roles of nutrition-sensitive interventions and market access in enhancing household food security and resilience in Sierra Leone
Juan Manuel	Orozco Ortiz	Colombia	2016	Insights into the genesis of Amazonian Anthrosols: The role of ceramic sherds and flies during the early stages of Terra Preta formation
Suparna	Banerjee	India	2016	The 'good' legitimacy; the 'bad' legitimacy - A study of conflict prolongation through the prism of state responses towards Maoism in India
Arslan	Waheed	Pakistan	2017	Development discourses and urban poor: A comparative study of slums of Islamabad and Brasilia
John	Ndungu	Kenya	2017	Sustainability assessment of organic and conventional agricultural farming systems in Kenya: The cases for Machakos, Murang'a and Kirinyaga Counties
Pallavi	Rajkhowa	India	2017	Personalized digital extension services, electronic marketplaces, and mobile phones: Implications of digital technology on rural development in India

HIGHLIGHTS 2021

In the heat of climate change policy: COP26 Glasgow

Our students have been invited and/or participated in the [COP26](#) held in Glasgow, UK, (October 31 - November 12, 2021) and came back with new insights and experiences after inspiring talks and encounters and interesting observations.

Two ZEF students from Germany, [Sarah Velander](#) (working with [LANUSYNCON](#) project at ZEF) and [Niklas Wagner](#) (working with [One Health and Urban Transformation](#) project at ZEF), were "following the science" and looked into how much science is left on the negotiation table at a Climate COP. Read more in their [blog post here: https://bit.ly/ZEFblogcop1](#)

ZEF and [Right Livelihood](#) student [Irene Awino Ojuok](#) from Kenya was invited by the [Global EverGreening Alliance](#) to attend the COP26 as its Ambassador. Irene's research focus is Land Degradation and Farmer Managed Natural Regeneration (FMNR) in Kenya. Read Irene's full COP26 story in her [blog post here: https://bit.ly/ZEFblogcopojuok](#)

Doctoral research stories

Our students have been conducting research on topics such as: African post-conflict cities in the Lake Chad Basin Region ([Oyewole Simon Oginni](#), read more in [story 5 here](#)), The economics of irrigation systems in Ethiopia ([Rahel Deribe Bekele](#), read and watch more [here](#)), Achieving sustainable wheat self-sufficiency in Egypt ([Ahmed Abdalla](#), read and watch more [here](#)), Development Discourses and Urban Poor: A Comparative Study of Slums of Islamabad and Brasilia ([Arslan Waheed](#), read his [blog here](#)), 'Blue Health for All? Urban Blue Spaces as Potentially Therapeutic Landscapes for Aging Populations in Ahmedabad and Ruhr Metropolis' ([Anna Brückner](#), see [story 2 here](#)) and Everyday risks and risk management strategies in unplanned coastal settlements in Monrovia, Liberia ([Phillip Garjay Innis](#), see [story 1 here](#)).

For all stories see <https://www.zef.de>

Impact of Covid-19

The Covid-19 pandemic accelerated virtual event and digital teaching formats. To meet these challenges ZEF initiated the "Online Development Study and Research Community" (ODSRC, see <https://bit.ly/zefodscr>) project with international partners for a virtual teaching exchange.

Due to the pandemic, students often had to adapt their original research plans and methods before or during their field research. Read more in this blog post about (adapted) field research [in Colombia and Indonesia](#) (by [Daiana Castillo López](#) and [Arif Budy Pratama](#)) and in [Honduras](#) (story 4 by [Maryoriet R. Salgado](#)).



Our 128 enrolled students come from 50 countries

Our currently enrolled students are coming from sub-Saharan Africa (31%), Latin America (25%), Asia (25%), Europe (11%), Central Asia (4%), and North America (4%)

15 of our doctoral students graduated in 2021 (see list above)




They are conducting research in more than **30** countries with funds from over **20** donors.

