

ZEF ANNUAL REPORT 2019-2020



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Beyond the curfew: COVID-19's impact on Colombia

April 07, 2020. Blog post by Eva Youkhana, Emilia Schmidt and Alejandro Mora-Motta about the situation in Colombia.

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The Corona Virus pandemic highlights the need for a 'One Health' approach to epidemics and pandemics

CONDUCTING GLOBAL RESEARCH IN TIMES OF A PANDEMIC

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MESSAGE FROM THE BOARD CHAIR

2020 AND THE CHALLENGES FOR SCIENCES

By Prof. Dr. Mohamed H.A. Hassan

2020 will probably be remembered as the 'year of the pandemic'. A pandemic affecting nearly all countries across the globe and the lives of millions of people. Whereas some countries are still struggling with the first wave of COVID-19, others are currently fighting the second one. Some countries have managed extremely well in curbing the human losses and economic damage. As medical historians have observed, there have been numerous pandemics in human history, but COVID-19 is probably one of the fastest spreading.

A key issue emerging from this pandemic is the pivotal role played by science and scientists. Like climate scientists before them, scientists from the medical field are being scrutinized in public debates and political discourse. In some countries scientists have been elevated to positions as main advisors of governments whereas in other cases, they have found themselves used as scapegoats. In both cases, science and scientists are under unprecedented pressure to come up with (quick) solutions and remedies. However, finding quick solutions and discussing preliminary conclusions in the public domain is more or less the opposite of how science and scientists work. Science has, over centuries, developed procedures and rules in order to safeguard the highest and safest scientific standards possible. But this pandemic has put to the test of public opinion the way science works and is regulated, posing new challenges for scientists regarding communication and accountability.

ZEF is a part of the world-wide science community and, naturally, COVID-19 has had an impact on its work and staff too. ZEF researchers responded fast by adjusting their research and integrating COVID-19 related aspects. One researcher in

Honduras looked at domestic violence in urban settlements in the Central District of her country during the COVID-19 pandemic. Surveys on coping with COVID-19 were carried out in Uganda, Sierra Leone and Ethiopia. Research proposals addressing COVID-19 and its impacts have been submitted and will be funded to conduct, for example, research on epidemic trends and health system needs projections in Thailand. Furthermore, doctoral researchers became stranded while conducting their field research in remote places like a village in the Himalayas or in the Lake Chad Basin region. They wrote impressive, touching and interesting contributions for the special ZEF COVID-19 blog.

This Annual Report 2019-2020 not only covers selected COVID-19 related research but also some of the more regular research and teaching activities. Though ZEF switched to a predominantly digital working mode in its Bonn-based headquarters in Germany when COVID-19 broke out, doctoral theses were still defended, peer-reviewed journal articles written and published, and projects coordinated and carried out. In this report we are happy to share the research activities and results from the past year with you.

ZEF's International Advisory Board, with its members based in Africa, Asia and Latin America, adapted its meeting mode and held a digital board meet-

ing to discuss urgent issues and a new ZEF strategy. The new strategy is not highlighted in this report, which covers the year behind us. But I do want to mention that ZEF intends to focus more on core themes and to strengthen its interdisciplinary research capacities, especially in close cooperation with its Bonn University of Excellence. Read more about [ZEF's new research strategy here](#).

ZEF is happy that, despite the ongoing crisis, it has succeeded in acquiring competitive grants from a variety of national and international donors. We are deeply grateful for our donors' continuous support, which contributes over 80 per cent of the Center's overall budget and thus constitutes the backbone of its scientific success and outreach. Our major donors include the German Federal Ministry of Education and Research (BMBF), the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Federal Ministry for the Environment (BMUB), the German Federal Ministry of Food and Agriculture (BMEL), the State of North Rhine-Westphalia, the German Academic Exchange Service (DAAD), the European Union, Robert Bosch Foundation, and Foundation fiat panis.



Prof. Dr. Mohamed H.A. Hassan

is Chairman of ZEF's International Advisory Board; President of the World Academy of Sciences, Trieste, Italy; President of the Sudanese National Academy of Sciences, Khartoum, Sudan



ZEF'S INTERNATIONAL ADVISORY BOARD

(IN THIS PICTURE: BOARD MEETING IN BONN, 2019)

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INTRODUCTION: ZEF'S RESEARCH AGENDA FOCUSSES ON SIX CORE THEMES



LAND, WATER, FOOD
AND
ENERGY

MARKETS AND
PUBLIC SERVICES



HEALTH,
NUTRITION AND
ECOSYSTEMS

GOVERNANCE,
CONFLICTS AND
NATURAL RESOURCES



INNOVATION,
KNOWLEDGE AND
SCIENCE POLICY

MOBILITY, MIGRATION AND
URBANIZATION



The Center's core research areas are based on the disciplinary strengths of its three departments, as well as on its interdisciplinary expertise. In addition, ZEF aim to ensure transdisciplinary stakeholder

involvement across all research activities, i.e. in the definition of research topics and the perception of scientific findings at different levels with regard to their technical, political and societal implementation.

1.1 LAND WATER FOOD ENERGY

ZEF's research on Land, Water, Food and Energy is probably the largest cross-cutting theme covering a whole range of ZEF research projects and topics. We look into issues ranging from The Right to Food, Water, agriculture and health, Risk reduction in urban supply as well as Renewable energy supply in (West) Africa to Bio-economy-related studies of Mapping carbon emissions embodied in Brazil's soy exports and of Thailand's emerging bioplastic industry.

RIGHT TO FOOD: KENYA'S COFFEE IS PREMIUM, FARMERS' LIVING CONDITIONS OFTEN ARE NOT

By Tina Beuchelt

Coffee is the second most valuable commodity worldwide, just topped by oil. Contrary to popular belief, coffee is not your typical plantation crop but is mainly produced by millions of smallholders in Africa, Asia and the Americas. For many of these producers, coffee is the only source of cash income, making them vulnerable to the often extreme fluctuations of coffee prices on the world market. One way of better insulating smallholder coffee growers from these market forces are certification schemes. However, it has often been ignored how these changing prices affect the food security of coffee growing communities.

The joint ZEF, Welthungerhilfe and World Wildlife Fund (WWF) project, "Food Security Standard (FSS)", tested the rights-based food security criteria and tools within a regular sustainability certification audit (from Rainforest Alliance) at the Kangunu Cooperative in Murang'a County in Kenya.

Kenya's case

Kenyan coffee is world-famous for its good quality. Kenyan coffee is one of the main contributors to the country's foreign exchange earnings after tea and horticulture, and around 75% of Kenya's coffee is produced by smallholder farmers. Kenyan coffee is traded at comparatively high prices on international markets. But what does this say about the well-being and food-security situation of the smallholder farmers who grow the coffee plants?

Smallholder coffee production in central Kenya

Due to Kenya's growing population there is hardly any land left for smallholders to

buy or rent in Murang'a County. Around 10-15% of the population suffer from food insecurity. Much of the younger generation is moving to urban areas to seek employment and more reliable sources of income than from the coffee-farming sector.

Smallholder coffee farms in central Kenya are highly diversified. The average coffee farm has 150 to 250 coffee trees forming the main source of cash income for most of the farmers. Apart from coffee, the farmers grow food for their own consumption and fodder for their few cows and goats. Depending on the farm size, they also grow tea as a second cash crop. The farmers are mostly organized in cooperatives for bringing the coffee to the market.

The Kangunu cooperative consists of around 2,500 active members who grow coffee and deliver it to the cooperative's own wet mill. The Coffee Management Services Ltd., a marketing agency, sells the Kangunu coffee on the global market since 2007, as a ruling of the Kenyan Government prescribes the use of marketing agencies.

During our field research farmers were found to be at risk of food insecurity: Some had to skip a meal for a couple of weeks per year, but overall no severe hunger situation occurred. The phases of food insecurity were reported to be caused mainly by food price peaks in local markets and falling coffee prices in the international coffee market. These lead to lower incomes, with the result that farmers face difficulties breaking-even. According to Coffee Management Services Ltd., only 21% of the coffee farms are economically viable.

The aim of Coffee Management Services Ltd. is to fetch better prices at the coffee auction by producing higher-quality coffee. It therefore offers, jointly with the cooperative, training to farmers on good agricultural practices. Food security is also addressed through training on the cultivation of food crops, food preparation and healthy food, provision of improved vegetable and maize seeds, and support for dairy production and marketing by farmers. However, when global coffee market prices are low these diverse activities and additional projects are insufficient to guarantee year-round food security to all farmers.

Certification eases the implementation of the Right to Food

Integrating the Food Security Standard into sustainability audits enables companies like Coffee Management Services Ltd. to have a closer picture of the food security situation, allowing them to identify gaps and areas for improvement. By incorporating the FSS into sustainability standards, a higher level of sensitivity for local food security can be reached by all actors and companies involved in the supply chain. This would enable all the actors involved in the coffee value chain to follow their due diligence to respect the Human Right to Food of farmers.

This research is funded by the German Federal Ministry of Food and Agriculture (BMEL) via "Fachagentur für Nachhaltige Rohstoffe".

Website: <https://www.zef.de/project/FSS-project>

HOW WATER, SANITATION AND AGRICULTURE CAN IMPROVE HEALTH AND NUTRITION

By Nicolas Gerber et al.

The COVID-19 crisis has forced renewed attention to the critical role of hygiene, sanitation, and clean drinking water. In 2010, the United Nations General Assembly recognized access to safe water and sanitation infrastructure as a human right. This strongly influenced the Millennium Development Goals, led to large international investments in water and sanitation infrastructure, and is reflected today in Sustainable Development Goal 6. Progress towards achieving targets 6.1 and 6.2 (universal access to safe and affordable drinking water and adequate sanitation by 2030) has been recorded and is expected to spill over to other dimensions of human development, in particular health and nutrition.

Yet, progress towards improved health and ending malnutrition is not commensurate with progress under Sustainable Development Goal 6. In rural settings across the developing world, we hypothesize that part of the answer lies in improving our understanding of the complex linkages between agriculture, water and sanitation.

Research on Water, Sanitation and Agriculture (WATSAN) in four countries

In our study we researched the water, sanitation and agriculture linkages and their association with nutrition and health in various rural and peri-urban multi-purpose water systems in Bangladesh, Ethiopia, Ghana and India. Across the four countries, we find a negative association between access to improved water sources and the height-for-age and weight-for-age of children below five years old. Our research at the study sites offers insights into this surprising result.

First, we find that water from improved sources is frequently contaminated. In India and Bangladesh, 78 per cent of our surveyed households use contaminated drinking water, although more than 90

per cent have access to improved water sources. This contamination takes place between the point of source (where the water is collected) and the point of use, probably due to water handling (e.g. non-covered or unclean containers), due to a lack of hygiene practices by those handling or transporting water (e.g. washing hands with soap after defecation) or during water storage. In some settings, piped water distribution is associated with larger amounts of stored water by the households, possibly due to intermittent piped water flows.

Policy recommendation: When undertaking efforts to improve domestic water supply, equal attention should be given to the quality, quantity and proximity of its source to maximize health benefits and nutrition outcomes. Monitoring quality from the source to the mouth can help to locate problematic issues, whether in the infrastructure or in the behavior of users.

The role of agriculture, irrigation and food safety

Irrigation agriculture, its outputs and spillover effects, can have positive and negative effects on nutrition and health for farm households and the surrounding communities. Irrigation agriculture enables higher and more stable yields, as well as a more diversified food production, whilst providing an additional source of water for domestic use. Yet, irrigation infrastructure can provide breeding grounds for parasites and diseases (e.g. malaria). Our cross-country analysis demonstrates that irrigation, in particular using wastewater, can have a negative net association with health and nutrition.

Policy recommendation: Agricultural water practices and domestic water supply should always be considered as linked to one another. Adequate treatment and handling must be ensured

when utilizing wastewater for irrigation. Disease risks should be considered when planning and implementing irrigation systems. Fixing water, sanitation and hygiene issues without taking into account food production issues cannot sustainably address the underlying goals of improved nutrition and health. We advocate the adoption of a system perspective to water use and management around the farm and household.

As the world struggles with the COVID-19 outbreak, we are reminded about the importance of basic hygiene behavior, such as washing hands with soap. Yet we cannot forget the necessity of considering water quality along the whole chain – from the source to the mouth. Such information, as part of water, sanitation and hygiene education and knowledge, can help to change problematic behavior. Research on water and sanitation programs suggests that this might be even more critical than addressing infrastructural needs alone.

This synthesis is based on five completed doctoral dissertations and a number of articles in peer reviewed journals.

It was published as ZEF policy brief no. 34, see <https://bit.ly/ZEFPolicyBrief-342HCRlhu>

This research was funded by the Bill & Melinda Gates Foundation.

RISK REDUCTION FOR URBAN RESOURCE SUPPLY IN SUB SAHARAN AFRICA

By Sarah Verleysdonk, Navneet Kumar and Bernhard Tischbein



Photo: Sarah Verleysdonk

The project 'Risk Assessment and Reduction Strategies for Sustainable Urban Resource Supply in Sub-Saharan Africa (RARSUS)' aims to strengthen the resilience of urban supply systems. ZEF's role in this consortium is geared towards sustainable water management in the urban and peri-urban zones of Niamey. Flood management in small urban river basins is challenging everywhere in the world, but in most of Africa the situation is especially difficult. Oftentimes, there is a lack of data on the smaller scales. In addition, the very quick response of small water basins to intensive rainfall implies that a flood can follow almost immediately after heavy rainfall. This is even intensified in urban areas where buildings and roads take up most of the available space. Limited availability to store water poses an additional challenge for Africa's densely populated urban areas.

First aim: Flood management concepts for Niamey

Our study looks into Niger's capital Niamey, one of the fastest growing cities worldwide. Areas close to water resourc-

es are heavily contested, mainly for housing and vegetable gardening. The first aim of this research was to advance flood management concepts within Niamey. We analyzed flood-coping mechanisms in a small urban basin of about 60 km², which is almost completely located within the city borders, and conducted a flood risk assessment and management study using hydrological modeling, monitoring and statistical analyses. We were able to develop better flood-management strategies for Niamey by strengthening the storage capacities for excessive water outside of the city where more space is available, by upgrading the hydraulic capacity of the drainage system in the city during heavy rainfall, and by enhancing infiltration as well as roof-water harvesting in the city. These measures should be taken in combination with early-warning systems and awareness raising within the population.

Second aim: Strengthen irrigation facilities

The study's second aim was to strengthen the small and medium-scale irrigation fa-

cilities in the urban and peri-urban zones of Niamey. Our results show a huge potential for water saving as gross water input by far exceeded the crop water requirements. This water saving potential can be mobilized via improved irrigation-scheduling and advanced handling of irrigation techniques without lowering yields (thus resulting in productivity gains). Improving irrigation schedules in Niamey's medium-size rice irrigation schemes therefore creates a win-win situation in terms of water and energy saving, because a huge share of the irrigation water is pumped from the river Niger. Remote-sensing, modeling and capacity development Use of remote-sensing techniques enabled us to develop a high spatial-resolution land-use map of Niamey. This information provides valuable input to hydrological and water-management modeling and can support the integration of water-management concepts into future spatial-planning. The research activities were carried out in close connection with capacity building measures via an online Summer School and e-learning materials. Moreover, we integrated research conducted by Master students of the Abdou Moumouni University of Niamey. The participation of local and regional students in the project means that its impacts are more likely to be sustained once the project ends.

This research is funded by the German Federal Ministry of Education and Research (BMBF) (RARSUS, RARSUS-SEMALI) and the German Academic Exchange Service (DAAD) (RARSUS-DAAD).

More information at: <https://www.zef.de/project/rarsus>

THE POWER OF WATER, SUN AND WIND: ADVANCING RENEWABLE ELECTRICITY SUPPLY IN WEST AFRICA

By Sebastian Sterl et al.

West Africa is on the verge of an energy turnaround. Its population is growing, urban areas are expanding, industries and electrification are advancing, and demand for reliable power supply is increasing accordingly. Until now, West Africa has been heavily dependent on natural gas, which covers more than 50 per cent of its total electricity supply, supplemented by hydropower. An international team of modelers have now calculated how a sustainable and reliable energy transition, breaking with the “natural gas and hydro” paradigm and diversifying towards clean solar photovoltaic (PV) and wind power, could be kick-started in West Africa. They developed a new computer model and used detailed water, weather and climate data from the region for their calculations.

The power of hydropower

According to the scientists, existing and planned hydropower may play a key role for such a green transition in West Africa. “Solar and wind energy vary on all time scales from hourly to annual, which means grid operators are often hesitant about their take-up,” says Sebastian Sterl, lead author of the study. “Hydropower is an ideal lever to support the uptake of solar and wind power, because it can be used highly flexibly and generates considerably lower CO₂ emissions than natural gas”.

West African Power Pool

For West Africa to successfully integrate high shares of solar photovoltaic and wind power in its electricity mix, however, greater regional cooperation and networking in energy production will be paramount according to the study. The scientists propose that a “West African Power Pool”, which would connect national power grids on an intra-regional basis, may provide an ideal way to increase the potential for integrating variable renewable resources on the grid. This is because the spatial distribution of hydro, solar and wind power potential is highly uneven.

Countries with a tropical climate, such as Ghana and Côte d’Ivoire, typically have a huge potential for hydropower and quite high levels of solar radiation, but hardly any wind. The drier countries like Senegal and Niger have little potential for hydropower, but more sunshine and wind. Taken together, about 60 per cent of the current electricity demand in West Africa could be covered by complementary renewable electricity sources: half from solar and wind power, the other half from hydro-electric power, without the need to build or use large batteries or other storage facilities. According to the study, within a few years the cost of solar and wind power generation in West Africa should fall to such an extent that the proposed solar-wind-water strate-

gies will provide cheaper electricity than gas-fired power plants.

Better ecological footprint

Hydro-electric power plants, however, also have negative impacts on local ecosystems. In many developing countries, piles of controversial plans for new hydropower plants have been developed. The study can help to make future investments in hydropower more sustainable. “By making the best possible use of existing and planned hydroelectric power plants and by massively promoting solar and wind energy, we can reduce the need to build some new dams,” says Sterl. “In this way, the CO₂ emissions from gas-fired power plants as well as the environmental damage caused by the overuse of hydropower can be reduced”.

Publication: Sterl, S., Vanderkelen, I., Chawanda, C.J. et al. Smart renewable electricity portfolios in West Africa. Nat Sustain (2020). <https://doi.org/10.1038/s41893-020-0539-0>

This study was carried out in the framework of the CIREG project (see cireg.pik-potsdam.de) with support from the European Union and the Belgian Office for Science Policy (BELSPO). Researchers came from the Vrije Universiteit Brussel (VUB) and the KU Leuven (KUL), both in Belgium, and the Center for Development Research (ZEF) of the University of Bonn in Germany.

