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ZEF NEWS

RURAL TRANSITION: OPPORTUNITIES AND TRADE-OFFS

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CONNECTING GENDER AND LAND-USE SCIENCE: WHY NOT?

Two recent papers published in the special issue "Women in Land Science" in the Journal of Land-Use Science*) stress the critical needs of female researchers in the field of land-use science. The **studies on the relation between gender and land-use science** were conducted by a group of female researchers of the LANUSYNCON project at ZEF.

Telling numbers

The authors conducted a meta-analysis based on 316,390 peer-reviewed journal articles published in 2000-2021, and found that **only 27% of all authors were women.** Besides, representation of ethnicity among the authors was biased towards White researchers (62%) followed by Asian (30%), Hispanic (6%), and Black (2%) researchers. "**Less than 1% of all authors represented black women** *indicating an intersectionality effect of female black authors, who are part of two marginalized scientific communities*" says Hannah Kamau, lead author of one of the studies.

Case study ZEF'S doctoral program BIGS-DR

The group decided not only to look at land-use science in general but also to understand why men are more successful in publishing and pursuing a scientific career. They took the **doctoral program at ZEF (Bonn International Graduate School for Development Research BIGS-DR) as a case study.** In an online survey, current and former members of the doctoral program were invited to answer questions about their academic performance while pursuing their doctorate, whether or not they had kids, and if they or their partner was in charge of family obligations. They found that particularly **female early-career researchers from the Global South faced challenges** in balancing an academic career and a family life. Significantly more women than men in the doctoral program were responsible for family obligations, with mothers experiencing a prolonged duration of completing their doctorates and a lower rate of scientific publications.

"*Considering these results, we call for supportive actions from academic leaders and funding institutions to empower women, reduce intersectional inequalities and* **support the achievement of the Sustainable Development Goals Gender Equality (SDG5) and Partnership for the Goals (SDG17) through gender-sensitive and inclusive international collaboration,**" says Sara Velander, lead author of the ZEF case study.

Furthermore, institutes need to address the constraints that early-career scientists, particularly mothers, face during their research so international gender equality in the field of land science can be strengthened.

Presentation and discussion at ZEF Gender Group

The results were also presented and discussed during a workshop on gender-sensitive research at ZEF, organized by the ZEF Gender Group in May 2021. The diffusion of the studies was timely and coincided with an analysis conducted by several senior researchers on the **need to address gender inequalities along the research cycle in a more systematic manner.** This includes the acknowledgment of the differentiated challenges that female and male researchers face at home, in academic spaces and in the field. During the workshop the two studies were highlighted because they constituted a good example of how to build evidence of the, otherwise, hidden structural disadvantages for female researchers.

Women scientists face specific challenges during their professional careers.

***) Publications:**

Hannah N. Kamau, Uyen Tran & Lisa Biber-Freudenberger (2021): A long way to go: gender and diversity in land use science, Journal of Land Use Science, DOI: 10.1080/1747423X.2021.2015001

Sara Velander, Fernanda Silva Martinelli, Dewi Idam Sari, Fatima Ali & Lisa Biber-Freudenberger (2021): A dichotomy of domestic and academic pathways: challenges of motherhood in an international doctoral program on land science, Journal of Land Use Science, DOI: 10.1080/1747423X.2021.2015002

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MONITORING BIODIVERSITY LOSS IN COLOMBIA: RESEARCH WITHIN THE DOCTORAL STUDIES SUPPORT PROGRAM

The Doctoral Studies Support Program (DSSP) is a bilateral graduate school run by ZEF and the Institute for Environmental Studies (IDEA) of the National University of Colombia in Bogotá, Colombia. The DSSP was launched in 2017 and is funded by the German Academic Exchange Service (DAAD). The overall aim is to **support and train doctoral researchers in inter- and transdisciplinary development studies at the nexus of natural resources, governance and conflict in Colombia.** The project's objective is to develop a research agenda and additional research projects on topics including environmental conflicts and their different manifestations, competing rural development models, land and territorial rights and their actors, including local population. In addition, the project is involved in knowledge-transfer, -exchange and training to strengthen communities regarding their use and protection of natural resources.