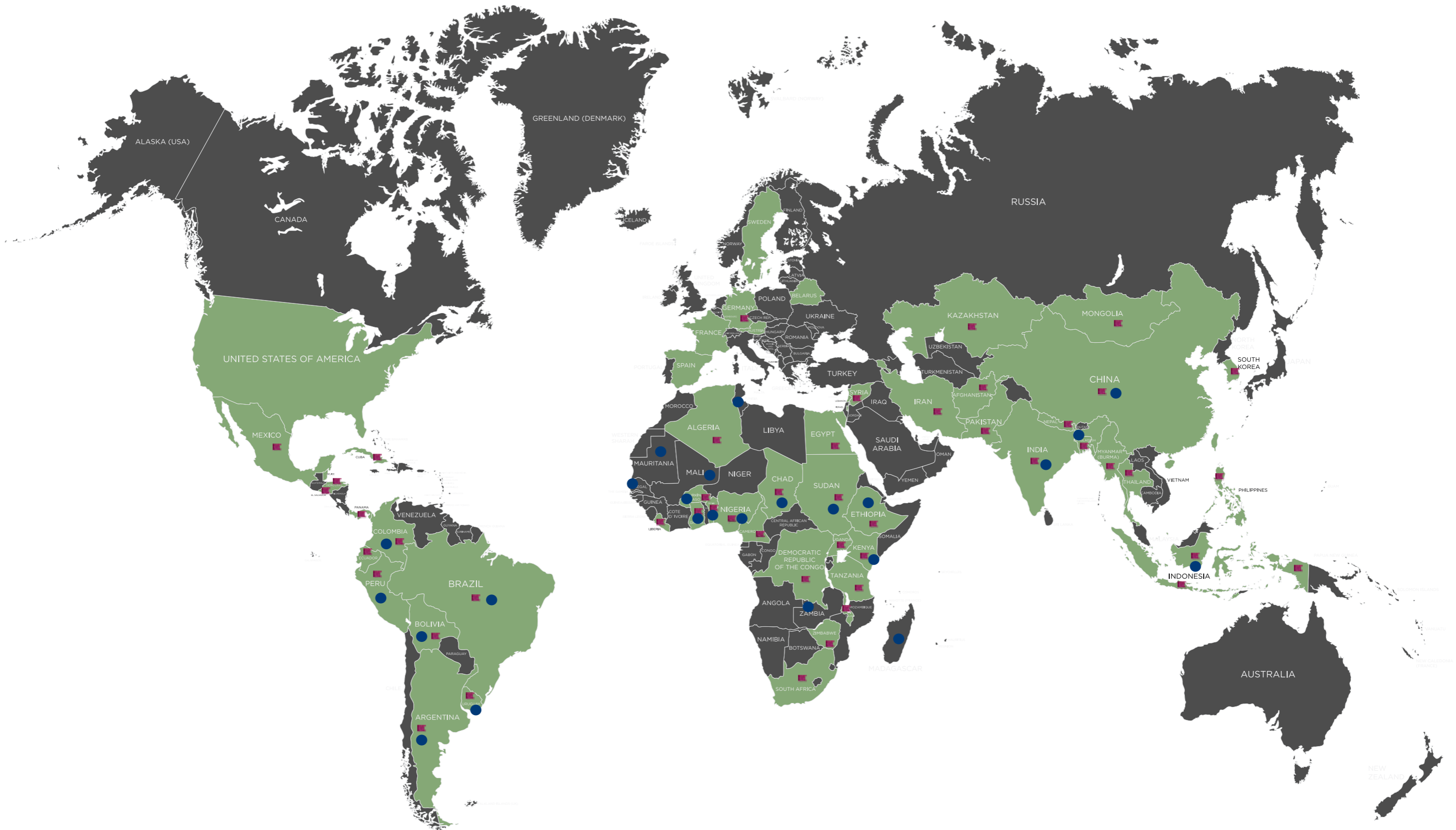


Irene Awino Ojuok meeting with former US president Barack Obama. Photo credits: Global EverGreening Alliance / Race to Resilience.