More information here: <https://www.zef.de/project/cireg>



Photo: Roberto Cantoni

CONDEMNED TO CIRCULARITY: THAILAND'S EMERGING BIOPLASTIC INDUSTRY

By Jan Janosch Förster

Waste bags on the streets of Bangkok, overloaded dumping sites, plastic waste in national parks and on the country's beaches: Thailand faces a considerable waste management challenge. This applies in particular to plastic waste from single use items. Moreover, Thailand is the world's sixth largest plastic waste polluter of the oceans. For these reasons, the Thai government is attempting to phase out a number of single use plastic items, such as bottles, bottle caps, straws and plastic bags (effective from January 2020). Promoted as a future industry in Thailand's Bio-Circular-Green Economy model, Thailand's bioplastic industry benefits from abundant supplies of agricultural feedstock: sugarcane and cassava. Recent field research on Thailand's bioplastic industry development explored the degree to which plastics based on natural feedstock can provide an alternative to conventional, oil-based plastics, as well as the drivers and constraints of this potential change. The research explored policy and regulatory aspects, end-of-life solutions, biodegradability, and compostability of bioplastic products in soil and marine environments.

Production-related aspects

Global bioplastic production capacity is projected to increase from 2.1 million tons in 2018 to 2.6 million tons in 2023. Early study results indicate that domestic demand for bioplastic has so far been limited, mainly due to its relatively high price. Around 95% of Thailand's annual production of around 75,000 to 100,000 tons of the bio-plastics PBS (polybutylene succinate) and PLA (polylactic acid) are exported. Our research findings indicate major constraints to the use and production of bioplastics in Thailand's different economic sectors including the high production costs for bioplastic as compared to those for oil-based plastics. While the current market price for a ton of conventional PE (polyethylene) ranges in between 1,200 to 1,600 USD per ton,

one ton of PLA from locally-sourced sugarcane or cassava is approximately three times higher. This poses a major obstacle to the increased use of bioplastic products by domestic converters and manufacturers along the value chain. Due to the relatively cost-intensive biochemical production processes of bioplastics in Thailand, only larger petro-chemical conglomerates have so far invested in the production of plastics based on natural feedstock. For small and medium-sized enterprises contemplating a transition to bioplastics production, high investment costs, the necessary research and development, a change of production machinery and related learning processes, as well as time-consuming procedures to apply for state funding and the long and costly process of product certification all pose considerable constraints.

The term bioplastic encompasses a number of different materials. A blend or a compound from biomass and conventional plastic is called biobased plastic. If bacteria under the right biophysical conditions completely assimilate a plastic's constituent parts as food for their energy, it is called biodegradable plastic. The results of degradation vary and depend on the structure of the polymer chain, not on the origin of the raw material. As part of a biodegradation, compostable plastics fully decompose biochemically in soil or in controlled environments of industrial composting facilities

Material composition, properties and their consequences

The material properties of current bioplastics can-not yet match those of conventional plastics in terms of temperature resistance, moisture absorption, chemical reactivity, durability, flexibility and degradability. These material performances are, however, crucial for specific applications in different sectors (space technology, mobility sector and health-related sectors). International certification and standards for bioplastics exist and further ones are under development, yet a clear definition of bioplastic remains elusive

(see box). The manifold material compositions make a differentiation between conventional plastic and those based on natural feedstock for recycling purposes difficult in practice.

Outlook for bioplastics in an interconnected world

Experts interviewed for this study explained that without a more advanced waste-management cycle of sorting, collecting, recycling, or reuse, bioplastic might just become another source of waste; thus turning the potential solution into an additional problem. Globally, sustainability trade-offs have to be considered, e.g. potentially negative land-use effects on food security and the role of CO₂ emissions in the production and degradation of bioplastics. Nevertheless,

What is Bioplastic?

especially compostable bioplastics and related products exemplify the potential of mimicking natural cycles in economic practices (i.e. in circular economy approaches) while providing a potential pathway towards greater sustainability for developed and developing countries alike.

This research is funded by the German Federal Ministry of Education and Research (BMBF). More about the STRIVE project at strive-bioecon.de

THE ROTTEN APPLES OF BRAZIL'S AGRIBUSINESS

By Raoni Rajão et al.

The increasingly polarized international political arena is making it difficult to find common ground to solve Brazil's ongoing environmental crisis, which has global as well as local implications. International buyers of Brazil's agricultural commodities have raised concerns about products that fuel deforestation. The European Union's criticism of the Brazilian government has bolstered demands to boycott Brazilian products and to withhold ratification of the trade agreement reached in 2019 between the EU and Mercosur, the South American trade bloc. Among the concerns is that increasing greenhouse gas emissions from deforestation and forest fires in Brazil could cancel out EU climate change mitigation efforts. The Brazilian government and agribusiness, however, contend that national laws ensure high conservation standards, and hence trading bans should not include legally authorized deforestation. Our study addresses the interlinkages between illegal deforestation in the Amazon and the Cerrado – the largest Brazilian biomes with the highest rates of deforestation – and EU imports of Brazil's soy and beef, the country's major agricultural commodities.

This study goes beyond previous assessments of soy and beef supply chain traceability and zero-deforestation commitments, because we explicitly link illegal deforestation on individual rural properties to their agricultural production and exports to EU countries. To achieve this we compiled a comprehensive set of land-use and deforestation maps for Brazil; information on 815,000 rural properties' boundaries from the Cadastro Ambiental Rural, the country's online environmental registry; data from TRASE (Transparency for Sustainable Economies); and GTA documents (cattle transport permits) that are issued when animals are traded between properties and sent to slaughterhouses. We also developed software to deal with the geospatial data challenge of calculating the level of legal compliance for each individual property, to differentiate between potentially legal and illegal deforestation alongside production of cattle and soy.

Our study finds that although most of Brazil's agricultural output is deforestation-free, 2 per cent of properties in the Amazon and Cerrado are responsible for 62 per cent of all potentially illegal defor-

estation and that roughly 20 per cent of soy exports and at least 17 per cent of beef exports from both biomes to the EU may be 'contaminated' with illegal deforestation. Raising awareness is important to press Brazil to conserve its environmental assets and to promote international political will for cutting telecoupled GHG emissions. This could be achieved, for example, through the environmental safeguards of the Mercosur-EU trade agreement, which require EU imports to comply with the export country's legislation.

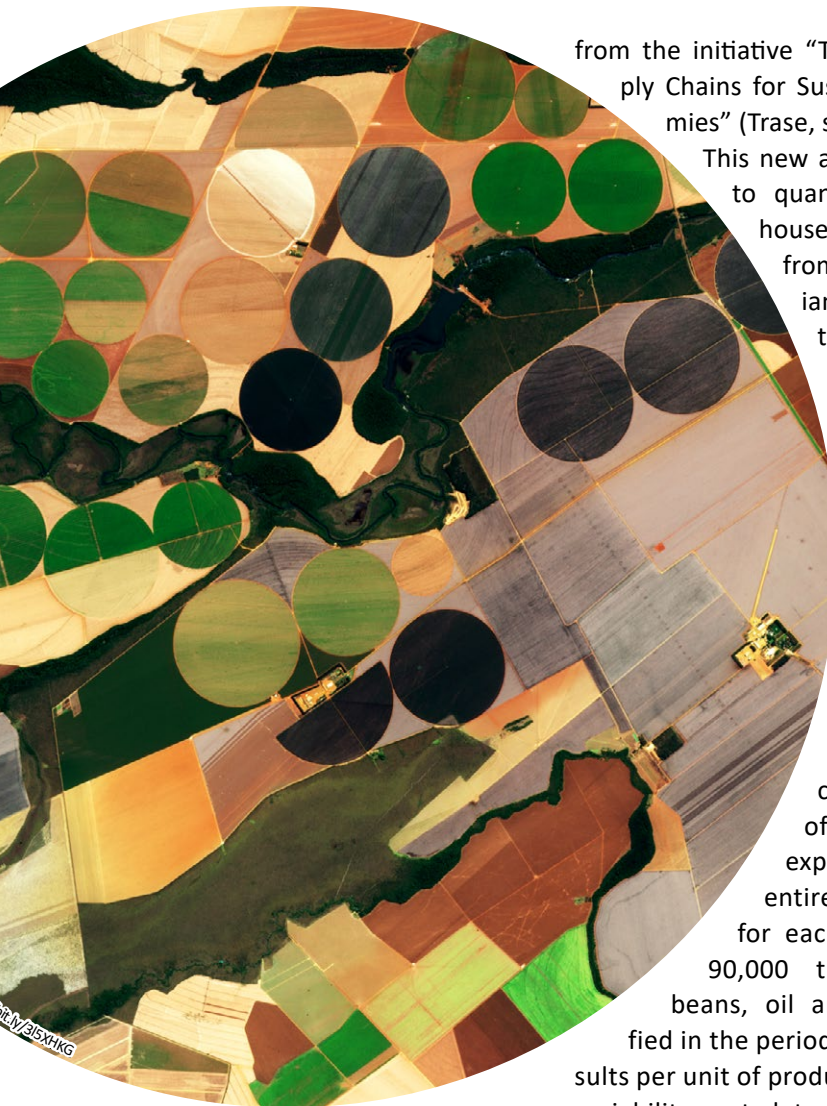
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[DOI: 10.1126/science.aba6646](https://doi.org/10.1126/science.aba6646)



MAPPING CARBON EMISSIONS EMBODIED IN BRAZIL'S SOY EXPORTS

By Neus Escobar et al.



from the initiative “Transparent Supply Chains for Sustainable Economies” (Trase, see: trase.earth).

This new approach is used to quantify the greenhouse gas emissions from trade in Brazilian soy, the most traded agricultural commodity in the world.

Carbon footprints at sub-national scales

The study is the first to provide an estimate of the carbon footprint of Brazilian soy exports across the entire sector and for each of the nearly 90,000 trade flows of beans, oil and cake identified in the period 2010-2015. Results per unit of produce show a large variability, not detected in previous studies. The most carbon-intensive products originate from municipalities – mainly located in the Cerrado savanna but also the Amazon rainforest – where soy was grown at the cost of natural vegetation. Specifically, the municipalities with the largest carbon footprints are located in the current hotspot of soy-induced deforestation, the MATOPIBA region (the states of Maranhão, Tocantins, Piauí and Bahia).

Together with Pará, these five states have the largest state-level footprints. Throughout Brazil transport is an important contributor to greenhouse gas emissions: it makes up more than a third of the emissions in the export-oriented states of Goiás and Mato Grosso in Center-West Brazil.

Implications for global responsibility

The results reveal a large variability in the carbon footprint per unit of soy of importing countries and regions. Among all importing regions, the European Union shows the largest footprint, 0.77 tCO₂-eq/t. By comparison, the world’s largest single importer, China, has a footprint of 0.66 tCO₂-eq/t. This difference arises because major EU countries import a large share of their soy from the MATOPIBA region, while China imports a larger share from municipalities where land was cleared long ago. China still accounts for more than half of the total greenhouse gas emissions in absolute terms, but the European Union imports more emissions from deforestation. This study can inform companies’ decisions on where to source soy to reduce their carbon footprint and prevent deforestation in Brazil, while enabling coordinated action for more effective governance at the local, regional, national, and international levels.

International trade causes a displacement and distribution of environmental impacts across its increasingly complex and transnational supply chains. Calculations of the environmental footprint, or ‘carbon footprint’, of products show that the largest impacts are generated at production sites and during transport, related to the infrastructure involved and export logistics.

Our research team at ZEF, together with partners in Spain, Belgium and Sweden, developed a framework to estimate the spatially-explicit environmental footprints of agricultural products with unprecedented accuracy. Our work involves the integration of the Life Cycle Assessment with data

Publication: Neus Escobar et al. Spatially-explicit footprints of agricultural commodities: Mapping carbon emissions embodied in Brazil’s soy exports. Global Environmental Change, Vol. 62 (2020). DOI: [10.1016/j.gloenvcha.2020.102067](https://doi.org/10.1016/j.gloenvcha.2020.102067)

More about the STRIVE project: strive-bioecon.de

OVERVIEW: ZEF'S PROJECTS ON LAND WATER FOOD ENERGY

PROJECT	DESCRIPTION	TIME SPAN	MAIN FUNDER	WEBSITE
Climate Information to support integrated Renewable Electricity Generation (CIREG)	Analysis of and policy advice on renewable energy generation in developing countries.	2018-2021	ERA4CS (BMBF)	https://www.zef.de/project/CIREG
Implementing CLIMate-sensitive Adaptation strategies to reduce Flood Risk in the trans-boundary Lower Mono River catchment in Togo and Benin (CLIMAFRI)	Reduce flood risk in the transboundary Lower Mono River catchment of Togo and Benin via a river basin information system.	2019-2022	BMBF	https://www.bmbf-client.de/projekte/climafri
EntoNUTRI	Development and implementation of insect-based products to enhance food and nutritional security in sub-Saharan Africa.	2015-2020	BMZ	https://www.zef.de/project/EntoNUTRI
Project Implementation of food security criteria within biomass sustainability standards (FSS)	Local food security and the Human Right to Adequate Food as new elements for sustainability standards and certification schemes.	2017-2020	BMEL via "Fachagentur für Nachwachsende Rohstoffe"	https://www.zef.de/project/FSS-project
Innovative Impulses Reducing the Water Footprint of the Global Cotton-Textile Industry towards the UN-Sustainable Development Goals (InoCotton-GROW)	Sustainable use of water in the cotton textile supply in Pakistan and India.	2017-2020	BMBF	http://inocottongrow.net/
Integrated Water Governance Support System	Effective and efficient governance of transboundary water in Southern Africa.	2017-2020	BMBF	https://www.zef.de/project/grow
Partnerships for Healthy Diets and Nutrition in Urban African Food Systems - Evidence and Strategies (NOURICITY)	Investigating the structure and dynamics of urban food systems in and at analyzing the co-existence of different facets of urban malnutrition and their drivers.	2019-2022	EC H2020 ERA-Net Co-fund, through LEAP-Agri	https://nouricity.org/ and https://www.zef.de/project/NOURICITY
Production and Processing of Edible Insects for Improved Nutrition - Innovative Approaches to process Local Food in Sub-Saharan Africa and Southeast Asia (ProciNut)	Use the nutritional and economic potentials of edible insects in Madagascar, Myanmar and Thailand.	2018-2021	BMEL	https://www.zef.de/project/procinut

PROJECT	DESCRIPTION	TIME SPAN	MAIN FUNDER	WEBSITE
Risk Assessment and Adaptation Strategies for Sustainable Urban Resource Supply in Sub-Saharan Africa (RARSUS)	ZEF is focusing on working out options towards more sustainable water infrastructure and its management in Niamey/Niger and Bamako and Katibougou (both in Mali).	2017-2019	BMBF (RARSUS, RARSUS-SEMALI) and DAAD (RARSUS-DAAD)	https://www.zef.de/project/rarsus
Transformation and Sustainability Governance of South American Bioeconomies	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 in South America.	2020-2023	BMEL	https://www.zef.de/project/SABio
WASCAL-PAUWES Cooperation project for capacity building	The cooperation project links the two African Capacity Building Centers supported by the BMBF WASCAL-GSP and PAUWES.	2017-2020	BMBF	https://www.zef.de/projects/
Supporting IPBES capacity building in West Africa (WABES)	MSc Program and Networking for Supporting IPBES capacity building in West Africa.	2017-2022	International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	http://www.wabes.net
Water and Energy Security for Africa (WESA)	MSc and PhD studies and networking at Pan African University - Institute of Water and Energy Sciences (PAUWES).	2016-2020	BMBF	https://www.zef.de/project/wesa

1.2 HEALTH NUTRITION ECOSYSTEMS

In the context of the Covid-19 pandemic our One Health research is at the center of this chapter. The basic idea of One Health is the interconnectedness and interdependency of human, animal and environmental health issues. Read more about this and further issues such as the varying causes and effects of antibiotics use, and the potential of edible insects in Madagascar and Myanmar.

THE CORONA VIRUS PANDEMIC HIGHLIGHTS THE NEED FOR A 'ONE HEALTH' APPROACH

By Timo Falkenberg

The novel corona virus, SARS-CoV-2, which is the causative agent of the current COVID-19 outbreak, has caught the world by surprise with devastating consequences for national health systems and the global economy. However, health experts have been warning about the pandemic risk of zoonotic spillovers for years, highlighting the need for integrated surveillance systems at the human-animal interface. Combining and integrating surveillance data on humans, domesticated or captive animals and wildlife, can improve the detection of viral outbreaks and lead to more rapid responses in the future.

Not-so-new zoonotic diseases

Zoonotic diseases are diseases that are transmitted between animals and humans, usually originating in wildlife populations and involving domestic animals as intermediate hosts before spilling-over into the human population. The US Center for Disease Control (CDC) has estimated that 60 per cent of all human infectious diseases are of zoonotic origin. They include many ancient diseases, such as rabies, influenza and tuberculosis, as well as most of the recently emerging diseases, such as Ebola, SARS and Zika. According to the CDC, 75 per cent of newly emerging infectious diseases are zoonotic. The question for health experts is, therefore, not if new zoonotic diseases will emerge, but when and where the next zoonotic outbreak will occur and how effective early-warning systems can be set up and rapid-response strategies established.

Animals and humans competing for space and habitats

The key driving force behind the in-

creased zoonotic disease spillover is the ever-increasing contact between humans and animals. Human population growth and economic development has led to higher food demand, particularly for animal protein, consequently bringing about agricultural intensification. Expansion of human settlements and agricultural land and seemingly insatiable resource extraction is resulting in human encroachment into wildlife habitats, thus intensifying the contact between wildlife, domestic animals and humans. Destruction of natural ecosystems and wildlife habitats is forcing wild animals to live closer to human settlements in their search for food. Some wild animals have adapted so well to urban life that they have become a part of the urban fabric, thereby posing a continuous risk of pathogen exchange with humans.

Cooperation beyond national borders and academic disciplines is needed

We are living in a globalized world, where people, living animals, animal products and goods move and are traded freely across borders and between continents. Therefore, it is necessary that all countries collaborate and collectively develop strategies for integrated surveillance and the prevention of zoonotic diseases. The interdependent relationships between economic development, food production, livelihoods, ecosystem integrity and health need a careful and holistic approach, therewith calling for system-oriented, integrated approaches to health.

Working out an international 'One Health' approach

Recognizing this necessity in the aftermath of the 2006 bird flu and 2009 swine flu outbreaks, the World Health Organiza-

tion (WHO), the World Organisation for Animal Health (OIE) and the Food and Agricultural Organization of the United Nations (FAO) set up the Tripartite Collaboration Agreement, which aims to prevent and manage zoonotic diseases along with their economic, social and public health impacts. In parallel, academia saw the revitalization of the 'One Health' concept, which implies that the health of humans, animals and the environment are intrinsically interconnected and interdependent. Though the 'One Health' concept is accepted by an increasing number of countries, its implementation is nevertheless hampered by intersectoral conflicts, lack of funding and power imbalances.

First lessons to be learned from COVID-19

The current COVID-19 outbreak has revealed the need for the early detection of zoonotic outbreaks as well as global early-warning systems to prevent zoonotic spillovers from turning into pandemic threats. The 'One Health' approach offers an integrated, interdisciplinary perspective on the dynamics of zoonotic disease emergence, enabling the identification of critical control points and the development of prevention strategies. The approach needs to be adopted at local, national and international levels so that future zoonotic diseases can be better and more quickly detected and controlled.

Find more information on the One Health Project at: <https://www.zef.de/onehealth.html>. The project is funded by the Ministerium für Innovation, Wissenschaft und Forschung des Landes Nordrhein-Westfalen (MIWF-NRW). Press release (in German) by the University of Bonn here: <https://www.uni-bonn.de/neues/089-2020>.