Monitoring biodiversity loss: ColPaMon project

Within this context, IDEA and ZEF, together with the Latin American Institute of the Free University of Berlin set up another project on "**Participatory monitoring of biodiversity loss in Colombia: Alternatives for understanding and resolving environmental conflicts" (ColPaMon)**. Here, the partner institutes will work with academic and non-academic experts on alternative solutions for pressing environmental problems and violent conflicts in Colombia. The first phase of ColPaMon is being funded by the Federal German Ministry of Education and Research (BMBF).

In Bogotá: Workshop and excursion to Ciudad Bolivar

A ColPaMon working group met in Bogotá on November 8-11, 2021. Besides participants from IDEA and ZEF, representatives from the Leibniz Centre for Agricultural Landscape Research in Berlin (ZALF) as well as from **Columbian civil society organizations took part in the workshop.** The latter included organizations such as the Farmers' Aqueduct Association of Tasco, the Committee for Water and Fife of Buenaventura, and the Governor of the indigenous community Embera. They all work with communities that suffer from conflicts related to their respective territories and environment. The working group aims to expand and complement existing environmental monitoring systems with local knowledge by using integrative methodological approaches. In the medium-term a full research project proposal is to be developed jointly. After a two-day in-person meeting, the worskhop participants visited different locations in Colombia's capital Bogotá. **Bogotá is an extremely fast-growing city with more than 7 million inhabitants** and it is suffering from a **huge garbage-disposal problem**. Most of the garbage is just dumped at the outskirts of the city, causing drastic (ground) water pollution and therewith posing an enormous risk, especially to marginalized people. One of the visited locations was Ciudad Bolivar, a peri-urban informal neighborhood in the southwest of Bogotá. **Ciudad Bolivar is considered one of the world's largest "mega-slums"** and covers an area of 13,000 hectares with almost one million inhabitants. People in Ciudad Bolivar form separate communities based on their regional origin in Colombia. Recently, investors have recognized Ciudad Bolivar's potential for constructing high-end buildings, due to its relatively urban atmosphere and its attractiveness to tourists. **Thus, gentrification and displacement processes are increasingly challenging the people living there and their communities.** The first residents of Ciudad Bolivar have already been evicted in order to make space for formal construction projects.

Author: Ellen Youkhana is a student assistant working with the ColPaMon project of DSSP.

MAKING IMPACT AND A REAL-LIFE CONTRIBUTION: STUDENTS OF THE CLIMATE AND SUSTAINABLE DEVELOPMENT ACTION CLUB IN NIGER

The Climate and Sustainable Development Actions Club (CSDAC) was founded in 2018 by ten master students from Ghana, Niger and Benin. All students were part of the ZEF-led Capacity Development project **West African Center for Sustainable Rural Transformation (WAC-SRT)**, which is one of 12 **DAAD African Centers of Excellence.** ZEF has been running another DAAD African Excellence Center, the Ghanaian-German Center for Development Studies since 2008. To finance their extracurricular activities, the Climate and Sustainable Development Actions Club members have been engaging in successful fund-raising activities, bringing them several grants.

Here is (part of) their story

Today, the Club has around **50 active members**. It has become a regional network of young professionals and students contributing to the climate change discourse and offering solutions at many levels. At the core of **CSDAC's activities have been strong commitment to enhancing local communities' capacities and practices towards achieving the SDGs and the African Union Agenda 2063.** This applies especially to issues such as environmental protection, gender equality as well as climate-change resilience, adaptation, and mitigation.

What actions do the students undertake?

The Club's members have been very active in using social media for promoting their work. Social media, especially Facebook, are playing a key role in communications among the youth in urban and semi-urban areas in West Africa. **During the COVID-19 pandemic the Club members ran several in-person and digital awareness-raising and information campaigns,** e.g. on how to prevent contracting the SARS-CoV-2 virus. They informed on the importance of applying personal hygiene practices, observing social distancing rules, wearing masks and using hand sanitizers. These campaigns were reaching out far beyond the Club's climate-change related mandate. This shows the dedication and motivation of the students to improve the living conditions of local communities by amplifying the impact of what they are learning at university and during their studies. **All actions and videos can be watched on CSDAC's Facebook page**.