2.3 OUR STUDENTS: WORLD MAP

Find a list of all enrolled ZEF doctoral students here: <https://www.zef.de/names.html>

-  Countries where our enrolled students come from
-  Countries where our enrolled students conduct their field research
-  Major research project countries (e.g. PARI)



2.4 FURTHER CAPACITY DEVELOPMENT PROGRAMS RUN BY ZEF

Beyond the doctoral students enrolled in BIGS-DR, ZEF runs a number of successful programs with master and doctoral students (supervision, teaching, workshops, summer schools, internships, etc.) in cooperation with its local partners.

AFRICA

ZEF runs around **10 capacity development programs** with (primarily) master but also doctoral students (supervision, teaching, workshops, summer schools, internships, etc.) in more than **20 countries in South, West, East and North Africa** in close cooperation with its local partners.

Among these capacity development projects are: The **Ghanaian-German Center for Development Studies (GGCDS, see <https://bit.ly/ZEFGGCDS>)**, with 48 PhD students (from different African countries). Operating since 2009, funded by the German Academic Exchange Service (DAAD) & **Germany's Federal Foreign Office**.

The **WASCAL Graduate School Program Climate Change Economics (see <https://wascal.ucad.sn/en>)** in Dakar, Senegal (since 2010), funded by the German Federal Ministry of Education and Research (BMBF).

The **West African Biodiversity and Ecosystems Services (WABES, see https://wabes.org/index_en.html)**. Supporting Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) capacity building in West Africa (since 2017). Funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety - International Climate Initiative (IKI BMU). With annual batches of 15 Master students from 15 ECOWAS states.

West African Center for Sustainable Rural Transformation (WAC-SRT, see <https://www.zef.de/wac-srt>). In Ghana and Niger with in total 114 master and doctoral students from different African countries since 2017 (funded by DAAD & AA). A group of students in this program have initiated the so-called Climate and Sustainable Development Action Club ([more info here](#)) for which they acquired funds by active fund raising. [Read the recent blog of two WAC-SRT students about their field research on water and sanitation in rural Niger.](#)

Global Center African Climate and Environment Center (see <https://bit.ly/afasnewszef>) - Future African Savannas (AFAS) Based in Côte d'Ivoire & Kenya (started in 2021), funded by DAAD and Germany's Foreign Federal Office)

Cooperation with African Economic Research Consortium (AERC, <https://aercafrica.org/>). Operating in Ethiopia, Kenya, Liberia, Malawi, Nigeria, Rwanda, Tanzania, Togo, Uganda and Zimbabwe, with 15 master and 5 doctoral students (part of PARI; funded by BMZ)



LATIN AMERICA

The Doctoral Studies Support Program (DSSP, see <https://dssp-colombia.org/>) on environmental peace and development in Colombia.

The program focuses on territorial rights, land use, access to and the extraction of natural resources to understand long-standing political and social conflicts and inequalities in Colombia.

Funding: German Federal Ministry for Economic Cooperation and Development (BMZ) via the German Academic Exchange Service (DAAD).

30 doctoral students have joined the program since its start in 2016: 23 from Colombia, 5 from Cuba and 2 from Nicaragua.

Publications: Read the blog about developments in Colombia [here: https://bit.ly/ZEFblogcolombia2021](https://bit.ly/ZEFblogcolombia2021). Read an article by Clement Roux (Batch 2020) about the female combatants in the propaganda of the insurgent groups for the case of the Colombian FARC-EP: <https://bit.ly/colombia202>. Read ZEF Working Paper no. 210 on Deforestation in Tinigua National Natural Park (see <https://bit.ly/3wJm1g>)

Project lead and contact: [Eva Youkhana, see https://bit.ly/zefyoukhana](https://bit.ly/zefyoukhana)

Right Livelihood Campus Bonn

The Right Livelihood College (RLC, see <https://bit.ly/zefrlcweb>) Campus Bonn at ZEF started in 2011 with facilitating PhD scholarships and organizing annual workshops. Since 2014, ZEF has also been hosting the Global Secretariat of the RLC. The RLC Campus Bonn is funded by the German Academic Exchange Service (DAAD) and the Volkswagen Foundation.