ANTIBIOTICS: CITY DWELLERS AND CHILDREN TAKE THE MOST

By Dennis Schmiede et al.

ZEF “One Health” researchers take a close look at 73 studies on the use of antibiotics.

City dwellers take more antibiotics than people in rural areas; children and the elderly use them more often than middle-aged people; and as education increases, the use of antibiotics decreases, but only in rich countries. These are three of the more conspicuous trends that researchers from the NRW Research College “One Health and Urban Transformation” at the University of Bonn identified in a recent study that looked at the use of antibiotics in the outpatient sector around the globe. The topic is of great importance: too many antibiotics are still being administered. A possible consequence is resistance: There are already hardly any effective drugs available against some bacteria.

Most antibiotics are taken by patients whose disease does not require hospitalization. In Germany, these cases account for approximately 85 per cent of all antibiotic prescriptions; EU-wide the rate is slightly higher. But what factors contribute to the use of antibiotics in the outpatient healthcare sector? Scientists have been interested in this question for some time. That too many antibiotics are administered is largely undisputed. This practice promotes the development of resistance and slowly blunts the effectiveness of these weapons, which are actually the sharpest weapons against bacterial infections.

The study summarizes the current state of knowledge on this problem. The participating scientists



tists evaluated a total of 73 publications on the driving factors of antibiotic use in the outpatient sector. “We were interested in individual parameters such as age and education, but also in geographical connections and socio-cultural factors,” explains ZEF-researcher Dennis Schmiede, who is doing his doctorate at the University of Bonn under the supervision of Prof. Mariele Evers (Geographical Institute) and Prof. Thomas Kistemann (Institute for Hygiene and Public Health).

600 possible influencing variables evaluated

Together with his colleague, ZEF senior researcher Timo Falkenberg, Dennis Schmiede evaluated almost 600 variables and combined them into 45 groups. For each of the groups, the overview paper lists whether they are to be considered significant influencing factors according to the current study situation. The groups are then ranked according to their relative influence. It is relatively well documented that children and seniors consume more antibiotics than middle-aged people. However, higher level of education tends to have a braking effect, a correlation that is reversed in poorer countries - “probably because it is more likely to be the better educated people who can access the health care system or afford to visit a doctor or buy a drug at all,” assumes Schmiede.

Among the geographical parameters, the discrepancy between urban and rural areas is striking: some publications show that the use of antibiotics is higher in urban areas. “We assume that this has something to do with better access to doctors’ surgeries and pharmacies,” said Schmiede. In fact, the density of doctors also seems to be one of the driving factors. In contrast, higher drug prices reduce the quantity of antibiotics sold.

Comparatively little research has been carried out on the socio-cultural parameters that promote antibiotics use. National



culture seems to have a certain influence: for example, more antibiotics are used by the citizens of “masculine” societies, considered to be more competition-oriented. The situation is similar in societies that are classically more concerned with avoiding uncertainty. “We see a clear need for more research in this area, especially in countries with lower and middle incomes that are currently underrepresented in the literature,” emphasizes Dennis Schmiede.

Publication: Dennis Schmiede, Mariele Evers, Thomas Kistemann und Timo Falkenberg: What drives antibiotic use in the community? A systematic review of determinants in the human outpatient sector; International Journal of Hygiene and Environmental Health; <https://doi.org/10.1016/j.ijheh.2020.113497>

This study was conducted in the framework of the NRW Research College “One Health and Urban Transformation”, which is a graduate college funded by the Ministry of Culture and Science of the State of NRW. It is conducted by the University of Bonn in cooperation with the Bonn-Rhein-Sieg University of Applied Sciences (H-BRS) and the United Nations University - Institute for Environment and Human Security (UNU-EHS) in Bonn. Further information on the research group is available on the website www.zef.de/onehealth.html

Press release launched by Bonn University (in German): <https://www.uni-bonn.de/neues/057-2020>

This research is funded by the Ministerium für Innovation, Wissenschaft und Forschung des Landes Nordrhein-Westfalen (MIWF-NRW)

THE POTENTIAL OF EDIBLE INSECTS IN MADAGASCAR AND MYANMAR

By Sarah Nischalke

The potential of edible insects to provide an alternative source of protein and nutrition has only recently been recognized in the Global North. Legislation adopted by the European Union last year makes it now possible for processors, supermarkets and restaurants to offer insect-based products to customers. At the same time, the agricultural sector has developed huge interest in using insects for feed, reflected in ongoing application and screening processes.

insects (e.g. giant crickets or water beetles) because of their superior taste. The farmers, likewise, fetch a higher price for such females. One detected problem for consumers is that wild insects often accumulate pesticides in their bodies absorbed from agricultural production.

ProciNut researchers on the ground

Researchers from the ZEF-led ProciNut project are attempting to establish functioning and safe insect production and

the area. At Yezin Agricultural University, Myanmar, trials are running on the semi-domestication of giant crickets, which is the most consumed insect in the country. So far, it has been unsuitable for rearing because of its long life cycle (the shorter the life cycle of insects, the higher the viability). First trials on different processing techniques in both countries and on the production of insect powder for serving as local snacks or side dishes are underway.

From theory to practice: unexpected constraints

Research has so far revealed unexpected constraints. The first is the absence of insight by farmers and policy makers that insect rearing is feasible and has the potential to enhance livelihoods and serve as a source of nutrition. The second is the lack of markets. Most insect markets in Madagascar are highly localized, whereas in Myanmar country-wide value chains only exist for giant crickets, silk worms or bamboo borers (partly imported from Thailand and China). Compared with conventional livestock rearing, which has a long tradition and hundreds of years of breeding experience, insect rearing is a new field and still requires extensive baseline research. This is especially the case if one targets species beyond the dozen or so that are currently reared across the world. Even with regard to these better known species, issues such as ideal rearing conditions, productivity or food safety are yet to be sufficiently handled.



Edible insects offered at a market in Myanmar, photo: Sarah Nischalke.

In contrast, insects are traditionally an integral part of food cultures in Madagascar and Myanmar in the form of daily meals, emergency foods or expensive delicacies. Their consumption helps overcome protein deficiencies in lean times and contributes to diversified diets in these countries. Whereas insects in Madagascar are cheaper than meat, in Myanmar insects are more expensive – and mostly collected in the wild and sold on the market to affluent urbanites. In both countries the collection of insects in the wild, either for household consumption or for sale, has put ecosystems and insect populations under stress. This stress is exacerbated by a rising demand from consumers for egg-bearing female

processing systems, by promoting insect rearing, providing training, and developing training materials for extension services in both Myanmar and Madagascar. In addition, the project group develops curricula for universities, value chains and organizes policy events. In Madagascar, trials were started on alternative feeds for the wild silk worm (*Borocera cajani*), on rearing local crickets (*Gryllus madagascariensis*), and on a locust species not classified as a pest. The participating farmers welcomed the training and will now try to establish their own small-scale production systems. In Myanmar, trials are currently being conducted on rearing house crickets at the Kengtung University and with farmers in

ZEF's Procinut research is funded by the German Federal Ministry of Food and Agriculture (BMEL) based upon a decision of the Parliament of the Federal Republic of Germany (Bundestag). More information at: <https://www.zef.de/project/procinut>



Photo: Sebastian Forneck.

OVERVIEW: ZEF'S PROJECTS ON HEALTH NUTRITION ECOSYSTEMS

PROJECT	DESCRIPTION	TIME SPAN	MAIN FUNDER	WEBSITE
Dr. Hermann Eiselen Doctoral Program of the Fiat Panis Foundation	Support of doctoral re- search in the area of nutrition and food se- curity.	Since 2011	fiat panis Foundation	http://www.stiftung-fiat-panis.de/en/
Partnerships for Healthy Diets and Nutrition in Urban African Food Systems - Evidence and Strategies (NOURICITY)	Investigating the struc- ture and dynamics of urban food systems in and at analyzing the co- existence of different facets of urban malnu- trition and their drivers.	2019-2022	EC H2020 ERA-Net Co- fund, through LEAP-Agri	https://nouricity.org/ and https://www.zef.de/ project/NOURICITY
One Health and Urban Transformations – iden- tifying risks and devel- oping sustainable solu- tions	Transdisciplinary gradu- ate school for inte- grated interventions to attain optimal health for humans, animals, plants and the environ- ment.	2016-2020 (first phase) 2020-2023 (second phase)	Ministerium für Innova- tion, Wissenschaft und Forschung des Landes Nordrhein-Westfalen (MIWF-NRW)	https://www.zef.de/ onehealth.html
Production and Pro- cessing of Edible Insects for Improved Nutrition - Innovative Approaches to process Local Food in Sub-Saharan Africa and Southeast Asia (ProciNut)	Use the nutritional and economic potentials of edible insects in Mada- gascar, Myanmar and Thailand.	2018-2021	BMEL	https://www.zef.de/ project/procinut

1.3 INNOVATION KNOWLEDGE SCIENCE POLICY

During the Covid-19 pandemic ZEF researchers published a number of policy briefs on how to mitigate the pandemic's impact on the lives and livelihoods of the world's poor and how to empower small-scale farmers, who are playing a key role as food providers. Read excerpts from research on and in Africa.

MECHANIZING AFRICAN AGRICULTURE. DRIVERS, BARRIERS AND BENEFITS

by Oliver Kirui

Agricultural technologies that reduce the need for intensive manual labor make it possible for farmers to cultivate more land more effectively. This can increase both incomes and total food production, with significant benefits to farming households and communities in food-insecure regions. Despite these advantages, farmers in much of Africa rely on hand-held tools for farming. In many regions, tractors and engine-powered machinery is hard to access, and support such as trained operators, technicians and spare parts are rarely available. Recently, several initiatives have been implemented to empower farming households to access machinery in several African countries.

This study is based on a recent study that analyzes the possible drivers of mechanization among 9,500 farming households in eleven African countries. The study shows that while there are significant barriers to increase mechanization, access to labor-saving technologies is much higher in some countries than in others. Countries in which tractor-powered machinery is most accessible tend to have higher levels of economic development.

In summary:

- Tractor-powered machinery is most common for farming households in Egypt and South Africa.
- Animal-powered equipment is the dominant type of agricultural tech-

nology for farming households in Senegal, Burkina Faso and Zimbabwe.

- Hand-held tools remain the dominant agricultural technology used by households in Cameroon, Ghana and Zambia. At the household-level, the following factors were found to relate to higher levels of mechanization:
- Household income: Perhaps unsurprisingly, higher-income households are more likely to have access to both animal and tractor-powered machinery, since these have higher upfront costs than basic hand-held tools. Smallholder farmers with lower income are also less likely to have the collateral necessary for bank loans.



- Farm size: Farms with a larger land area tend to be more highly mechanized than smaller farms. Having more land to cultivate increases the potential benefit of labor-saving technologies and can make the investment more cost-effective. Land size may also be related to household income.
- Education level of the head of household: More educated household heads are more likely to have access to both animal- and tractor-powered tools. They are more likely to be aware of the benefits of various technologies and may find it easier to learn to use more advanced technologies.
- Gender of the head of household: Male-headed households are more likely to use animal- and tractor-powered technology. This may be because women generally have lower educational attainment in Africa, which makes adopting advanced technologies more challenging, and because women have less access to credit and collateral, which means they may not be able to access the

funds to invest in these technologies. See PARI Policy Brief No. 19 for more information on the obstacles faced by women in African agriculture.

RECOMMENDATIONS

Below are potential ways for organizations seeking to promote development in this sector to address the main challenges that are holding back mechanization in Africa: To increase the availability of medium and heavy agricultural machinery

- Create public-private partnerships to facilitate the importation, distribution and maintenance of high-potential technologies
- Incentivize the local production of smaller-scale technologies, such as two-wheeled tractors, that are designed to fit the local context and are gender appropriate To address the high costs of medium and heavy machinery
- Develop targeted schemes for smallholders to increase access to credit to purchase or lease farm equipment, e.g. Micro-credit

- Enable collective ownership by existing farmer collectives, and put in place supporting institutions to train operators and technicians
- Incentivize alternative tenure models, such as private sector-led equipment leasing schemes

Read the full PARI Policy Brief No 18: <https://bit.ly/PARIpolicybrief183nSeJMM>

PARI Policy Brief No 18 is based on the study: Kirui, O.K. (2019) *The Agricultural mechanization in Africa: micro-level analysis of state drivers and effects*, ZEF Discussion Papers on Development Policy No. 272 (see full paper here: https://bit.ly/ZEFDP272_366IUuW)

This research was conducted in the framework of the Program of Accompanying Research for Agricultural Innovation (PARI) (<https://research4agrinovation.org/>) which is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ).

OVERVIEW: ZEF'S PROJECTS ON INNOVATION KNOWLEDGE SCIENCE POLICY

PROJECT	DESCRIPTION	TIME SPAN	MAIN FUNDER	WEBSITE
Program of Accompanying Research for Agricultural Innovation (PARI)	Research and policy advice for agricultural growth and food security in Africa.	2014-2022	BMZ	https://research4agrinovation.org/
West African Biodiversity & Ecosystem Services (WABES)	Msc Program and Networking for Supporting IPBES capacity building in West Africa.	2017-2022	Blnternational Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	http://www.wabes.net



THE COVID-19 PANDEMIC CRISIS AND POOR PEOPLE'S STRUGGLE FOR SURVIVAL: HOW SHOULD GOVERNMENTS IN LOW-INCOME COUNTRIES RESPOND AND WHAT RESOURCES ARE NEEDED?

By Tekalign Gutu Sakketa and Lukas Kornher

This paper looks into the economic impact of the Covid-19 pandemic in Africa and possible policy responses. Here is a “Dos and Don’ts” list of the authors:

The following responses could be vital in the fight against COVID-19:

1. Targeting is costly and takes time. Unless only selected groups are affected by the economic slow-down and poverty levels are moderate, targeting should be omitted.
2. Use virtual money (e.g. mobile money transfers) instead of cash pick-up to avoid human interactions and to reduce travel needs.
3. Keep food systems functioning and value chains intact as long as possible and use cash transfer programs to increase the purchasing power of those most affected.
4. Identify bottlenecks in the supply chain and support collecting agricultural products from the farm gate to sustain food supply to urban areas.
5. Use in-kind distribution of food and other essentials if (food) supply is highly centralized and avoid crowds of people receiving their in-kind transfer at the same time.
6. Prioritize policy options that work fast using existing institutions and infrastructure, for instance suspending billing for basic needs, such as electricity, water, mobile communication.

Read the full paper (ZEF Policy Brief 33) here: <https://bit.ly/ZEFpolicybrief33>

HOW COVID-19 IMPACTS THE AFRICAN FOOD AND BEVERAGE MANUFACTURING INDUSTRY

The Covid-19 pandemic and in particular the measures that have been taken by governments to contain the spread of the virus is affecting all segments of society and business around to world. To understand the impacts in on the African food and beverage manufacturing industry, ZEF/PARI in collaboration with the SADC Research Center, conducted a rapid phone survey of close to 600 companies in Nigeria, Kenya and South Africa in May 2020.

Key findings

Most of the companies where still operating at the time of the survey, that most of them had to reduce production volumes.

The number of temporary or permanent closures is likely to be higher than reported here, as they were less likely to answer the phone.

Many firms had to pay higher prices for raw materials, in particular in Nigeria (95%) and Kenya (69%), but less so in South Africa (41%).

Companies for the most part held on to their employees, but at times had to reduce salaries. Most increased shifts to ensure social distancing.

Many of the companies where impacted by measures imposed by foreign governments, in particular through delays and additional requirements at the border. Many Kenyan companies also saw their exports fall while South African and Nigerian companies where more affected by a drop in imports.

To reduce the economic impact of Covid-19 containment measures, companies most frequently called for practical and business-survival interventions, such as a re-opening of the economy, financial support, tax relief and assistance in the area of health & safety.

Further details on country-specific findings:

[PARI Policy Brief No. 24 \(South Africa\)](#)

[PARI Policy Brief No. 25 \(Nigeria\)](#)

[PARI Policy Brief No. 26 \(Kenya\)](#)

More information at <https://research4agrinnovation.org/covid19-industry/>

TOWARDS NEAR REAL-TIME FOOD SECURITY MONITORING: LESSONS FROM A CITIZEN-SCIENCE - APPROACH IN KENYA

by Regine Weber

This study looked into early warning and monitoring systems as an important pillar in the context of humanitarian emergencies, disaster risk reduction and food security.

Its policy recommendations say:

- Prioritize investing in cost-effective technologies that enable instantaneous snapshot assessments and mapping of risks.
- Collaborate with local tech Start Ups that facilitate innovative technologies tailored to the local environment.
- Continue investigating measures that contribute to the democratization of information, e.g. through direct communication channels with the at-risk population.
- Explore use of SMS systems for near real-time data collection beyond food security monitoring.

Read the full paper (ZEF Policy Brief 32) here: <https://bit.ly/ZEFpolicybrief32>

1.4 GOVERNANCE CONFLICTS AND NATURAL RESOURCES

When the COVID-19 pandemic broke out early 2020, many governments had to address unforeseen challenges in terms of policy-and decision making, often with direct impact on human lives and society as a whole. Vulnerable groups, especially in the Global South were hit hardest by the pandemic and the following policy responses. The majority has no proper health insurance and/or access to health care facilities. Many cannot sustain their families without pursuing their daily (mainly informal) jobs.

BEYOND THE CURFEW: COVID-19'S IMPACT IN COLOMBIA

By Eva Youkhana, Emilia Schmidt, and Alejandro Mora-Motta

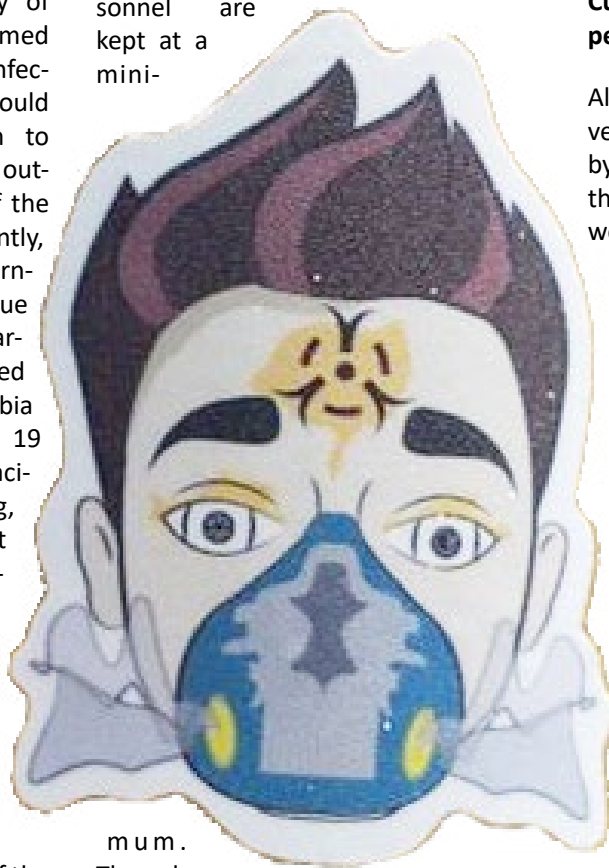
The Colombian government's response to COVID-19

On March 6, 2020 the Ministry of Health and Social Protection confirmed Colombia's first case of COVID-19 infection. From that moment on, we could observe a day-by-day approach to try to prevent an uncontrollable outbreak of the virus and collapse of the public health system. Consequently, the right-wing conservative government under President Iván Duque Márquez announced a national quarantine which was initially imposed until April 13. By April 3, Colombia reported 1,161 corona cases and 19 cases of death. Due to limited capacities to carry out large-scale testing, these numbers might not reflect the actual situation. The government's response to the increasing number of coronavirus infections consisted of closing schools and universities, the closing of all national land, river and sea borders and the imposition of a strict curfew, partly enforced by security forces and terms of imprisonment in cases of violation in most parts of the country.