Supporting local and regional capacities with concrete actions and impact

In May 2020 the CSDAC was one of 25 award-winning initiatives granted funding by The Youth Challenge Fund of Plan International West and Central Africa. More than 1,300 applications from 14 countries had been submitted. The CSDAC students received the grant for their project "**Entrepreneurship and Empowerment of Nigerien Youth in the face of Covid-19**". This project aimed at helping young Nigeriens, especially women, cope with some of the effects of the pandemic which hit them hardest, i.e. rising unemployment rates and increasing economic vulnerability. By training young people on installing, deploying and repairing solar systems for irrigation purposes, the CSDAC has strengthened their practical skills and enhanced their opportunities in the job market. Besides, **the CSDAC's actions contributed to setting up sustainable and clean energy systems in Niger.**

Successful fundraising: Granted grant after grant!

CSDAC members have also applied for and acquired a grant by the **CoLab program of the French National Research Institute for Sustainable Development.** Due to this grant they were able to develop an app (see youtube video here: **WOHEVER**) which aims to enhance medical care during pregnancy and thereby reduce child and maternal mortality rates. The development and implementation of this app has given the students an enormous exposure, also in Nigerien Media outlets.

Grant for training 17 women for 17 SDGs

In December 2021, the CSDAC students were awarded another grant by Plan International West and Central Africa. The new project plans to build human capacities in advocacy and digital campaigning: **17 Nigerien girl-leaders will receive training on how to best disseminate and promote the 17 SDGs in French and two local Nigerien languages on social media channels.** The project was officially launched at the Abdou Moumouni University of Niamey in Niger's capital Niamey on February 21, 2022. Read the full blog post about this event here: https://blog.zef.de/?p=7975

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MAN OR MACHINE? HOW THE RENTAL MARKET FOR FARM MACHINES CAN BOOST AGRICULTURAL PRODUCTION IN BANGLADESH

Trends of agricultural mechanization have taken on a new significance in developing countries in recent years. These trends have been triggered by the shrinking availability of hired labor and rising labor wages, as more non-farm income opportunities for farmers have arisen over the past 20 years. **Whereas crop cultivation used to be their only source of income, (Mishra et al., 2015), many farmers have turned to complementary sources of income now.** Thus, instead of depending solely on human labor force for cultivating their lands, farmers have been exploring and using alternative resources such as farm machinery rental services.

Agricultural sector in Bangladesh has undergone a remarkable transformation

In 2020, Bangladesh's Government developed a National Agricultural Mechanization Policy. Its vision was to transition the country's agriculture to an efficient, profitable, and commercial sector by means of mechanization. In this ongoing process, the country is facing a number of challenges. On the one hand, Bangladesh is one of the most populated countries in the world. It therefore seems paradoxical that producers at farm level are facing manpower shortages. In addition, farm-level producers have inadequate access to alternatives to human power such as machine rental services. On the other hand, Bangladesh's free-market economy has generated benefits for farmers and the government has built an extensive network of paved roads in rural areas. **These positive factors have accelerated the partial adoption of farm machinery in Bangladesh** (Mottaleb et al., 2016).

Farm machinery rental services in Bangladesh: a viable option?

The most popular farm machinery rental services in Bangladesh are those targeting land preparation, threshing, shelling, and transportation. Typical clients of such rental services are smallholder farmers in village communities, mostly cultivating less than one hectare of land. Providers of rental services are primarily farmers themselves. They often invest in equipment, both for their own use and because they have recognized the potential of hiring services in their local markets.

Nevertheless, very little is known about the demand and supply as well as the market structure of these rental services. For generating sustainable production growth and increasing agricultural productivity, it is **essential that farm machinery power is made available at a low price and along well-functioning distribution channels.** That is why it is important to understand how custom hiring [custom hiring services are similar to rental services and indicate hiring agricultural machines from a center or hub, or market, ed.] of agricultural machinery operates and how service providers and users interact with each other.