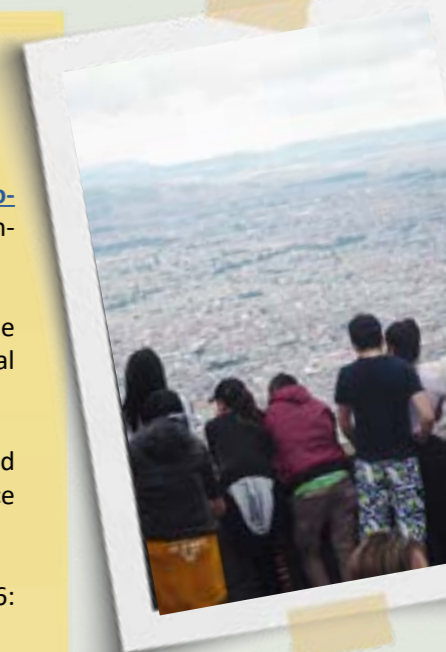
The RLC Campus Bonn works in Africa, Asia and Latin America. So far, 11 PhD students have been enrolled in the program.

Since 2011, two workshops per year have taken place at ZEF, in addition to further workshops being organized at other RLC Campuses around the world. Each workshop has around 30 participants from all over the world.

Read the scrolly telling story about ZEF/RLC doctoral student Ahmed Abdalla and his field research on 'Achieving wheat sufficiency in Egypt' on our website [here: https://bit.ly/sparkabdalla](https://bit.ly/sparkabdalla).

Read the blog post about ZEF/RLC student Irene Ojuok's participation in the COP26 [here: https://bit.ly/ZEFblogcopojuok](https://bit.ly/ZEFblogcopojuok).

Project lead and contact: [Till Stellmacher, see: https://bit.ly/stellmacherzef](https://bit.ly/stellmacherzef)



3 BUDGET 2020/2021

ZEF'S FUNDING PARTNERS

INDIRECT SUPPORT*)	IN EURO	IN %
German Academic Exchange Service (DAAD) / German Federal Ministry of Economic Cooperation and Development (BMZ)	529,284	66.60
DAAD Regional Program / German Foreign Office (AA)	38,260	4.81
Own funds of students	27,600	3.47
KAAD	28,800	3.62
Schlumberger Stichting Fund	29,680	3.73
Colciencia Colombia	24,000	3.02
HEC Pakistan	15,000	1.89
Thünen Institute and the German Ministry of Food and Agriculture (BMEL)	15,000	1.89
ProEcoAfrica/OFSA, Switzerland	14,400	1.81
Stiftung des Deutschen Volkes	14,400	1.81
Sudan Ministry of Higher Education and Scientific Research Scholarship	12,600	1.59
Friedrich Ebert Stiftung (FES)	14,860	1.87
GIZBMZ via BEAF	14,860	1.87
Nnamdi Azikiwe University, Nigeria	8,400	1.06
Alexander von Humboldt	7,600	0.96
Total	840,298	100