Is Colombia's public health system prepared?

The Colombian health system is based on Law no. 100 which was issued in 1993. While access to essential health care services is considered universal under this law, health care is treated as a commodity. The mainly private companies in charge of providing health care services try to

maximize profits by keeping costs and expenditures low. This implies that costs for treatment and medical personnel are kept at a mini-



mum. The low national budget for health (in addition to an almost non-existent public health system) is a recipe for disaster in the case of a major health event. Moreover, around 65 per cent of the labor force in the health sector is informal. And most of those who have formal working contracts are hired on a short-term basis, not as regular employees. Needless to say, the government does not provide unemployment subsidies. The COVID-19 outbreak in Colombia finds a health system incapable of coping with

many seriously ill people simultaneously.

Curfew: a special challenge for poor people

Although the imposed measures prevent people from getting infected by making them stay at home, more than half of the Colombian population works in the informal sector and depends on daily income from street sales. Only a few of them can afford the "luxury" of quarantine while living from financial reserves. At the end of 2019, just before the coronavirus world crisis started, Colombian people took to the streets to protest for significant changes. Among their many demands was a desire for the transformation of the neoliberal public health, labor and social protection systems. Currently people cannot protest in the streets due to quarantine, but sadly, COVID-19 arrived in Colombia only to show that the protests in 2019 were justified. In addition, NGOs in Colombia have reported that the curfew has worsened the situation of victims of domestic violence, especially in the bigger cities. Only a few days after the curfew had been imposed, UN Women reported that more women had been murdered and assaulted than in other comparable periods. The crisis will particularly affect the socially vulnerable and exacerbate existing structures of poverty and inequality within the country.



Above: Long queues in front of the supermarkets – only 10 people at a time are allowed to enter.

Right: Empty restaurants. The corona virus has had dramatic consequences on many sectors of the economy and society in Colombia. Gastronomy is one of them.



This is an excerpt from a blog post published on ZEF's Blog COVID-19 and its impact on research realities on April 7, 2020, see <https://www.zef.de/2129/blog-colombia.html>

The Doctoral Studies Support Program (DSSP) on "Environmental peace building and development in Colombia" is a bilateral program of the Center of Development Research (ZEF) at the University of Bonn and the Institute of Environmental Studies (Instituto de Estudios Ambientales – IDEA) at the Universidad Nacional de Colombia. It is funded by the German Academic Exchange Service (Deutscher Akademischer Austauschdienst, DAAD). More information at <https://dssp-colombia.org/>

CAN COVID-19 OFFER LESSONS FOR GOVERNMENTS TO ADDRESS BIODIVERSITY LOSS?

By Abdul W. Arimiyaw, Ambrose B. Kenneh, and Abdoulaye D. Diallo

Lockdown interventions have become a crucial component of public health measures to curtail the rapid spread of the novel coronavirus. In many West African countries, the identification of community hotspots of COVID-19 infections certainly justifies the decision to restrict movement in these areas, which are mainly urban or sub-urban. To most governments, the implementation of lockdown measures is an effort to avoid frequent contact between people, as social distancing clearly helps slow down the spread of the virus. It is therefore expected that these preventive measures will mitigate the spread of the outbreak and ultimately reduce the number of people affected.

Environmental health: who cares?

Although the lockdown measures reveal overwhelming concern for human lives, the speed with which governments have implemented them presents an opportunity to reflect on why there is no similar concern and attention to existing ecological issues. While scientists have warned of the high risk of extinction of flora and fauna (IPBES, 2019; bit.ly/3byuzql), the relevant actors have paid little attention to this threatening development. Environmental degradation continues unabated, putting many species at risk of extinction.

Response to COVID-19 in Ghana

In contrast to the slow pace of implementing laws to safeguard biodiversity, the government of Ghana has shown considerable commitment to the fight against COVID-19. On April 14, 2020, the country confirmed 636 infected cases, eight recoveries and nine persons who have succumbed to the disease. The introduction of lockdown and palliative interventions such as a three-month waiver on water bills, contact tracing of citizens who have been in contact with COVID-19 patients, ongo-



Above: An almost deserted highway in Accra, Ghana.

Below: Some beneficiaries of the free food supplies. Source: <https://bit.ly/2wSeCMv>



ing and widespread awareness-raising campaigns on hygiene measures to be observed in different languages (Akan,

Ewe, English, Dagbani, Kotokoli, Fante, Ga among others), and the daily distribution of food parcels to poor citi-

zens in lockdown areas, are to be commended. However, the implementation of these measures has encountered a number of challenges. The constant brutalization of citizens by law enforcement agents and the politicization of free food supplies are some of the issues that need to be corrected if the objectives of these interventions are to be achieved.

Ghana: slow efforts in biodiversity protection

The recent IPBES Global Assessment report (2019) showed that the earth has already lost almost 47 per cent of its natural ecosystems, and that around 25 per cent of its species are on the verge of extinction. As a signatory to, and a member of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), it is expected that Ghana will demonstrate its commitment to the protection and conservation of biodiversity. However it is still common for Ghanaian people to indulge in illegal hunting and trade in endangered wild species, such as pangolins and chimpanzees, for personal gain. The consumption of bush meat delicacies is still a widespread trend in many restaurants, bars and ceremonies. According to Ghana's National Biodiversity Strategy and Action Plan (NBSAP, 2016, bit.ly/2zc4Rtb), about 380,000 tons of bush meat are consumed annually with an estimated value of US\$ 350 million. Even though existing laws prohibit the killing of endangered species, implementation and compliance hardly exist and the illegal and unsustainable capture of wildlife continues unabated. If this trend continues, the biodiversity of Ghana will be severely depleted in the coming years to such an extent that some important wildlife species of conservational interest will become extinct.

The need to keep our ecosystems healthy

The challenges that many people face today in West Africa and in Ghana, in particular during the pandemic, are the lack of provision of basic necessities such as food, water, freedom of movement, and personal protective equip-



A view of Ghana's capital Accra in lockdown. Source: <https://bit.ly/2VLnD26>

ment. This situation provides insight into the shortages we can expect if environmental degradation and unsustainable wildlife capture continues. It is imperative that we take appropriate measures to ensure the smooth delivery of nature's contributions to people, because nature is relied upon for survival in difficult times. With a majority of poor and disadvantaged people and limited alternative livelihood options, Ghanaians are bound to suffer in different ways and to varying degrees from the destruction of nature and the disruption of ecosystem services (NBSAP, 2016). Efforts and progress made towards the achievement of the biodiversity-related UN Sustainable Development Goals (SDGs) 1, 2, 3, 6, 14 and 15 may otherwise be made in vain.

Global action for biodiversity conservation is imperative

For decades it has been clear that we need to pay more attention to the conservation of biodiversity around the globe. Just as governments are taking urgent action to protect their citizens from COVID-19, similar efforts need to be replicated for the conservation of the natural environment and biodiversity. Effective policy actions need to be taken and rhetoric and grandstanding should be replaced with actions to pro-

tect the natural environment. Enforcement and protection agencies should be equipped and encouraged to mitigate biodiversity loss.

The authors are master students from the WABES project (see information below). This text was posted on ZEF's Blog COVID-19 and its impact on research realities: <https://www.zef.de/2129/blog-wabes.html>.

'WABES' is a ZEF-led research and capacity building program funded by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). 'WABES' stands for 'West African Biodiversity and Ecosystem Services'. The program aims at supporting IPBES capacity building in West Africa. Website: <http://www.wabes.net>

OVERVIEW: ZEF'S PROJECTS ON GOVERNANCE CONFLICTS NATURAL RESOURCES

PROJECT	DESCRIPTION	TIME SPAN	MAIN FUNDER	WEBSITE
Climate Information to support integrated Renewable Electricity Generation (CIREG)	Analysis of and policy advice on renewable energy generation in developing countries.	2018-2021	ERA4CS (BMBF)	https://www.zef.de/project/CIREG
Bilateral Doctoral Studies Support Program (DSSP)	PhD Program on Environmental peace-building and development in Colombia.	2017-2020 (application for second phase pending)	DAAD	https://dssp-colombia.org/
Integrated Water Governance Support System	Effective and efficient governance of transboundary water in Southern Africa.	2017-2020	BMBF	https://www.zef.de/project/grow
Participatory Mapping and Monitoring of Biodiversity Loss due to Environmental Conflicts in Colombia	Scientific exchange on Environmental peace-building and development in Colombia.	2019-2020	BMBF	https://www.zef.de/project/
Sustainable TRade and InnoVation transfer in the bioEconomy: From National Strategies to Global Sustainable Development Goals (STRIVE)	Improving the knowledge base for the design of sustainable bioeconomy policies and investments with a focus on international regulatory frameworks.	2016-2021	BMBF	https://strive-bioecon.de/
West African Biodiversity & Ecosystem Services (WABES)	MSc Program and Networking for Supporting IPBES capacity building in West Africa.	2017-2022	International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	http://www.wabes.net
Waterfront Metropolis Abidjan	Anthropological analysis of social and political dynamics around waterfronts in Abidjan, Cote d'Ivoire.	2017-2019	Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), EG 381/1-1	https://www.zef.de/project/WATERFRONT-METROPOLIS
West African Center for Sustainable Rural Transformation (WAC-SRT)	Development of interdisciplinary, transnational research as well as the infrastructure in West Africa.	2017-2021	DAAD	https://www.zef.de/project/WAC-SRT

1.5 MARKETS, PUBLIC SERVICES

This research theme 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 development of markets is partly related to the expansion of public services, as the latter often serve as a precondition for people to participate in markets. Among public services, particular attention is given to information, education, social transfer, insurance, and health systems. Read here some of our latest studies conducted under this theme.

EU COMMON AGRICULTURAL POLICY - IMPACTS ON TRADE WITH AFRICA AND AFRICAN AGRICULTURAL DEVELOPMENT

By *Lukas Kornher and Joachim von Braun*

This study analyzes the impacts of European agricultural and trade policies on agricultural development and food security in Africa. The research is prompted by the pending further development of the Common Agricultural Policy (CAP) after 2020. The proposal for the new CAP is based on higher ambitions with regard to environmental protection and climate change through mandatory ecological programs and an enhanced linkage of direct payments to the greening rules.

The methodological approach comprises: (i) an examination and critical review of existing studies; (ii) an analysis and assessment of agricultural trade flows between the EU and Africa as a whole and in the context of case studies on meat and milk; (iii) a systematic consultation of leading experts in European and African agricultural and trade policy on trends and impacts of the CAP; and (iv) model simulations of the effects of possible reform projects on production in and trade flows with Africa.

The study finds that direct payments to EU farmers continue to account for up to 50% of total farm income in the EU, but EU spending on agricultural development in Africa is rather small in comparison. The current EU agricultural subsidy policy hampers the development of African agriculture much less than it did before export subsidies and coupled subsidy payments were largely abolished. However, these earlier effects cannot be corrected quickly because agricultural productivity depends

on longstanding favorable framework conditions and long-term investments in innovation.

According to the expert consultation carried out for this study, a stronger environmental and climate orientation of the CAP is considered likely and would have a dampening effect on European agricultural exports to Africa. The model simulation estimates that European food exports to Africa would decrease under the expected EU policy changes. However, this reduction in European exports would be mainly taken over by other exporters. Investments in African agricultural development should be expanded by the EU.

Although African raw agricultural material exports to the EU are largely free of duties, the access of processed products to the EU market is still limited due to complicated rules of origin and social and hygiene standards for goods imported into the EU. These standards are necessary but must be more transparent. The EU should provide more support to improve standards in Africa; otherwise, the export potential of African countries cannot be fully exploited.

You can read the full ZEF Discussion Paper 294 here: <https://bit.ly/ZEF-DP-294>

THE VALUE OF COCOA AND SHEA VALUE CHAINS IN GHANA

By Adjoa Annan

This study tries to understand how quality is promoted or non-promoted in food and agriculture value chains, with cocoa and shea in Ghana as a case study. The cocoa sector is state-regulated and quality is highly controlled by the marketing board, whereas the shea sector is privately driven with control of quality in the hands of private firms and actors. The initial focus of the study was to understand the knowledge exchange and innovation diffusion on quality enhancement technologies in the sectors.

Potential of luxury goods industry, such as confections and cosmetics in Ghana

Efforts are being made to strengthen origin processing and to promote locally-owned processing and manufacturing companies in the country. The Ghanaian government seeks to increase its share of processed cocoa beans into intermediate products such as cocoa butter, liquor and powder as well as chocolate from 40 to 50 percent. With respect to shea, Ghana is the hub of shea processing in West Africa and is trying to expand shea production to sustainably meet its processing capacity. There is an increase in chocolate consumption among Ghanaians because of sensitization and educational

programs implemented over the past years. Shea is domestically consumed and its use in beauty and hair products is gaining momentum in Ghana. However, to maximize profits in both value chains, our research indicates, Ghana should increase its trading of intermediate cocoa and shea products. Ghana could also benefit from the marketing and branding of Ghanaian chocolate or confections and shea luxury products in the regional, African, and international markets. I believe these efforts could contribute to increasing margins and profits. More so, producers participating in these value chains could capture higher values if policies were to target the alleviation of poverty by, for example, increasing prices.

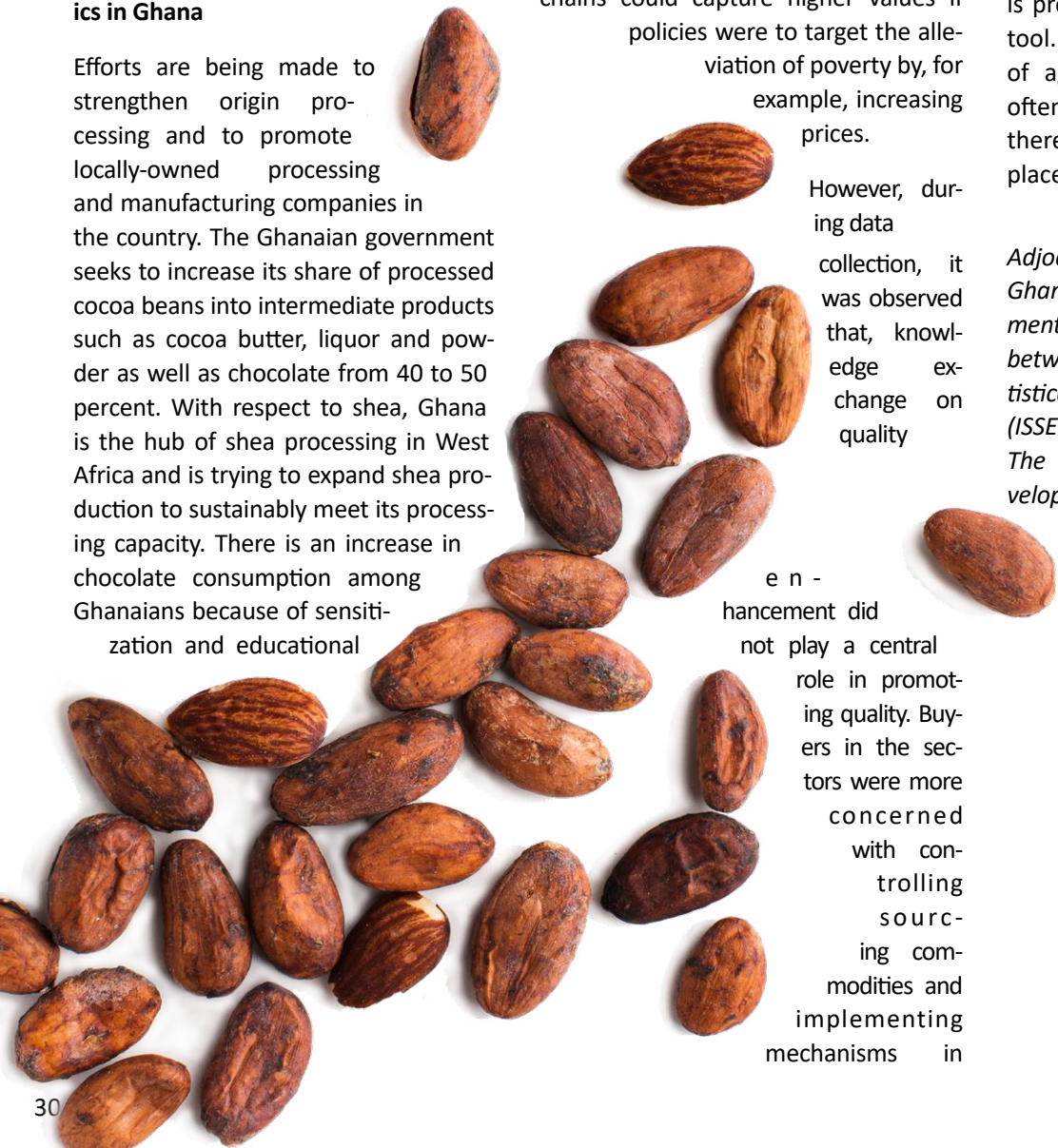
However, during data collection, it was observed that, knowledge exchange on quality

enhancement did not play a central role in promoting quality. Buyers in the sectors were more concerned with controlling sourcing commodities and implementing mechanisms in

purchasing commodities. Quality enhancement was not highly innovative and its uptake was low, with some producers resisting innovations. As such, the current focus of the study examines the power relations and control of quality in the upstream (i.e. production, farm gate level) and downstream (i.e. end-market) segments of the chains.

A disconnect in the promotion of quality in the cocoa and shea value chains was noticed. This serves a double function; whereas in the downstream of the chains it is promoted as a branding and marketing tool, in the upstream, it is promoted as a control and sourcing tool. When we look at the value chains of agricultural products from Africa, often the raw materials are harvested there, but lots of the refinement takes place elsewhere.

Adjoa Annan is a doctoral student at the Ghanaian-German Centre for Development Studies, which is a collaboration between ZEF and the Institute of Statistical, Social and Economic Research (ISSER), University of Ghana, Accra. The Ghanaian-German Centre for Development Studies and Adjoa Annan's research are funded by the German Academic Exchange Service (DAAD).



COVID-19: IMPACTS ON FOOD TRADE - IS GLOBAL FOOD SECURITY AT RISK?

By Lukas Kornher and Tekalign Gutu Sakketa

Many industrialized countries, including Germany and the United States, have responded to the Covid-19 pandemic with large public investment programs to cushion the economic effects of the lockdown. Developing countries do not have the budgetary means to implement similar programs. Instead, closed borders and limited export opportunities and supply constraints are slowing down economic activities.