On the ground: empirical data collected in Bangladesh

This study was conducted in 2017 in Bangladesh, i.e. in the cities of Dhaka and Rajshahi, and in Khulna division. **A total of 610 households including 371 owners and 239 users of farm machines were sampled**, by means of multi-stage stratified random sampling. Based on these collected data we assessed the supply chain of farm machinery and determined the factors associated with machinery ownership. We estimated whether farm machines would be a viable option as a profitable enterprise and, in addition, we assessed the demand as well as future willingness to pay for the desired rental services.

Study on hiring labor vs. rental services discloses different market types

The results show that **manual planting and harvesting were the two most common activities for which farmers were hiring labor.** A paddy farmer can save 85.40 USD[1] per hectare by planting paddy with the help of a mechanical planter and 70 USD per hectare by harvesting paddy with the combine harvester.

A primary school teacher driving a power tiller by himself due to hired labor shortage.

A member of a tractor cooperative interviewed in the rental service hub.

Photo left: Tractor tilling land with a metal plough.

Photo right: Harvesting paddy by reaper.

This study also reveals that there are **different types of markets for machinery rental.** Price competition among tractor-owners varied, depending on the distance traveled. The limited number of tractor service-providers and little price variation among clients suggest that there is a monopolistic-type of market. Though the charges for power-tiller services were the same across neighboring villages, there are a handful of power-tiller service providers, indicating a competitive market structure. As for the rental market for transplanters, combine harvesters, and reapers, we could see a monopoly. We observed that households' access to credit increases their probability of machine ownership. In contrast, having fragmented lands significantly decreases the probability that households adopt farm machines and participate in the rental business. **Although more than half (59%) of the agricultural labor force is female in Bangladesh (BBS, 2018), females are less likely to own agricultural machinery.** In general, regardless of whether they were owners or non-owners, most of the farmers were highly interested in mechanizing planting-and- harvesting operations.

The major barrier preventing potential competitors from entering in the custom hiring market is the capital intensity required for buying farm machines (Fang, 2017). Though the rental market generates higher profit, it also works with shorter payback time. For example, the investment required for a tractor is almost triple of that for a power-tiller but has a shorter payback time (eight months). The time needed to recoup the investment for a thresher machine was three months and for a combine harvester 11 months.

The importance of social capital

Social capital seems to be an important factor in bringing owners into profit as well as making services for users available. We therefore used a Likert scale [an econometric model, ed.] to generate the social capital indices for each owner-household. We used information regarding the

[1] Note*: 1 USD = 85.50 BDT (year of 2017)*

Female labor participation in post-harvest activities.

owner's relationship with friends, whether the owner provides services to own relatives and neighbors, whether the owner performs a service on credit for friends and relatives, whether the owner can meet the demands of his/her village and how much trust the owner has in transactions. We observed that social capital improves the smoothness of the rental market and therewith increases the profit of an enterprise. **Farmers can use social capital to secure rental services on time and optimize their agricultural output.**

Implications and recommendations how to boost hire services in Bangladesh

The study points out that the rental business of farm machinery is recommendable, not only for commercial purposes but also because it increases efficiency in agricultural production. Social businesses through social capital may play an important role in making mechanization affordable for farmers. **To strengthen the existing capacity of custom and hire service entrepreneurs and to support new entrepreneurs, appropriate adoption facilities and information-dissemination programs should be launched all over Bangladesh.**

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Photos in this article by author.

FARM MECHANIZATION CAN HAVE POSITIVE SPILL-OVER EFFECTS ON INDIA'S AGRICULTURAL LABOR SECTOR

Growing population densities, urbanization, and rising incomes due to higher consumer demand have increased the need for more food products in emerging countries. One way to address this demand is raising agricultural production through sustainable agriculture intensification. This can be achieved by either expanding cultivable land or increasing land productivity. However, when agricultural systems intensify, we see higher labor requirements per unit of farmed area for land preparation, weeding, harvesting, processing, and maintaining draught animals.

Induced innovation

Over the past years, increased work opportunities in the non-farm sector have led to an increase in rural wages in several emerging economies. According to the theory of *'induced innovation'*, **rising wages and labor shortages lead to the substitution of labor with mechanical power or labor-saving technologies.** Consequently, widespread use of labor-saving technologies may result in labor displacement and therewith raise serious equity concerns.