EXTERNAL FUNDS**)	PROJECTS	IN EURO	IN %
German Federal Ministry of Economic Cooperation and Development (BMZ)		1,924,763	26.9
• BMZ	PARI Volatility II UN Food Systems Summit		
• BMZ/GIZ to International Research Centers			
International Food Policy Research Institute (IFPRI) Biodiversity International BIOFAWMA IITA Sub Grant	Montpellier Malabo Panel BIOFAWMA: Improving Dietary Quality and Livelihoods in Ethiopia and Kenya IITA (GIZ)		
German Federal Ministry of Education and Research (BMBF) via		1,409,312	19.7
• German Aerospace Center (DLR)	CIREG NOURICITY PRODIGY ERA-SOLMAB WASCAL-PAUWES WESA CLIMAFRI - Verbundvorhaben Client II LANUSYNCON Wissenschaftler Austausch Kolumbien		
• Forschungszentrum Jülich (FZJ)	STRIVE RETO-DOSSO - Verbundvorhaben Client II		

EXTERNAL FUNDS - CONT.	PROJECTS	IN EURO	IN %
German Academic Exchange Service (DAAD)		1,735,254	24.3
	International Doctoral Studies Program 2021 DAAD/ZEF Centre of Excellence, Ghana, WAC-SRT DAAD/ZEF Centre of Excellence, Ghana, III RLC Campus IV Socio-environmental impact management of hydro-power megaprojects in Bolivia DAAD Forschungsstipendium Imran Sajid Bilateral SDG-Graduate School DSSP Colombia II RLC Alumni Programm Centre of Excellence, Ghana, III		
North Rhine-Westphalia / MIWF-NRW	One Health and Urban Transformation, Phase II BioSC-Transform2Bio	709,432	9.9
German Federal Ministry of Food and Agriculture (BMEL) via		589,259	8.2
	ABU		
• Federal Office for Agriculture and Food (BLE)	PROCINUT		
German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	IKI: IPBES Support, West Africa	352,889	4.9
German Research Foundation (DFG)	Virus SFB/Transregio 228 Übergänge in ländlich-urbanen Schnittstellen Äthiopien	156,502	2.2
Fiat Panis Foundation	Dr. Hermann Eiselen Doctoral Program	65,000	0.9
Volkswagen Foundation	Research Funds Dr. Martha Awo Senior Fellowship Dr. Ayamga RLC Platform for Young East African Scientists	79,104	1.1
Alexander-von-Humboldt Foundation	Georg Forster Forschungspreisträger	36,735	0.5
Third-Party Project Fund available after Project End		88,404	1.2
Total		7,146,654	100

CORE FUNDS***)	IN EURO	IN %
Personnel Costs	1,285,240	78.78
Administrative Costs	283,530	17.38
BMBF & DFG Overhead Shares****)	62,674	3.84
Total	1,631,443	100
INDIRECT SUPPORT & EXTERNAL FUNDS & CORE FUNDS		9,572,841 EURO

*) Scholarships directly funded by the donors.

**) Third-party projects of ZEF. Funds budgeted i.a.w. annual financing plans.

***) University of Bonn, State of North Rhine-Westphalia funds for ZEF.

****) Partial distribution of BMBF (5 percent) & DFG (4 percent) Overhead Shares to ZEF by the University of Bonn.

Matin Qaim succeeds Joachim von Braun as ZEF director

ZEF is happy and proud that agricultural economist Matin Qaim was appointed to the University of Bonn to serve as Schlegel-Professor of Economic and Technological Change and Director at ZEF as of October 1, 2021. Before, Qaim had been Professor of International Food Economics and Rural Development at the University of Göttingen since 2007.

News item and interview on ZEF's website here: <https://bit.ly/ZEF-Qaim>

Press release university of Bonn on Matin Qaim as one of three excellence initiative professors: <https://www.uni-bonn.de/de/neues/232-2021>



Matin Qaim. Photo by Volker Lannert

More information about Matin Qaim on his website here: <https://bit.ly/ZEFQaimwebsite>



Habilitation for Alisher Mirzabaev at Bonn University

At the Dies Academicus of Bonn University on December 1, 2021, ZEF senior researcher Alisher Mirzabaev gave his public lecture as a last step in the procedure to become "Privatdozent (PD)" with the Agricultural Faculty of Bonn University. Congratulations to Alisher on this great achievement!