The United Nations [Economic Commission for Africa \(ECA\) estimates](#) that economic losses in Africa could tighten the fiscal resources of governments, creating a pressure on the provision of social safety nets that make an important contribution to livelihoods for the poor in many countries. Globally, the International Monetary Fund (IMF) has responded by granting loans of 50 billion USD to developing countries. The World Bank has approved an emergency program of 14 billion USD to countries and compa-

nies to finance their efforts to prevent and respond to the rapid spread of COVID-19. The IMF and World Bank have also called on bilateral donors to consider debt relief for the poorest countries.

Global commodity markets are not immune to the global economic downturn and the uncertainty of how the crisis will evolve. The International Food Policy Research Institute (IFPRI) simulated the impact of a global economic slowdown on poverty (and food insecurity). The figures are alarming if the crisis persists for a longer period: a 1 per cent drop in global growth rates is associated with an increase in poverty by 2 per cent affecting 14 million people worldwide. Certainly, the impacts on food insecurity are more severe if trade channels are disrupted.

Governments must put urgent mea-

sures in place to keep markets functioning. In a globalized world, countries are advised to keep trade open and supply chains working. For this to happen international coordination, not nationalism, is of paramount importance to fight this global curse and return to normal as soon as possible. In this context, instead of restricting trade flows, governments in poor countries should mobilize resources to expand their social safety nets, specifically to mitigate the effect on the most vulnerable population in urban areas who are living hand-to-mouth.

This blog was posted on ZEF's Blog COVID-19 and its impact on research realities: <https://www.zef.de/2129/zef-covid-19.html>

Information in German: <https://www.uni-bonn.de/neues/covid-19-auswirkungen-auf-den-nahrungsmittelhandel-ist-die-globale-ernaehrungssicherheit-gefaehrdet/>

OVERVIEW: ZEF'S PROJECTS ON MARKETS AND PUBLIC SERVICES

PROJECT	DESCRIPTION	TIME SPAN	MAIN FUNDER	WEBSITE
Program of Accompanying Research for Agricultural Innovation (PARI)	Research and policy advice for agricultural growth and food security in Africa	2014-2022	BMZ	https://research4agrinovation.org/
Analysis and Implementation of Measures to Reduce Price Volatility in National and International Markets for Improved Food Security in Developing Countries	Investigation of the drivers and causes of price volatility, the transmission to regional, national and micro-level, and the impact on poor people (farmers and consumers).	2011-2020 (now in phase 2)	BMZ (Federal Ministry for Economic Cooperation and Development)	https://www.zef.de/project/volatility

1.6 MOBILITY MIGRATION URBANIZATION

Research under this theme is characterized by interdisciplinary social science research carried out at various scales. The usual focus is on the local scale where mainly qualitative studies are often complemented with quantitative methods. ZEF's interdisciplinary working group "ZEF in the City" contributes to this ZEF research theme. In this chapter we look into our latest studies on and carried out in Africa.

DENSE AND TENSE: HIGH POPULATION DENSITIES AND LOW HOUSING QUALITY OF POOR URBANITES IN ABIDJAN, CÔTE D'IVOIRE

By Irit Eguavo

The Corona pandemic shifted our focus to favelas, townships, or slums, where residents have been unable to keep physical distance. In the Global South and North alike, the pandemic has been illustrating that high population densities coupled with insufficient social security and poor housing quality increase not only infection rates but also vulnerability to mental stress.

Population densities indicate economic inequalities

Unequal densities and living conditions in cities are not random. They often result from policies of city administrations that would also be able to set other priorities. The popular narrative continues to reason about dense quarters in African cities being a result from rural to urban migration and short supply of formal, good-quality housing. Our findings from Abidjan, however, underline the relevance of urban policy and private investors, as well as their impact on housing markets for the poor.

Population densities in different parts of Abidjan, a West African city of five million inhabitants, range between ca. 4,900 to 26,800 inhabitants per km². These numbers hint at economic stratification. While most houses in the well-off and middle-class quarters are multi-storey buildings such as villas or apartment blocks, the dominant housing type in precarious quarters are low-rise buildings, so-called courtyards houses. Here, population densities are the highest in the city. In practice, everyday spaces of residents are even denser as everybody lives and works on the same level.

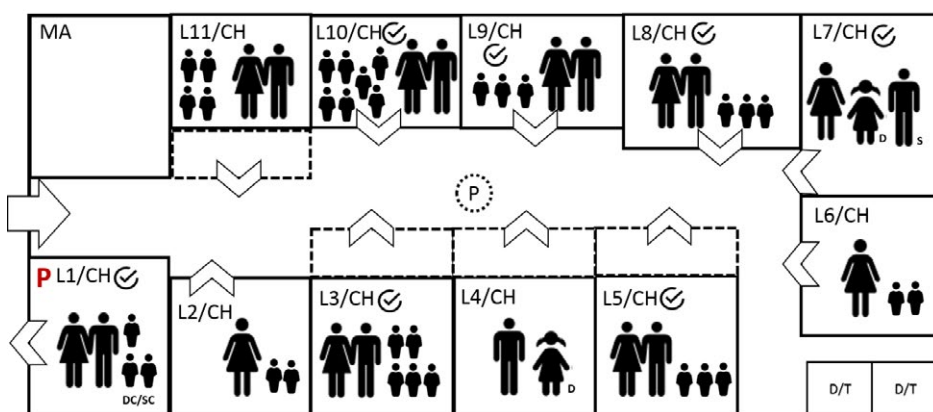


Fig. 1

L + no.	Household identifier	☑	Surveyed household
CH	Type of accommodation (single room)		
D/T	Bathroom/latrine	MA	Shop
P	Owner of the courtyard		
[]	Extension made by tenants (timber)	(P)	Hand-dug well
♂ ♀	Man/ woman (> 18 years old)	♂ ♀	Male/ female youth (> 14 years old)
♂ ♀	Couple of adults	♂	Children (< 14 years old)
S D	Son/ daughter	SC DC	Grandchildren
Icons made by Freepik from www.flaticon.com			

Fig. 2

Ethnographic research in an unplanned settlement

Based on an ethnographic census in Adjahui-Coubé, an unplanned settlement on a central peninsula in Port Bouët Municipal District of Abidjan, for which we collected data on 52 courtyard houses

and their residents, we estimated current population numbers and identified typical housing conditions. Most households live in a single-rented, windowless room of 9 to 10m², constructed from wooden planks, without access to electricity or drinking water facilities in



Photo by Irit Eguavo

the house. The schematic of the courtyard house (see fig. 1) shows a classical layout including a shop. It was home to 53 people who shared a ground plot of ca. 200m². Courtyard houses were built wall-to-wall to each other forming in-between a maze of paths and sand roads.

Courtyard houses: part of the housing problem or solution?

People reach their homes, as well as basic sanitation facilities by walking through the yard. These open spaces are shared for leisure, work, household activities and childcare. For many decades, these yards have shaped everyday life and social interactions in Abidjan. Courtyard houses are very popular among Abidjanais. We find family courtyards and a higher share of owner-occupiers in older quarters. Rental housing dominates the younger unplanned settlements, such as Adjahui-Coubé. There, informal real estate agencies facilitate contracts between small-scale private investors and their tenants.

Neither successive Ivorian governments nor city administrations have ever been in favor of courtyard houses. They perceived them as a hindrance on their way to modern city ambitions. Many such quarters have experienced demolitions, as well as forceful evictions, especially after the Ivorian political crisis in 2011. Ironically, authorities justify evictions with the protection of

vulnerable populations against hazards and pandemics.

The layout of the houses, though, is not the problem. Instead, courtyard houses are part of the solution as they provide much high-demanded low-cost housing. Though population densities are very high, tenants of affordable little housing units still benefit from the airy semi-public space of the yard. Where the government tolerated these unplanned settlements, house owners and tenants improved buildings over time, irrespective of lacking legal land titles. Housing quality became better with stone buildings and windows for ventilation. In older quarters, electricity and tap water in the yard became normal amenities.

Reasons for intra-urban migration

Although housing quality in Adjahui-Coubé was more precarious than in older quarters of Abidjan, the settlement has attracted more than 60,000 new inhabitants since 2011. Almost all households had already lived in Abidjan and other cities before. Many households had lost their former home due to evictions or demolitions, which further reduces availability of low-price housing. Former owner-occupiers became tenants. Skyrocketing security deposits and costly rental apartments in the city pushed even more low-income people to Adjahui-Coubé. We also observed some new courtyard houses in planned quarters. The need to close the local

rent gap, however, resulted in layouts with 10m² self-contained units. Yards were tight corridors without additional function. When investors prioritised quick amortisation of investment over housing quality, they also triggered densification in practice.

This research was funded by the Deutsche Forschungsgemeinschaft (German Research Foundation (DFG), EG 381/1-1.

More information at: <https://www.zef.de/project/WATERFRONT-METROPOLIS>

YOUTH ASPIRATIONS AND OUT-MIGRATION DECISIONS IN RURAL ETHIOPIA

by *Essa Chanie Mussa*

The study examines youth aspirations in rural sub-Saharan Africa using data obtained from a large-scale SMS-based survey, complemented by an investigation on the causal effects of out-migration decisions by youth in southwestern Ethiopia. The cross-country study shows that most rural youth in Africa would prefer to work in nonfarm economic sectors. Over half of the respondents were undecided about their migration aspirations, which provides an opportunity for governments to influence patterns of rural youth out-migration.

Policy makers should keep in mind that anti-poverty policy measures that simply improve the incomes of rural youth might have unpredictable and unintended consequences on their migration decisions. Policy measures, there-

fore, should seek to make farming and rural life more attractive to the youth.

Taking southwestern Ethiopia as a case in point, the study finds that over half of adolescents have negative perceptions towards farming (both farming life and the prerequisites to becoming a farmer). Taking a four-year period to understand aspirations and decision making, the results show that educational and occupational aspirations during adolescence exert differing effects on migration decisions. Youth who aspire to attain more years of schooling are unlikely to out-migrate whereas their counterparts who aspire to have high socio-economic status occupations tend to out-migrate in search of work.

The study concludes that out-migration of youth from rural areas and small

towns is not only a result of push factors such as lack of farmland, but is also due to their aspirations to work in high socio-economic status occupations that are hard to come by in rural areas. Thus, African countries should work to make rural areas and farming more attractive to the aspiring youth. Improving access to technology, developing infrastructure, and providing support to the expansion of rural non-farm sectors are all measures that can help achieve this goal.

The full ZEF Discussion Paper 296 can be downloaded here:
<https://bit.ly/ZEF-DP-296>



‘US’ AND ‘THEM’: PROSOCIAL ATTITUDES AMONG REFUGEES AND HOST COMMUNITIES IN NORTHERN UGANDA

By Annet Adong, Oliver Kiptoo Kirui, and Jolly Achola



Source: <https://www.pxfuel.com/en/free-photo-ebzrs>

This paper examines prosocial attitudes between refugees and host communities exposed to armed conflict and living in close proximity in Northern Uganda. Trust and dictator games were

conducted in the field to test if there are in-group preferences or parochialism regarding trust, trustworthiness and altruism, and whether parochial tendencies change with remoteness. The research team found that refugees show out-group preferences for reciprocating trust and altruism with increasing remoteness from district headquarters. By contrast, members of host communities show parochial preferences for trust, although this reduces with increasing remoteness.

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The research team found that refugees show out-group preferences for reciprocating trust and altruism with increasing re-

moteness from district headquarters. By contrast, members of host communities show parochial preferences for trust, although this reduces with increasing remoteness. Refugees do not perceive that their partners might expect them to discriminate along social identities of being refugee or host. However the hosts believe that refugees expect them to show parochial preferences. The researchers conclude that refugees do not consider the social differentiation of “us refugees” and “them host” in their interactions as much as hosts do, particularly in areas remote from urban areas which offer opportunities for increased interactions.

The results are useful for policy makers in humanitarian contexts where concerns to assist vulnerable displaced people are high.

The full ZEF Discussion Paper 292 can be downloaded here:

<https://bit.ly/ZEF-DP-292>

OVERVIEW: ZEF’S PROJECTS ON MOBILITY MIGRATION URBANIZATION

PROJECT	DESCRIPTION	TIME SPAN	MAIN FUNDER	WEBSITE
Waterfront Metropolis Abidjan	Anthropological analysis of social and political dynamics around waterfronts in Abidjan, Cote d’Ivoire	2017-2019	Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), EG 381/1-1	https://www.zef.de/project/WATERFRONT-METROPOLIS

1.7 ZEF GENDER GROUP

ZEF's Gender Group was established in early 2020. The Gender Group aims to strengthen gender-sensitive research at ZEF and promote interdisciplinary collaboration on gender issues among ZEF researchers.

ZEF's Gender Group

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

Aim

The Gender Group aims to strengthen gender-sensitive research at ZEF and to promote interdisciplinary collaboration on gender issues among ZEF researchers. The group focuses on supporting senior and junior researchers to integrate gender perspectives into their research projects, address gender differences as researchers, develop gender studies curricula and material for inter- and transdisciplinary courses, and share publications and ideas on gender-sensitive research.

What does gender mean and why does it matter to us?

Gender equality and women's empowerment have been defined in the Sustainable Development Goals (SDG5) 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 their social progress. Moreover, women's experiences and particular vulnerabilities tend to be invisible and excluded from research and policy implementation.

Academia has a crucial role to play in the transformative process of achieving a world in which access to rights and opportunities is independent of one's gender (gender equality). It is important, for example, to avoid reproducing stereotypes

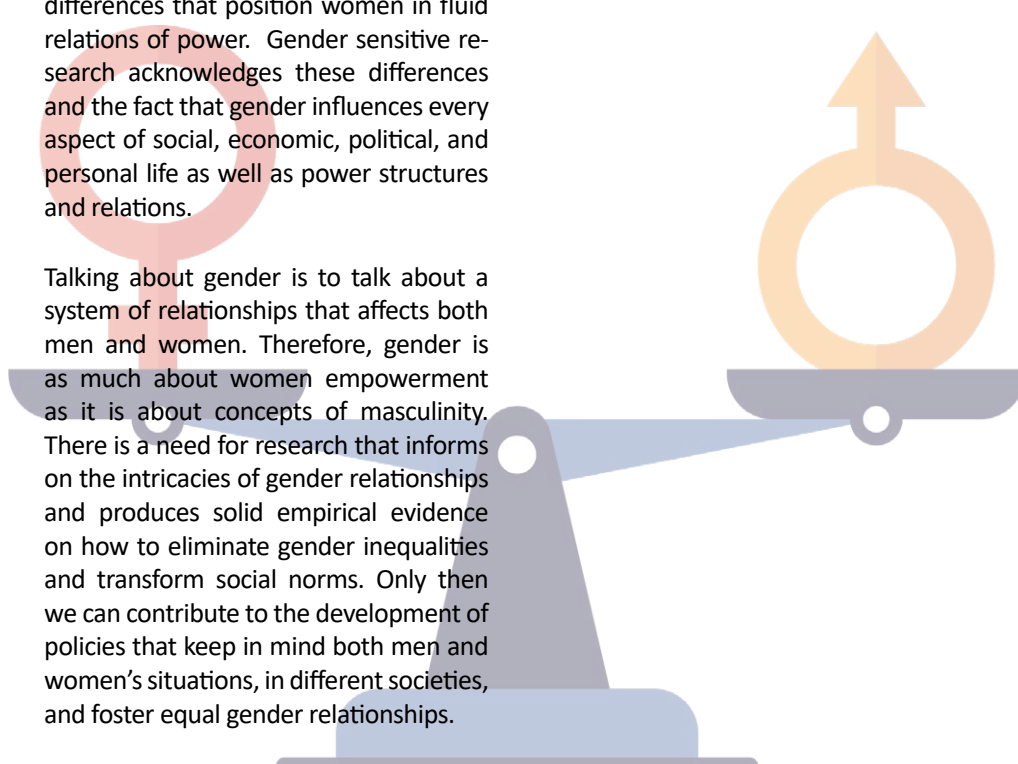
that portray women as either saviors or victims based on claims that are rarely grounded in data or generalizable. Reproducing them can hinder the design of policies that effectively reduce poverty and improve food security. What is more, gender is but one social identity or categorization alongside ethnicity, class, age and other context-related differences that position women in 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 to talk 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 the development of policies that keep in mind both men and women's situations, in different societies, and foster equal gender relationships.

Find more information on our Website:

<https://www.zef.de/gender-group.html>

Contact: Dennis Avilés,
davilesi@uni-bonn.de



GENDER INEQUALITIES SHOW AND DEEPEN IN TIMES OF PANDEMIC

According to conventional wisdom, inequalities are revealed when disaster or crisis strike. Moreover, misfortunes do not happen in a social vacuum, but find different expressions in specific contexts and groups of people. So what are the impacts of the COVID-19 pandemic on women and men beyond the disease per se? Do women have different experiences than men? Is it even possible to pose such a general question considering that other factors also play a role, such as place of residence, age, culture and other socio-economic conditions? In this blog post, we focus on the situation of women in the Global South, where severe inequalities are often a part of their daily lives and experiences.

Read the full blog post by ZEF's Gender group on ZEF's blog COVID-19 and its impact on research realities here: <https://www.zef.de/2129/blog-gender.html>

2 CAPACITY DEVELOPMENT

ZEF's doctoral graduate program "Bonn International Graduate School for Development Research" (BIGS-DR) is at the core of our education efforts. But ZEF runs many more projects involved in educating young people from the Global South and North. The overall goal of our capacity development programs is to enable a next generation of decision- and policymakers as well as scientists to address current and future global challenges.

PROJECT	DESCRIPTION	TIME SPAN	MAIN FUNDER	WEBSITE
Bilateral Doctoral Studies Support Program (DSSP)	PhD Program on Environmental peace-building and development in Colombia.	2017-2020 (application for second phase pending)	DAAD	https://dssp-colombia.org/
Ghanaian-German Center for Development Studies (GGCDS)	PhD Program at ZEF-led DAAD Center of Excellence in Ghana.	2008-2023 (program is now in third phase)	DAAD	https://www.zef.de/project/ggcds
One Health and Urban Transformations – identifying risks and developing sustainable solutions	PhD research in 4 countries on the interconnections between human, animal and environmental health.	2016-2020 (first phase) 2020-2023 (second phase)	Ministerium für Innovation, Wissenschaft und Forschung des Landes Nordrhein-Westfalen (MIWF-NRW)	https://www.zef.de/project/onehealth
West African Biodiversity & Ecosystem Services (WABES)	MSc Program and Networking for Supporting IPBES capacity building in West Africa.	2017-2022	International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	http://www.wabes.net
West African Center for Sustainable Rural Transformation (WAC SRT)	MSc and PhD Programs in Ghana and Niger.	2017-2021	German Foreign Office and DAAD	https://www.zef.de/projects/
WASCAL-PAUWES Cooperation project for capacity building	The cooperation project links the two African Capacity Building Centers supported by the BMBF WASCAL-GSP and PAUWES.	2017-2020	BMBF	https://www.zef.de/projects/
Water and Energy Security for Africa (WESA)	MSc and PhD studies and networking at Pan African University - Institute of Water and Energy Sciences (PAUWES).	2016-2020	BMBF	https://www.zef.de/project/wesa

2.1 BIGS-DR

The Bonn International Graduate School for Development Research (BIGS-DR) is ZEF's doctoral program which is part of a group of international graduate programs at the University of Bonn. Due to this institutional setting and the international setting in Bonn, students have access to a large worldwide research network. Roughly 700 students have joined ZEF's doctoral program since its inception in 1999. Our doctoral students complete the full-time doctoral program in 3.5 years on average. In this time frame they participate in course work, conduct their field research, and write their theses. In addition to the academic curriculum, students take part in softskill workshops that train them in academic writing, intercultural working, leadership skills, and ethical considerations. Over 40% of our students are women. Our educational concept encourages the open exchange of academic and social ideas.

HIGHLIGHTS 2019-2020

ZEF alumna Shen Xiaomeng appointed new director of UNU-EHS

ZEF alumna Shen Xiaomeng is the new Bonn-based Vice-Rector in Europe of the United Nations University (UNU) and Director of its Institute for Environment and Human Security (UNU-EHS) as of August 1, 2020.

Shen Xiaomeng started her doctoral studies in the (at the time new) joint doctoral program of ZEF and UNU-EHS in 2004 and obtained her doctoral degree from Bonn University in 2008.

More at <https://ehs.unu.edu/about/director>

Grant for ZEF junior researcher Nawaphan Mechanun

Nawaphan Metchanun's research proposal on "Covid-19 epidemic trends and health system needs projections for developing countries" received a grant in a competitive call by the [Transdisciplinary Research Area Innovation and Technology for Sustainable Futures \(TRA 6\) of Bonn University](#), who will also provide research funds of 30,000 €. The study applies mathematical-computational disease modeling to project Covid-19 epidemic trends and health system needs for low- and middle-income countries (LMICs), using Thailand as a case study, to demonstrate how modeling can be applied in a situation where health care resources are highly limited.

ZEF alumna Marwa Shumo met virtually with Nobel Laureates

ZEF alumna Marwa Shumo was nominated to participate in the 70th Lindau Nobel Laureate Meeting 2020 (June 28-July 1). Once a year a scientific review panel of the Council for the Lindau Nobel Laureate Meetings selects the 650 most qualified applicants from all over the world to meet about 40 Nobel Laureates for scientific exchange. This year, the 70th Lindau Nobel Laureate Meeting was turned into a virtual event ([Online Science Days Meeting](#)). More on the Lindau Nobel Laureate Meeting here: <https://www.lindau-nobel.org>.

More on Marwa Shumo's research here: <https://bit.ly/ZEF-Shumo>

ZEF alumnus Felix Ankomah Asante appointed University's Pro-Vice-Chancellor

ZEF alumnus Felix Ankomah Asante was appointed University of Ghana's New Pro-Vice-Chancellor for Research, Innovation and Development as of August 1, 2020.

Felix Akomah Asante conducted his doctoral research at ZEF from 1999 to 2002 and received his doctoral degree from Bonn University's Faculty of Agriculture. His research was funded by the German Academic Exchange Service (DAAD).

Our 137 enrolled students

come from

56 countries (see map

on page 40)



2.2 DOCTORAL DEGREES 2019-2020

Despite difficult working conditions, 16 of our doctoral students succeeded in completing and defending their doctoral theses in the past year (status August 10, 2020).

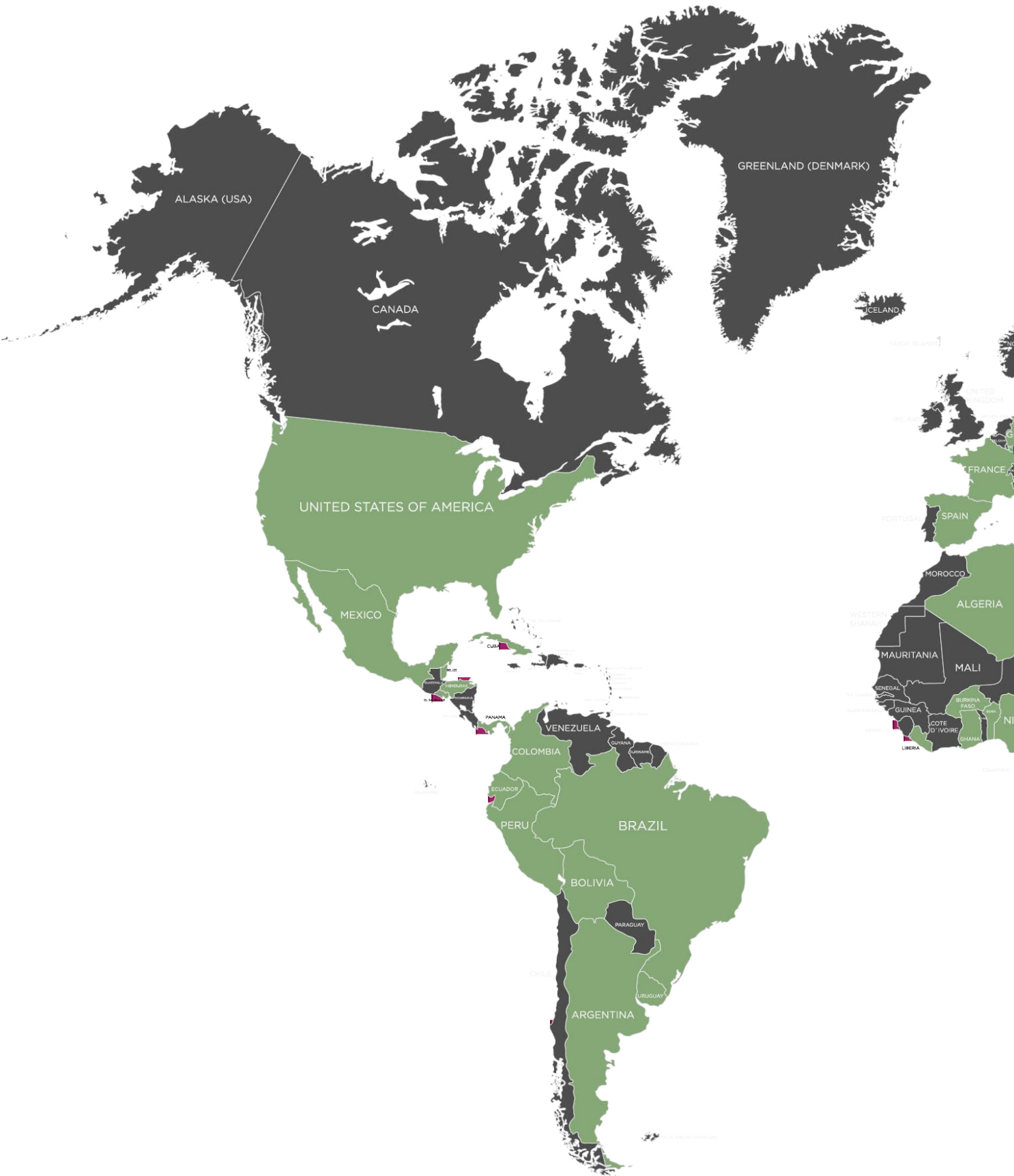
Nawaphan	Metchanun	Thailand	7/21/2020	Evaluating novel vector control strategies - Modeling the impact of gene editing for malaria elimination in the Democratic Republic of Congo
Mohammad	Hossain	Bangladesh	7/3/2020	Dispossession, environmental degradation and protest: Contested development in Bangladesh
Johannes	Schielein	Germany	6/22/2020	Broken roads and broken laws. How infrastructure and law enforcement shape Amazonian deforestation frontiers
Francis Molua	Mwambo	Cameroon	6/8/2020	Energy efficiency analysis of biomass production - Considering human and draft animal labor inputs in maize-based production system in the Sudanian savanna agroecological zone, Ghana
Alicia	Bustillos Ardaya	Bolivia	5/26/2020	Applying disaster risk governance in dynamic environments - case study Rio de Janeiro State, Brazil
Mouhamed	Idrissou	Togo	4/21/2020	Modeling water availability for smallholder farming in inland valleys under climate and land use/land cover change in Dano, Burkina Faso
Melissa Roxana	Quispe Zúñiga	Peru	3/16/2020	Mining and small-scale farming in the Andes: Socio-environmental roots of land-use conflicts
Eeusha	Nafi	Bangladesh	3/10/2020	Interactive tillage and crop residue management effects on soil properties, crop nutrient uptake and yield in different weathered soils of West Africa - measurements, modelling and scenario simulations
Marwa	Abdel Hamid Shumo	Sudan	1/29/2020	Use of black soldier fly (<i>Hermetia illucens</i>) in bioconversion and feed production
Sneha	Sharma	India	1/21/2020	Politics of waste: contestations, practices and geographies of exclusion at a dumping site in Mumbai
Regine	Weber	Germany	1/20/2020	Food security monitoring for developing countries in the age of big data
Aftab	Nasir	Pakistan	12/18/2019	Language choice as a gate-keeping practice: An exploration into the psycho-social impacts of multi-linguism through case studies from the educational and judicial sectors of Pakistan
Gabisel	Barsallo Alvarado	Panama	12/17/2019	Decisions, practices and priorities: A qualitative study on university dropout and personal development in Panama
David	Boansi	Ghana	10/30/2019	Extreme weather events in Sudan savanna Region of West Africa: agricultural impacts and adaptation
Michael	Mensah	Ghana	10/16/2019	Gender roles in agriculture and natural resources management in upper east region, Ghana
Gohar	Ghazaryan	Armenia	10/8/2019	Analysis of long-term land surface dynamics in Ukraine observed by satellite sensors



137 doctoral students enrolled in 2019-2020

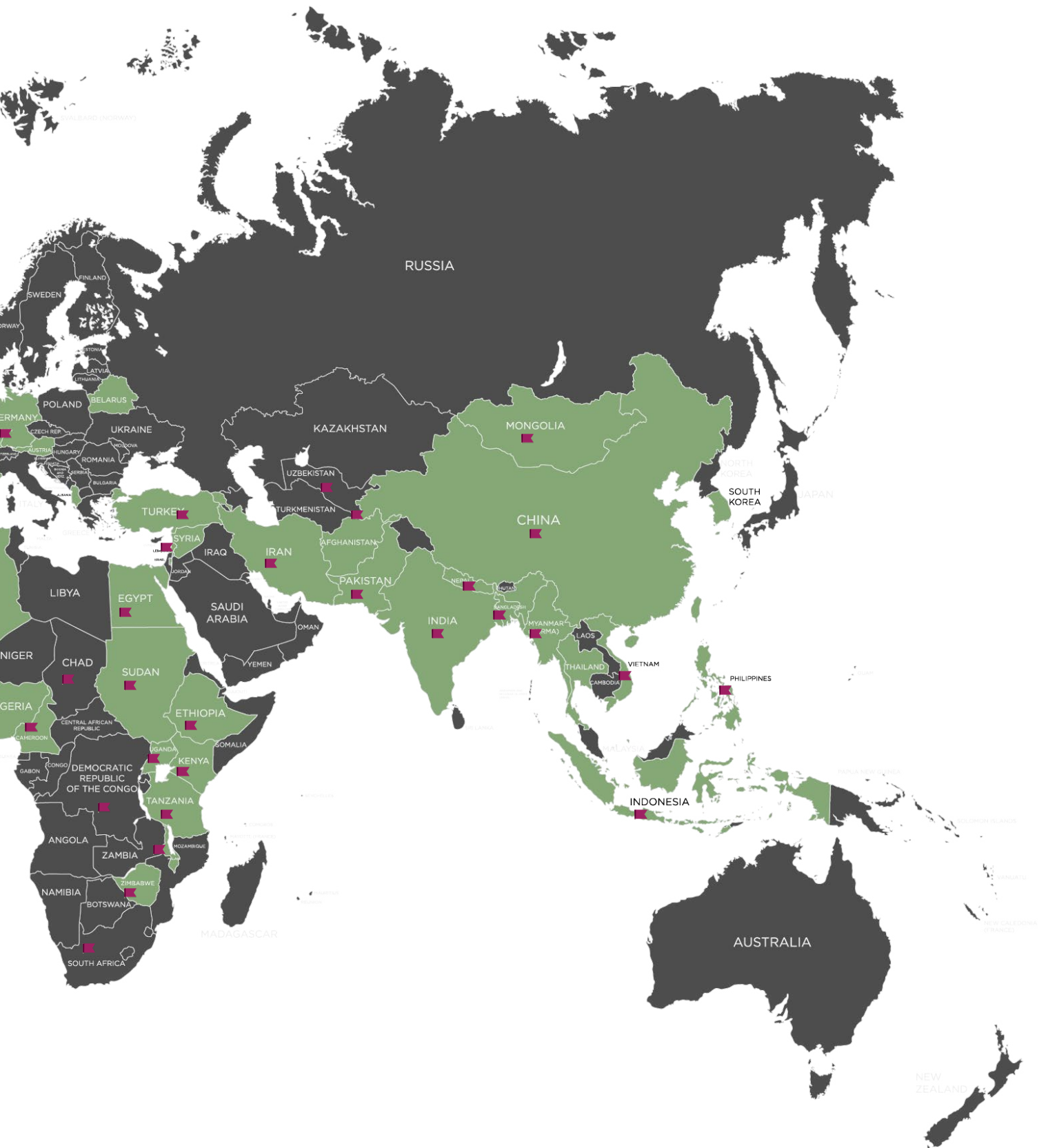
16 of our doctoral students graduated August 2019-July 2020

Our **137** enrolled students conduct their field research in **46** countries (see map on next page)

2.3 OUR STUDENTS: WORLD MAP



-  (46) Countries where our (137) enrolled students come from
-  (56) Countries where our (137) enrolled students conduct their field research



2.4 OUR STUDENTS: PORTRAITS AND STORIES

(Former) doctoral students tell about their research and experiences at ZEF.

Julia Minetto Gellert Paris

Impact of dietary choices on the health of humans, animals and the environment in the Metropolis Ruhr, Germany

The objective of my 'One Health' research is to evaluate the impacts of food consumption on human nutritional health, the welfare of livestock animals, and the damage to ecosystems. Due to the sudden outbreak of the COVID-19 pandemic I had to adapt my survey and shift into digital mode. My earlier plan to distribute printed material at restaurants and other food outlets around the city of Essen had to be modified because of the pandemic and its travel restrictions. Although I distributed some postcards, it didn't help much because people avoided eating out. So I decided to use this unique opportunity to focus on how our lifestyles and diet behaviors changed during the pandemic and lockdown period. I am interested to explore if the crisis can be taken as an opportunity to improve our diets towards more sustainable and healthier in the post-COVID-19 period.

[This research is part of the NRW Forschungskolleg 'One Health and Urban Transformation' which is funded by the Ministry of Culture and Science of North Rhine-Westphalia].



Nawaphan Metchanun

COVID-19. Epidemic trends and health system needs projections for developing countries: a case study of Thailand

This study applies mathematical-computational disease modeling to project COVID-19 epidemic trends and health system needs for low- and middle-income countries, using Thailand as a case study. It intends to demonstrate how a model can be applied to a new outbreak in a situation where healthcare resources are limited. The project runs until the end of 2020.

In previous malaria modeling work, I ran simulations to evaluate the efficacy and cost-effectiveness of a novel vector control method (gene drives) and existing malaria interventions for malaria elimination in the Democratic Republic of the Congo. I developed an assessment framework for the country and other high malaria burden countries.

[This research is funded by the Transdisciplinary Research Area Innovation and Technology for Sustainable Futures (TRA 6) of Bonn University]



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Marwa Shumo

Use of the Black Soldier Fly in bioconversion and feed production in Kenya

I investigated the use of the Black Soldier Fly (*Hermetia illucens*) in bioconversion and feed production in Kenya. My research employed a set of laboratory-based experiments to investigate the use of the Black Soldier Fly (*Hermetia illucens*) as a tool in the bioconversion of urban organic waste streams and in the production of high-quality livestock feed within a developing world context. I wanted to assess the impact of commonly and readily available urban organic waste streams on the nutritive quality of the Black Soldier Fly larvae reared on these waste streams.

My comparative research indicated that the nutrient composition of the Black Soldier Fly larvae differed depending on the organic substrates they were reared on. Overall, the findings of my doctoral research confirmed the possibility of taking advantage of the readily available urban organic waste streams in Nairobi, Kenya, and arguably elsewhere in the developing world, to produce nutrient-rich feed derived from Black Soldier Fly larvae.

[This research is funded by the International Center of Insect Physiology and Ecology (icipe), Foundation fiat panis, the Federal Ministry of Economic Cooperation and Development (BMZ) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)]



Maryoriet Nicole Rosales Salgado

The pandemic against women: The situation of domestic violence in urban settlements in the Central District of Honduras during COVID-19

COVID-19 exacerbates prevailing inequalities in Honduras, placing women and girls at greater risk of sexist (especially domestic) violence. My research, which consisted mainly of phone surveys, has explored the impact of the health crisis on gender-based violence, providing important information to the public health sector as well as national and international agencies working for the protection of women and girls' rights in Honduras.

[This research is funded by Studienstiftung des Deutschen Volkes]

Shaibu Mellon Bedi

Scaling-up agricultural innovations: Who should be targeted?

Adoption of new agricultural innovations is low in Sub-Saharan Africa. Reasons such as poor road network or lack of learning material are often given. However, the option of scaling-up strategies and the question of which farm households should be targeted are less documented. Since farming systems in Sub-Saharan Africa are heterogeneous in terms of resource endowment and agro-ecological conditions, farmers respond differently to interventions. My research looks into how the scaling-up of agricultural innovations could be targeted in a better way. Current results indicate that farmers' resource endowment and unobserved factors influence their marginal benefit of adopting sustainable intensification practices. For low-resource endowed farmers, the results show that they will benefit most from the scaling-up.