Past and Future Research for Inclusive and Sustainable Development at the DAAD Centers of African Excellence

From September 28-30, 2021, the German Academic Exchange Service DAAD invited all of its 12 Centers of Excellence in Africa to meet, connect and exchange experiences (virtually). ZEF organized and hosted the online research fair.

Around 120 participants from 19 countries joined the research fair, including representatives and alumni from all 12 Centers of African Excellence, executives of the African Excellence Network, and representatives of the DAAD Section for Development Cooperation. More on our website here: <https://bit.ly/DAADCoEfair2021>

ZEF has been running one of the Centers, The Ghanaian-German Center for Development Studies (GGCDS) since 2008. More information here: <https://bit.ly/ZEFGGCDS>



WWW.ZEF.DE

ZEF PUBLICATIONS OVERVIEW AND HYPERLINKS

All ZEF-related publications are listed here: <https://www.zef.de/publications-1.html>

Peer-reviewed articles by ZEF researchers are listed here: <https://www.zef.de/publications/scientific-publications/peer-reviewed-journal-articles.html>

ZEF's Working Papers series is listed here: <https://www.zef.de/publications/zef-publications/zef-working-papers.html>

ZEF's Discussion Papers series is listed here: <https://www.zef.de/publications/zef-publications/zef-discussion-papers.html>

ZEF's ongoing doctoral theses are listed here: <https://www.zef.de/publications/zef-doctoral-theses/doctoral-theses-ongoing.html>

ZEF's published doctoral theses are listed here: <https://www.zef.de/publications/zef-doctoral-theses/doctoral-theses-published.html>

PUBLICATIONS ON ZEF RESEARCH THEMES

AGRICULTURE, LAND USE, CLIMATE CHANGE

Journal articles: <https://www.zef.de/research-capacity-development/zef-themes/land-water-food-and-energy/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/zef-themes/land-water-food-and-energy/doctoral-theses.html>

WATER RESOURCES (MANAGEMENT)

Journal articles: <https://www.zef.de/2138/research-themes/water-resources/publications.html>

Doctoral theses: <https://www.zef.de/2138/research-themes/water-resources/doctoral-theses.html>

BIODIVERSITY

Journal articles: <https://www.zef.de/research-capacity-development/research-themes/biodiversity/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/research-themes/biodiversity/doctoral-theses.html>

FOOD AND NUTRITION

Journal articles: <https://www.zef.de/research-capacity-development/research-themes/food-aid-policy/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/research-themes/food-aid-policy/doctoral-theses.html>

HEALTH

Journal articles: <https://www.zef.de/research-capacity-development/zef-themes/health-nutrition-and-ecosystems/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/zef-themes/health-nutrition-and-ecosystems/doctoral-theses.html>

GENDER

Journal articles: <https://www.zef.de/research-capacity-development/research-themes/gender/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/research-themes/gender/doctoral-theses.html>

MOBILITY, MIGRATION AND URBANIZATION

Journal articles: <https://www.zef.de/research-capacity-development/zef-themes/mobility-migration-and-urbanization/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/zef-themes/mobility-migration-and-urbanization/doctoral-theses.html>

GOVERNANCE AND CONFLICT

Journal articles: <https://www.zef.de/research-capacity-development/zef-themes/governance-conflicts-and-natural-resources/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/zef-themes/governance-conflicts-and-natural-resources/doctoral-theses.html>

MARKETS AND SERVICES

Journal articles: <https://www.zef.de/research-capacity-development/zef-themes/markets-and-public-services/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/zef-themes/markets-and-public-services/doctoral-theses.html>

INNOVATION AND SCIENCE POLICY

Journal articles: <https://www.zef.de/research-capacity-development/zef-themes/innovation-knowledge-and-science-policy/publications.html>

Doctoral theses: <https://www.zef.de/research-capacity-development/zef-themes/innovation-knowledge-and-science-policy/doctoral-theses.html>