Research is funded by the German Academic Exchange Service (DAAD) via the German Federal Ministry for Economic Cooperation and Development (BMZ)]



2.5 ENROLLED DOCTORAL STUDENTS

NAME	FAMILY NAME	ENROLLMENT	NATIONALITY	TITLE OF RESEARCH PROPOSAL / DISSERTATION
Imran	Sajid	2018	Afghanistan	Options to improve irrigation efficiency and productivity in field, farm and scheme level in Mongi distributary canal Level in context of Warabandi system in Punjab Pakistan
Kalterina	Shulla	2016	Albania	Analyses on the role of non-state actors for the implementation of Sustainable Development Goals
Anis	Fellahi	2015	Algeria	Youth Migration Choices in Light of the Rural Renewal Program in Algeria: The case of Batna Province (Aures Region)
Pablo	Mac Clay	2020	Argentina	Transformation and sustainability governance of South American bioeconomies
Philipp	Swoboda	2017	Austria	Turning Rocks to Bread? Agricultural usage of rock dust in the context of One Health
Md. Fuad	Hassan	2015	Bangladesh	Inter-linkage between food price and agricultural wage and its impact on farm mechanization: Evidence from Bangladesh
Yauheniya	Shershunovich	2019	Belarus	Rethink. Reduce. Recirculate: Economic Instruments of Better Waste Management
Veronica	Manzanero	2018	Belize	Huanglongbing (Citrus Greening) disease in Belize: Incidence, severity and its interaction with Citrus rootstock varieties and mineral nutrition
Merveille Koissi	Savi	2017	Benin	Exploring the Complexity of Malaria Transmission and Control in Urban Settings, Ghana
Vanessa	Gandarillas Rodriguez	2017	Bolivia	Developing biodiversity indicators for impact assessment: The Case of Hydropower in the Bolivian Amazon
Aline	Barbosa Pereira	2013	Brazil	Iron-ore mining in Minas Gerais: local grievances, national policies and global demands - legal fields under dispute in socio-environmental conflicts
Andre	Bueno Rezende de Castro	2019	Brazil	The agro-processing value chain as a pathway for development: Evidence from Tanzania
Jéssica Francine	Felappi	2017	Brazil	Reconciling mental health promotion and wildlife conservation in a megacity: the importance of urban parks' qualities
Juliana Minetto	Gellert Paris	2017	Brazil	Shifting towards sustainable and healthier dietary patterns in the Metropolis Ruhr, Germany
Samara Evangelista	Gomes	2017	Brazil	An assessment of the implementation of the Environmental Quota instrument in the city of Sao Paulo since its entry into force in 2016 and its potential impacts on environmental health
William Ricardo	Isidorio	2020	Brazil	Investigating the Impacts of Diet on Gut Microbial Antibiotic Resistance (AMR) Among Distinct Adult Populations Living in Brazil

NAME	FAMILY NAME	ENROLLMENT	NATIONALITY	TITLE OF RESEARCH PROPOSAL / DISSERTATION
Gabriel	Ponzoni Frey	2015	Brazil	Modern agricultural frontier development and pasture restoration in the Brazilian Amazon: implications for biodiversity and ecosystem services.
Felipe	Quartucci	2019	Brazil	Deep soil organic matter assessment and soil carbon stabilization after land restoration in São Paulo, Brazil
Fernanda	Silva Martinelli	2018	Brazil	"Measuring bioeconomy's contributions to the Sustainable Development Goals achievement in Brazil".
Trevor	Tisler	2020	Brazil	Ecosystem services loss to the economy as a result of infrastructure development and ensuring land-use and land cover change
Wenceslas	Somda	2013	Burkina Faso	Adaptability of small irrigation systems to Climate Change in inland valleys in Dano
Minette	Nago Zeufack	2016	Cameroon	Climate change adaptation aid effectiveness in Congo Basin: A case study of EU and COMIFAC's countries cooperation
Annie Stephanie	Nana	2017	Cameroon	Heavy metal contamination and assessment of cancer risk related to wastewater irrigation in Yaoundé city
Liwen	Zhang	2014	China	Labor Migration within China: A Field Study in Xiangfu Township of Southwestern China
Oscar	Burbano-Figueroa	2017	Colombia	Yield, productivity and technical gaps that limits the cotton agricultural production system in the Colombian Caribbean
Cesar	Canon Barriga	2014	Colombia	Technical and Social Adaptation to Floods and Risk Mitigation in Urban Areas: A Case in Cali, Colombia
Daiana Mayuri	Castillo Lopez	2019	Colombia	Food sovereignty and (post) conflict in the rural Colombia: The case of Tenza Valley
Gina María	Chinchilla Salcedo	2016	Colombia	Building resilient communities after the conflict in Colombia: memories, identity, and contested narratives.
Milena	Guerrero Florez	2019	Colombia	Effect on diarrheal diseases rates, undernourishment and death of children associated to infection by Cryptosporidium at two municipalities from Narino, Columbia
Mayra Alejandra	Martin Espinosa	2019	Colombia	Social mobilization in Colombia: advocacy action for the guarantee of the rights of freedom of expression and access to public information. Two cases of National Platforms of Civil Society Organizations - CSOs
Alejandro	Mora Motta	2015	Colombia	Rural well-being, sustainability and territorial transformation: fundamental human needs in the context of extractive forestry plantations in Los Rios, Chile
Juan Manuel	Orozco Ortiz	2016	Colombia	Black Soldier Fly (<i>Hermetia illucens</i>): Key component in the genesis of Amazonia black earths (terra preta de andio)?
Abby Daniela	Ortega Sandoval	2019	Colombia	Best management practices and low impact development techniques for urban flood risk management in a latinamerican city with bimodal climate

NAME	FAMILY NAME	ENROLLMENT	NATIONALITY	TITLE OF RESEARCH PROPOSAL / DISSERTATION
Fernando	Rodriguez-Camayo	2018	Colombia	"Enhancing food security and the resilience of small-holder coffee farmers to climate change through sustainable business models specialty coffee value chains? The case of the dry corridor in Honduras."
Galia	Figueroa Alfonso	2014	Cuba	Agroecology in times of change: political, institutional and economic analysis in the context of the 'updated' socio-economic reform in Cuba
Ivone Aracely	Núñez Mejía	2020	Ecuador	IT services specialized in traditional sectors: an upgrading opportunity of exported services for Chile and Ecuador?
Ahmed Mohamed	Abdalla Abdelaal	2019	Egypt	Transition towards sustainable agriculture: The case of wheat-based production systems in Egypt
Nourhan	Morsy Elsobky	2019	Egypt	Detecting and mapping the impacts of land fragmentation on Water and food security in South Asia, the case of Viet Nam
Mahmoud	Nady Abdelsabour Mohamed	2020	Egypt	The effects of wetlands dynamics and future scenarios on biodiversity and society
Rodolfo Eduardo	Herrera Martinez	2018	El Salvador	Return migration, food security and wellbeing in El Salvador
Solomon Benti	Abuna	2017	Ethiopia	Developing nature induced urban planning strategies for small urban areas in Ethiopia: Case studies from small towns nearby Oromia special zones surrounding Addis Ababa, Ethiopia
Hiwot Wolde	Adebo	2019	Ethiopia	Navigating through the Roughness: Ethiopian Migrants' Lived Experiences and Migration Decision Making in South Africa
Rahel Deribe	Bekele	2015	Ethiopia	Essays on Irrigation Systems of Ethiopia: Institutional and Technological Performance Analysis
Asrat Ayalew	Gella	2015	Ethiopia	Gender, Gender (in)Equality and Small Scale Family Farming in Ethiopia: Discourses and Practices
Hadush Kidane	Meresa	2018	Ethiopia	'Water extreme risk modelling and management under the influence of environmental change'
Mekdim Dereje	Regassa	2017	Ethiopia	Rural-Urban Linkage and Household's Welfare in Sub-Saharan Africa (SSA)
Nicholas	Moret	2013	France	Biodiversity as indicator of ecosystem resilience in West Africa
Nino	Pkhikidze	2015	Georgia	Road infrastructure improvements and spatial development in developing countries
Anna	Brückner	2017	Germany	Blue health for all? Investigating urban blue spaces as potentially therapeutic landscapes for elderly people in deprived communities. Learning from cases in Ruhr and Ahmedabad Metropolis
Sebastian	Forneck	2015	Germany	(Re)Creating Home: Climate Variability, Food Security and the Social Construction of Home in Ladakh, India
Franziska	Geiger	2019	Germany	Thriving After Trauma - Individual and Group Resilience of Female Refugees in Bonn Bad Godesberg
Aminata	Germer	2011	Germany	"Food habits and nutrition security in West Africa Practices from Southwestern Burkina Faso"
Anna	Hennecke	2009	Germany	Greenhouse gas balances and sustainability assessment of agrofuel production with focus on smallholder agrosystems, agroforests and monoculture plantations in Mexico

NAME	FAMILY NAME	ENROLLMENT	NATIONALITY	TITLE OF RESEARCH PROPOSAL / DISSERTATION
Emilia	Schmidt	2019	Germany	Preserving past - Building future? Local communities and cultural heritage at the National Archaeological Park Tierradentro in South Colombia
Anna	Brückner	2017	Germany	Blue health for all? Investigating urban blue spaces as potentially therapeutic landscapes for elderly people in deprived communities. Learning from cases in Ruhr and Ahmedabad Metropolis
Sebastian	Forneck	2015	Germany	(Re)Creating Home: Climate Variability, Food Security and the Social Construction of Home in Ladakh, India
Franziska	Geiger	2019	Germany	Thriving After Trauma - Individual and Group Resilience of Female Refugees in Bonn Bad Godesberg
Aminata	Germer	2011	Germany	"Food habits and nutrition security in West Africa Practices from Southwestern Burkina Faso"
Anna	Hennecke	2009	Germany	Greenhouse gas balances and sustainability assessment of agrofuel production with focus on small-holder agrosystems, agroforests and monoculture plantations in Mexico
Emilia	Schmidt	2019	Germany	Preserving past - Building future? Local communities and cultural heritage at the National Archaeological Park Tierradentro in South Colombia
Dennis	Schmiege	2017	Germany	Risk assessment of source and dissemination of multidrug-resistant Enterobacteriaceae in the catchment area of a wastewater system in the Ruhr Metropolis, Germany
Holm	Voigt	2009	Germany	Hydrological Dimension of Dryland Afforestation in Central Asia
Edna	Agyepong	2017	Ghana	Land scarcity' in the southern communities of Ghana's Bui Dam: Poly-rational social constructions, access, and societal transformation in contested spaces
Adjoa Tsetsewa	Annan	2016	Ghana	Quality Enhancement in Commodity Chains; a Myth or Reality? Promoting Quality in the Cocoa and Shea Chains of Ghana.
Isaac	Bonuedi	2016	Ghana	Enhancing Food and Nutrition Security through Cash Crop Promotion and Nutrition Education in Sierra Leone
Albert Allan	Dakyie	2017	Ghana	Between free movement and citizenship struggles. Mechanisms of transborder citizens in accessing public education and health care in Ghana
Makafui Isaac	Dzudzor	2018	Ghana	Food and nutrition (in)security: the dilemma of urban households in Ghana
Shaibu	Mellon Bedi	2018	Ghana	Sustainable intensification practices, household welfare, poverty, perceive shock and food and nutrition security: Empirical evidence from Ghana
Francis Xavier	Naab	2020	Ghana	Changing Youth Aspirations in Agriculture Towards Rural Transformation in the Wa West District, Ghana
Joshua	Ntajal	2017	Ghana	Linking land use dynamics and surface water systems in Accra, Ghana: human health risk perspective
Genevieve	Odamtten	2019	Ghana	International Organisations in the Politics and Governance of African Migration
Daniel Akoto	Sarfo	2014	Ghana	Towards bamboo-agroforestry development in Ghana: exploring socioeconomic and ecological potentials

NAME	FAMILY NAME	ENROLLMENT	NATIONALITY	TITLE OF RESEARCH PROPOSAL / DISSERTATION
Salamatu	Shaibu	2017	Ghana	Impact assessment of climate change on the extractive's corporate sustainability: Perspectives from South Western Ghana
Maryoriet Nicole	Rosales Salgado	2018	Honduras	The Space where we belong; Narratives of space and insecurity in urban Honduras
Suparna	Banerjee	2016	India	Left Wing Extremism in India- A Study of State Responses
Mibi	Ete	2011	India	An Ethnographic Study of Local Development Brokers in the Arena of Hydropower Development in Arunachal, India
Amit	Kumar	2016	India	Urban Citizenship: An Ethnographic Study of Everyday Practices, Resistance and Negotiations in the slum communities of Mumbai
Vivek	Kumar	2017	India	"Spatio-temporal assessment and mapping of health risk due to climatic and non-climatic factors in Patna, India"
Krupali B.	Patel	2017	India	AMR in Urban Ahmedabad: A Comparative study between Animal Handlers & Non-animal Handlers
Pallavi	Rajkhowa	2017	India	Mobile phones, agriculture technology platforms and electronic auctions: Implications of digital technologies on agriculture performance and market efficiency
Namrata	Rawat	2018	India	Youth Aspirations, Decision Making and Migration Choices in the Hill Region of Uttarakhand, India
Poornima	Thapa	2015	India	Water and Sanitation access during Pregnancy in an urban slum in Jaipur, India.
Sandul	Yasobant	2017	India	Convergence model for One health approach: Exploring opportunities for control and management of selected zoonotic diseases in Ahmedabad, India
Alfariany Milati	Fatimah	2016	Indonesia	Intergenerational Mobility of Internal Migrant's Children in Indonesia
Faus Tinus	Handi Feryandi	2015	Indonesia	Proposed aquatic land cadastral system (ALCADS) to secure land tenure in the coastline area of Kepulauan Riau Province, Indonesia
Lenny	Martini	2014	Indonesia	Knowledge Communities and the Creative City Concept: Their Interplay in Urban Development in Bandung, Indonesia
Arif Budy	Pratama	2019	Indonesia	The pursuit of smartness - An ethnographic study understanding everyday practice of smart city in the Magelang municipality, Indonesia
Homa	Maddah	2013	Iran	Women Household Heads in Iran: A Discursive Analysis
Amir Hossein	Mahrookashani	2013	Iran	Simulation and analysis of drought stress effect on wheat in interaction with high temperatures
Marian Salim	Adan	2020	Kenya	Integrated Pest and Pollinator Management
Emily Injete	Amondo	2018	Kenya	Climate Variability and Health Adaptation: Effects on Human Health Outcomes, Food security and Welfare
Irene	Awino Ojuok	2020	Kenya	Land degradation and farmer managed natural regeneration in Kenya
Elizabeth	Kusia	2018	Kenya	Biodiversity and distribution of Saturniidae (Lepidoptera), and their potential for mass rearing in Kenya
Cecilia	Maina	2020	Kenya	Cost benefit analysis of including prevention and treatment services of non-communicable diseases into the universal health coverage (UHC) benefits package in low income countries

NAME	FAMILY NAME	ENROLLMENT	NATIONALITY	TITLE OF RESEARCH PROPOSAL / DISSERTATION
Elizabeth	Mumbi Ndunda	2019	Kenya	Contribution of Multi-stakeholder initiatives and Collective action in Conflict Management among Pastoral communities in Northern Kenya
John	Ndungu	2017	Kenya	Sustainability assessment of organic and conventional agricultural farming systems in Kenya: The cases for Machakos, Murang'a and Kirinyaga Counties
Wyclife Agumba	Oluoch	2019	Kenya	Availability and sustainable harvesting of wild edible plants in Turkana County, Kenya
Klara	Dzhakypbekova	2019	Kyrgyzstan	The ex-ante assessment of innovations in the walnut-fruit forests in Kyrgyzstan, Central Asia
Vanessa	Bassil	2020	Lebanon	Peace Journalism as a Media Development Tool To Advance Peace & Human Rights in Conflict-Affected Societies: Lebanon as a Case Study.
Phillip Garjay	Innis	2018	Liberia	Unlocking vulnerability to urban floods in informal settlements in Monrovia, Liberia
Henry	Kankwamba	2016	Malawi	Economic disruptions, commodity and factor market linkages in eastern Africa: Implications for income distribution, food and nutrition security
Powell	Mponela	2016	Malawi	Options for sustainable intensification in Maize Mixed Farming Systems: Explorative ex-ante assessment using Multi-Agent System Simulation
Ernesto	Cruz Kanter	2016	Mexico	Dynamics of Ejidal conflicts in the context of Neo Zapatism 1980-2015
Silvia Berenice	Fischer	2017	Mexico	Assessing socio-ecological vulnerability to drought in peri-urban agriculture in São Paulo city
Alfonso Javier	Miranda Arana	2014	Mexico	Land use decisions and environmental policy performance: Structural modeling of the Brazilian agricultural system for spatially explicit policy analysis at the forest frontier
Ana Maria	Perez Arredondo	2017	Mexico	The influence of social networks in household health environment and risks. The case of urban poor communities in Accra
Oyuntuya	Shagdarsuren	2012	Mongolia	Policy and Practices of Sustainable Development in the Extractive Industries and Education Sectors in Mongolia
Su Mon	San	2019	Myanmar	Assessment on forest governance in Reserved Forests in order to support the Nationally Determined Contribution (NDC) of Myanmar submitted to UNFCCC
Myint	Thu Thu Aung	2019	Myanmar	Value chains of edible insects in Myanmar
Dipesh	Chapagain	2019	Nepal	Detection and attribution of the spatiotemporal trend of climate-related disaster losses and vulnerability in Nepal
Shova	Shrestha	2016	Nepal	Effects of emerging crop rotations and changing soil aeration status on B and Zn availability and vegetable responses in Nepal
Ewere Evelyn	Anyokwu	2017	Nigeria	Bio-economic Transition and Land Use Change in Nigeria: Building Sustainability and Mitigating trade-offs
Abdulrasheed Abdulkarim	Isah	2020	Nigeria	The Effects of Climate Change on Crop Choice: Micro econometric Evidence from Nigeria
Kingsley Nnaemeka	Ogbu	2018	Nigeria	Performance evaluation of hydrologic models under the influence of land use and climate change in a sparsely gauged watershed
Oyewole Simon	Oginni	2018	Nigeria	Away from home: everyday urban life and wellbeing of displaced people in the Lake Chad Basin (LCB) region

NAME	FAMILY NAME	ENROLLMENT	NATIONALITY	TITLE OF RESEARCH PROPOSAL / DISSERTATION
Christopher	Okolo	2020	Nigeria	Dynamics of nematode-bacteria interactions for the control of insect pests of plants
Hina	Amber	2019	Pakistan	Role of Entrepreneurship in Reducing Youth Unemployment in Pakistan
Madiha	Hussain	2017	Pakistan	"Opportunities and Barriers for the Inclusion of Young Women in politics. A Case Study of Young Women Activists and Politicians of Pakistan."
Kashif	Mehmood	2019	Pakistan	Assessment of Water Allocations using Modeling approach for Indus Basin, Pakistan
Sundus	Saleemi	2016	Pakistan	Empowerment of Rural Women in Pakistan: Impact of Migration and Policy Interventions
Arslan	Waheed	2017	Pakistan	Development Discourses and Urban Poor: A Comparative Study of Slums of Islamabad and Brasilia
Layla	Hashweh	2015	Palestine	The hydrochemistry and hydrogeology of Ewaso Narok wetland in Kenya Modelling of a floodplain in a data-scarce environment
Michelle Mineli	Guanti Lasso	2015	Panama	"Rethinking the issue: Primary and Secondary Prevention of HIV and AIDS since the Structural Vulnerability approach, the case of the Panamanian Indigenous groups Ngäbe and Buglé".
Renzo	Giudice Grana-dos	2014	Peru	Is it working? A quantitative analysis of a conditional cash transfer mechanism to reduce deforestation, carbon emissions and to promote sustainable development
Gretchen	Gonzaga	2020	Philippines	An Intersectional Analysis of Disaster Rehabilitation and Recovery in the Philippines
Anne Margaret	Pili	2020	Philippines	"Linking Intestinal Parasitism with Water, Sanitary and Hygiene Domestic Practices and Conditions"
Stephanie	Sangalang Oc-ampo	2015	Philippines	Environmental health in schools in Manila, Philippines: assessing the impact of exposures to indoor air quality and water, sanitation, and hygiene on children's health, nutrition, and education outcomes
Erecson Sipin	Solis	2017	Philippines	Bioenergy initiatives in developing and emerging countries and their environmental, social and economic impacts
Rizza Karen A.	Veridiano	2019	Philippines	Policy, practice and people: towards science-based climate-resilient forest management in the Philippines
HongMi	Koo	2012	South Korea	Agricultural land use planning for enhancing ecosystem services using scenario-based assessment: Cases of Bolgatanga and Bongo districts in the Upper East Region, Ghana
Helena	Cermeno Mediavilla	2013	Spain	Access to the city: a comparative research of urban assemblages and resulting processes of social inclusion and exclusion in Amritsar and Lahore
Marcos	Jiménez Martínez	2013	Spain	Temporal dynamics of biomass-based products provision in a region of Upper East Ghana
Fatima	Ali	2020	Sudan	Mapping and valuation of forest ecosystem services in relation to agriculture expansion in Sudan
Tasneem	Moawia Abdalla Osman	2018	Sudan	Biology and ecology of arboviral disease vectors: Evidence from Kenya
Dima	Al Munajed	2017	Syria	Participation of Syrian women in civil society organizations following the Syrian conflict: Investigating participation in Turkey and Lebanon.

NAME	FAMILY NAME	ENROLLMENT	NATIONALITY	TITLE OF RESEARCH PROPOSAL / DISSERTATION
Khushbakht	Hojiev	2011	Tajikistan	Conflicts in Fergana Valley: Identity and Social Dynamics along Tajikistan and Kyrgyzstan border.
Qambemeda	Nyanghaiura	2020	Tanzania	Optimizing Rural Development and Conservation: Displacement and Compensation in Wildlife Corridors, Tanzania
Annet	Adong	2016	Uganda	Violent conflicts, property rights and food security: Evidence from post conflict and refugee settlements
Dorothy Birungi	Namuyiga	2018	Uganda	Agro-ecological intensification in perennial mixed farming systems for sustainable food and livelihood security in Uganda
Maria Eugenia	Silva Carrazzone	2020	Uruguay	Pending
Elizabeth	Ekren	2016	USA	Institutions, innovation and opportunity in asylum-seeker communities: Evidence from North Rhine Westphalia, Germany
Quyen	Mai	2015	Vietnam	Networks and flows in the World Heritage governance: The case of Vietnam
Mercy	Mashingaidze	2015	Zimbabwe	Pooling resources, scattering the family': transnational realities of Zimbabwean post-2000 migrants in the United Kingdom



3 BUDGET 2019/2020

ZEF'S FUNDING PARTNERS

INDIRECT SUPPORT*)	IN EURO	IN %
German Academic Exchange Service (DAAD) / German Federal Ministry of Economic Cooperation and Development (BMZ)	538,238	64.1
DAAD Regional Program / German Foreign Office (AA)	54,260	6.5
Own funds of students	45,200	5.4
KAAD		
Schlumberger Stichting Fund	29,680	3.5
Colciencia Colombia	20,000	2.4
SENACYT, Panama	17,000	2
HEC Pakistan	15,000	1.8
Thünen Institute and the German Ministry of Food and Agriculture (BMEL)	15,000	1.8
ProEcoAfrica/OFSA, Switzerland	14,400	1.7
Stiftung des Deutschen Volkes	14,400	1.7
Sudan Ministry of Higher Education and Scientific Research Scholarship	12,600	1.5
Friedrich Ebert Stiftung (FES)	12,460	1.5
GIZBMZ via BEAF	12,460	1.5
Nnamdi Azikiwe University, Nigeria	8,400	1
Total	840,298	100

EXTERNAL FUNDS**) PROJECTS	IN EURO	IN %
German Federal Ministry of Economic Cooperation and Development (BMZ)	2,504,756	31.8
<ul style="list-style-type: none"> BMZ 	PARI Volatility SDG2 UN Food Systems Summit	
<ul style="list-style-type: none"> BMZ/GIZ to International Research Centers 		
International Centre of Insect Physiology and Ecology (<i>icipe</i>)	Ento NUTRI	
International Food Policy Research Institute (IFPRI)	Montpellier Malabo Panel	
German Federal Ministry of Education and Research (BMBF) via	1,619,019	20.5
<ul style="list-style-type: none"> German Aerospace Center (DLR) 	CIREG Desertification NOURICITY PRODIGY RARSUS RARSUS-SEMALI WASCAL-PAUWES WESA CLIMAFRI - Verbundvorhaben Client II LANUSYNCON Wissenschaftlertausch Kolumbien	
<ul style="list-style-type: none"> Forschungszentrum Jülich (FZJ) 	STRIVE	
<ul style="list-style-type: none"> Karlsruher Institut für Technologie (PTKA-WTE) 	GROW InoCottonGROW	
<ul style="list-style-type: none"> Biodiversity International (GIZ) 	Improving Dietary Quality and Livelihoods in Ethiopia and Kenya	

EXTERNAL FUNDS - CONT.	PROJECTS	IN EURO	IN %
German Academic Exchange Service (DAAD)		1,381,948	17.5
	International Doctoral Studies Program 2020		
	RARSUS-DAAD		
	RLC Alumni Programm II		
	RLC Campus III		
	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		
	RLC Alumni Programm		
North Rhine-Westphalia / MIWF-NRW	One Health and Urban Transformation	713,752	9.1
	BioSC-Transform2Bio		
German Federal Ministry of Food and Agriculture (BMEL) via		759,421	9.6
	ABU		
• Federal Office for Agriculture and Food (BLE)	PROCINUT		
• Fachagentur Nachwachsende Rohstoffe (FNR)	FSS-ZEF		
German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	IKI: IPBES Support, West Africa	352,889	4.5
German Research Foundation (DFG)	Waterfront Metropolis Virus SFB/Transregio 228 Übergänge in ländlich-urbanen Schnittstellen Äthiopien	258,034	3.3
Robert Bosch Foundation	RLC Network		
Fiat Panis Foundation	Dr. Hermann Eiselen Doctoral Program	65,000	0.8
Volkswagen Foundation	Research Funds Senior Fellowship Dr. Ayamga Extension Senior Fellowship Dr. Tonnang, funds for student assistant	29,280	0.4
Alexander-von-Humboldt Foundation	Georg Forster Forschungspreisträger	8,539	0.1
Stockholm Environment Institute (SEI)	SEI	11,350	0.1
European Union via		4,672	0.1
• Welthungerhilfe (WHH)	Fostering Smallholder Agriculture in Sierra Leone		
TRA6 Uni Bonn	TRA6_COVID 19 trends and health system needs	30,000	0.4
FAO	FAO_Great Green Wall	50,000	0.6
Third-Party Project Fund available after Project End		93,827	1.2
Total		7,882,488	100

CORE FUNDS***]	IN EURO	IN %
Personnel Costs	1,193,485	73.04
Administrative Costs	283,530	17.35
BMBF & DFG Overhead Shares****)	157,017	9.61
Total	1,634,032	100
INDIRECT SUPPORT & EXTERNAL FUNDS & CORE FUNDS	10,356,818	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.

4 (SOCIAL) MEDIA AND OUTREACH [A SELECTION]

The Covid-19 pandemic forced ZEF like so many partner institutes to go more virtual and digital. Be it for staff and research meetings, colloquia, doctoral supervision and defenses or seminars: ZEF succeeded to keep the work going!

You can read about the impact of COVID-19 on ZEF's researchers work on ZEF's special BLOG: "Covid-19 and its impact on research realities" (see <https://www.zef.de/2129/zef-covid-19.html>).



Listen to ZEF's first audio podcast: A "One Health" Perspective on the Pandemic on our Youtube channel (<https://bit.ly/ZEFpodcast1>). In this podcast we talk with the medical geographer Timo Falkenberg, coordinator of the One Health project at ZEF about the One Health approach in times of Corona, the danger of human-animal disease transmission, and the role of health in sustainable development.

ZEF and IPCC

Climate change remains a major cross-cutting research theme at ZEF. The institute is also closely involved in key scientific processes related to climate change at the international level. As part of the IPCC's 6th Assessment report (Working Group 2), ZEF senior researcher Alisher Mirzabaev is currently co-leading the cross-chapter paper on "Deserts, semi-arid areas and desertification". He is also a lead author in Chapter 16 on Key Risks Across Sectors and Regions in this report, where he is coordinating the work of the group assessing the risks to food security due to climate change. Mirzabaev was also a coordinating lead author (Desertification chapter) in the IPCC Special report on Climate change and Land published last year.

Right Livelihood Campus is Annual Partner of City of Bonn

On the occasion of its tenth anniversary, the "Right Livelihood College" was appointed annual partner of the Federal City of Bonn in 2020 by the Committee for International Affairs and Science. The German headquarters of the international organization are located at ZEF / University of Bonn.

NACHHALTIGKEIT. SUSTAINABILITY. DURABILITE. BONN.

Jahrespartner der Stadt Bonn 2020

Right Livelihood College (RLC)
Campus der 'Alternativen NobelpreisträgerInnen'

Seit 10 Jahren in Bonn: Bildung, Forschung und Entwicklung für globale Nachhaltigkeit

Am Zentrum für Entwicklungsforschung [ZEF] der Universität Bonn

www.zef.de | www.rlc-blog.de

Web talk: Building better systems for resilient and sustainable futures

June 23, 2020. As part of the Bonn Water Lecture series, this webinar under the lead of the [International Water Management Institute \(IWMI\)](#) and ZEF brought together experts to share their views on the nexus between water-energy-agriculture-health-environment systems for resilient and sustainable futures in light of the global pandemic. More than 80 people from all over the world joined.

ZEF senior researcher Heike Baumüller one of most cited researcher

Heike Baumüller was recognized as one of the most cited researchers in the Journal of International Development for her article "[The little we know: An exploratory literature review on the utility of mobile phone-enabled services for smallholder farmers](#)" (see Journal of International Development). Int. Dev.30, 134–154 (2018) Published online on 23 August 2017 in Wiley Online Library [DOI: 10.1002/jid.3314](https://doi.org/10.1002/jid.3314)



www.zef.de

5 OUR RESEARCH PARTNERS: ZEF'S INTERNATIONAL NETWORK [A SELECTION]

AFRICA

Algeria:

- Abou Bakr Belkaid University of Tlemcen
- Pan African University - Institute of Water and Energy Sciences

Benin:

- University of Abomey Calavi, Benin
- Ministry of Living Environment and Sustainable Development, Benin
- Faculty of Technical Sciences at the Université d'Abomey Calavi in Cotonou
- WASCAL Graduate School Program Climate Change and Water

Burkina Faso:

- The Regional Center Agrhymet, Permanent Interstate Committee for drought control in the Sahel (CILSS Headquarters)

Côte d'Ivoire:

- Centre Suisse des Recherches Scientifiques, Abidjan
- Université Félix Houphouët Boigny, Abidjan
- Université Nangui Abrogoua, Abidjan

Ethiopia:

- Department of Landscape Planning and Design, Addis Ababa University
- Ethiopian Coffee Forest Forum, Addis Ababa

Ghana:

- Forum for Agricultural Research in Africa
- Institute of Statistical, Social and Economic Research, University of Ghana
- University for Development Studies, Wa & Tamale, Ghana/Faculty of Planning and Land Management & Faculty of Agribusiness and Communication Science

- West African Science Service Center on Climate Change and Adapted Land Use, Ghana

Kenya:

- International Centre of Insect Physiology and Ecology, Nairobi
- Welthungerhilfe Kenia, Nairobi

Madagascar:

- Centre National de la Recherche Appliquée au Développement Rural, Madagascar
- University of Antananarivo, Madagascar

Mali:

- Faculty of Sciences and Techniques; University of Sciences, Techniques and Technologies of Bamako
- Institut Polytechnique Rural de Formation et de Recherche Appliquée (Katibougo)

Mozambique:

- International Center for Water Economics and Governance in Africa; University of Eduardo Mondlane, Mozambique

Niger:

- Abdou Moumouni University of Niamey/WASCAL MRP Climate Change and Energy (Niger)

Senegal:

- African Growth and Development Policy Modeling Consortium
- Malabou Montpellier Panel (headquarters), Dakar Almadies

South Africa:

- Centre for Environmental Economics and Policy in Africa, University of Pretoria, South Africa
- DST-NRF Centre of Excellence in Food Security at the University of Western Cape

Togo:

- Directorate of Water Resources of the Ministry of Water, Rural and Village Hydraulics, Togo
- Ministry of Environment and Forestal Resources, Togo
- University of Lomé, Togo

ASIA

Afghanistan

- The Central Statistics Organization of Afghanistan

Bangladesh:

- Building Resources Across Communities
- Bureau of Socioeconomic Research and Training, Bangladesh Agricultural University, Bangladesh

India:

- Indian Institute of Public Health-Gandhinagar, Ahmedabad
- Indian Council for Research on International Economic Relations, New Delhi, India

Japan:

- International Program in Agricultural Development Studies / University of Tokyo

Myanmar:

- Spectrum
- Yezin Agricultural University

Pakistan:

- Punjab Irrigation and Power Department
- University of Agriculture, Faisalabad

Thailand:

- Mahidol University, Thailand

EUROPE

- Björnson Consulting Engineers GmbH, Germany
- Bonn International Center for Conversion
- Department of Remote Sensing/ University of Wuerzburg
- Department of Sustainable Engineering at Technische Universität Berlin
- Dr. Hermann Eiselen Doctoral Program of the Fiat Panis Foundation, Germany
- Food Security Center, University of Hohenheim, Germany
- Forschungszentrum Jülich, Germany
- Green Growth Knowledge Platform, Germany
- Helmholtz Centre for Environmental Research – Leipzig, Germany
- House of Finance, Goethe University Frankfurt, Frankfurt, Germany
- Institute of Environmental Engineering and Management at the Witten/Herdecke University, Germany
- Institute for Environmental Planning, University of Hannover, Germany
- Institute for Technology and Resources Management in the Tropics and Sub-Tropics / Technische Hochschule Cologne, Germany
- Institute of Business Administration & Hochschule Ruhr West, Germany
- Institute of Crop Science and Resource Conservation, University of Bonn
- Institute of Hydraulic Engineering and Water Resources Management at RWTechnische Hochschule Aachen, Germany
- IWW Water Centre Muehlheim, Germany
- International Centre for Sustainable Development at the University of Applied Sciences Bonn-Rhein-Sieg
- Intergovernmental Panel on Climate Change (IPCC)
- Mercator Research Institute on Global Commons and Climate Change, Berlin, Germany
- Potsdam Institute for Climate Impact Research, Germany

- Research Institute for Textile and Clothing at Hochschule Niederrhein; Germany
- Research Institute for Water and Waste Management at RW Technische Hochschule Aachen, Germany
- Right Livelihood Award Foundation, Stockholm, Sweden
- School of Life Sciences Weihenstephan at the Technical University of Munich, Germany
- Stockholm Environment Institute, Sweden
- Technical University of Denmark
- United Nations University – Institute for Environment and Human Security, Germany
- Universität Münster, Germany
- University of Bayreuth, Germany
- University of Hohenheim, Germany
- UN-System Staff College (Knowledge Center for Sustainable Development), Germany-based
- Vrije Universiteit Brussel, Belgium
- Wageningen Economic Research, part of Wageningen University and Research, The Netherlands
- World Conservation Monitoring Center, Cambridge, United Kingdom
- Welthungerhilfe, Germany-based
- World Wildlife Fund, German brand

USA

- International Food Policy Research Institute (headquarters), Washington DC

SOUTH AMERICA

Bolivia:

- Universidad Católica Boliviana, Cochabamba

Brazil:

- University São Paulo
- Universidade Federal de Minas Gerais

Colombia:

- Institute for Environmental Studies in Bogotá
- Universidad Austral

Nicaragua:

- Universidad Nacional Autónoma de Nicaragua-Managua

Uruguay:

- Universidad ORT Uruguay

6 SELECTED PUBLICATIONS

For a detailed overview of all ZEF-publications please look at: www.zef.de/publications.html

Health, nutrition and ecosystems

Callo-Concha, D., Jaenicke, H., Schmitt, C. and Denich, M. 2020. Food and Non-Food Biomass Production, Processing and Use in sub-Saharan Africa: Towards a Regional Bioeconomy. *Sustainability*, 12 (5). (Open Access). <https://www.mdpi.com/2071-1050/12/5/2013>

Callo-Concha, D., Jemal O. and Seyoum, H. 2019. Local Alternatives to Local Problems: The Contribution of Agroforestry System By-products to Food and Nutrition Security of Communities in Southwestern Ethiopia. *Food Studies*, 9(1): 29-42. (Open Access). <https://cgscholar.com/bookstore/works/local-alternatives-to-local-problems>

Nshakira-Rukundo E., Mussa E.C., Gerber N. and von Braun J. 2019. Impact of voluntary community-based health insurance on child stunting: Evidence from rural Uganda. *Social Science and Medicine*. doi: 10.1016/j.socscimed.2019.112738

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Innovation, knowledge and science policy

Kirui O.K. 2020. Skills Development for Value Chain Actors in African Agriculture: In "Policies for Successful Agricultural System Transformation." *Regional Strategic Analysis and Knowledge Support System (ReSAKSS) 2020 Annual Trends and Outlook Report (ATOR)*. Pg 98-107.

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Markets and public services

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Land, water, food and energy

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7 ABBREVIATIONS*

BEAF Advisory Service on Agricultural Research for Development

BMBF German Federal Ministry of Education and Research

BMEL German Federal Ministry of Food and Agriculture

BMU German Federal Ministry of the Environment, Nature Conservation, and Nuclear Safety

BMZ German Federal Ministry for Economic Cooperation and Development

BIGS-DR Bonn International Graduate School of Development Research

CIFOR Center for International Forestry Research

DAAD German Academic Exchange Service

DFG Deutsche Forschungsgemeinschaft

DLR German Aerospace Center

EC H2020 European Commission Horizon 2020

ERA-Net Networking the European Research Area

ECOWAS Economic Commission of West African States

ERA4CS European Research Area for Climate Services

EU European Union

FARA Forum for Agricultural Research in Africa

FONAP Forum for Sustainable Palm Oil

Globe BMBF'S Global Food Security Initiative

GIZ German Federal Enterprise for International Cooperation

icipe International Centre of Insect Physiology

IDEA Institute for Environmental Studies of National University Bogotá

IFPRI International Food Policy Research Institute

IITA International Institute of Tropical Agriculture

IKI International Climate Initiative of the German Federal Ministry of the Environment, Nature Conservation, and Nuclear Safety

IPADS International Program in Agricultural Development Studies, University of Tokyo, Japan

IPBES Intergovernmental Platform for Biodiversity

ISSER Institute of statistical, social and economic research at the University of Ghana

ITT Institute for Technology and Resource Management in the Tropics and Subtropics

IWMI International Water Management Institute

LEAP Agri A Long-term EU and Africa research and innovation Partnership on food and nutrition se-

curity and sustainable Agriculture

MIWF-NRW Ministry for Innovation, Science and Research of the State of North Rhine-Westphalia

OECD Organization for Economic Cooperation and Development

PARI Program of Accompanying Research for Agricultural Innovation

PAUWES Pan African University - Institute of Water and Energy Sciences

SDGs Sustainable Development Goals

UAM Abdou Moumouni University, Niger

UDS University of Development Studies of Tamale, Ghana

UN United Nations

UNU-EHS United Nations University - Institute for Environmental and Human Security

UNAL National University Bogotá

VW Foundation Volkswagen Foundation

WASCAL West African Science Service Center on Climate Change and Adapted Land Use

WHH Welthungerhilfe

WWF World Wildlife Fund

*) in alphabetical order.