Publication on 'Revisiting the relationship between farm mechanization and labor requirement in India'

In a study, published as a paper*), we use panel data from India to analyze the relationship between different types of farm machines — such as water-lifting equipment, draft power, tractors and threshers — and labor requirement in India. **This research is unique in terms that it examines not only the disaggregated impacts of the use of farm machinery on family, male and female labor, as well as hired labor, but also the effects on child labor.** In addition, it looks into the heterogeneous effects of mechanization on labor demand based on land size.

Mechanization can induce more demand for hired labor

The results of the study indicate that **mechanization induces more demand for hired labor.** The study thus suggests that agricultural mechanization does not necessarily have to replace labor. It may also result in higher demand due to a scale effect i.e. a higher labor requirement for land preparation, input application due to increased cropping intensity, and post-harvest activities. We also find that **the increased demand for hired labor is channeled through expansion of cultivable land and increased input-use intensity.** Moreover, we find that the effect of farm mechanization on the demand for hired labor decreases as the size of the farm increases. **Smaller farms** are likely to automate only the most labor-intensive processes, such as water-lifting and soil preparations, due to limited access to capital. This might minimize labor needs in these operations. Increased cultivable area extension or cropping intensification, on the other hand, may raise labor requirements in other processes such as input application or post-harvest activities. **Larger farms**, on the other hand, are more likely to include a variety of technologies that can minimize labor needs across several farming activities.

Mechanization increases women's farm work and reduces child labour

Further, we find that the **level of mechanization increases women's participation in farm work, while it decreases the probability of children participating in agriculture-related work.** The latter has particularly important implications in that not only mechanization has a direct negative impact on child labor, but in addition, once we account for mechanization, child labor might also be replaced by hired labor. This further reinforces the direct impact of mechanization. Disaggregated analysis based on the different types of farm machinery suggests that water-lifting equipment, draft power, and tractors increase the probability of male household members working on their farms, **while all types of farm machines, except tractors, increase female farm labor participation.**

***) Publication:** Rajkhowa, P., & Kubik, Z. (2021). Revisiting the relationship between farm mechanization and labour requirement in India. *Indian Economic Review*. https://link.springer.com/article/10.1007/s41775-021-00120-x

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AFRICA'S "GREEN WALL" ALSO MAKES ECONOMIC SENSE, BUT NOT FOR ALL REGIONS IN THE SAHEL

Fifteen years ago, the African Union decided on an ambitious program: the African Great Green Wall. The goal was to successively restore degraded ecosystems in parts of the Sahel in order to secure food for the people living there and to protect the soil against further degradation. At the same time, the African Great Green Wall has been an important contribution to combating climate change. A **study carried out by ZEF (University of Bonn) and the Food and Agriculture Organization of the United Nations (FAO) now shows that the African Great Green Wall initiative also makes economic sense.** However, not everywhere in the Sahel. The analysis also reveals to what extent violent conflicts threaten the success of the program. The ZEF/FAO study has been published in the journal Nature Sustainability*).

The Sahel extends south of the Sahara desert; from Senegal in Africa's west to Ethiopia in the east of the continent. Vast areas of the formerly fertile region are now virtually uncultivated. This situation has been caused by droughts, poor agricultural cultivation methods as well as overuse of soils, due to the raising demand for food and firewood.

The "Great Green Wall" initiative aims to compensate for and reverse these losses through **mass planting of native trees and grasses. 100 million hectares of land are to be restored** in this way. So far, this ambitious goal is very far from being achieved - partly because of a lack of financial resources.

However, this might change in the future: **At the One Planet Summit for Biodiversity, held in Paris in January 2021, various donor countries pledged nearly 15 billion U.S. dollars to the project**. "*In order to use these funds in an efficient way, we now have to ask ourselves where and for which measures they should be used most sensibly*," emphasizes ZEF senior researcher Alisher Mirzabaev.

Every invested dollar yields a 20-cent of net returns

The agricultural economist has led the ZEF/FAO study, providing some answers. The researchers divided the Sahel region into 40 million plots of 25 hectares each. They then analyzed for each of these which land restoration measures would be possible and how much they would cost. They compared this calculation with the economic benefits that could be achieved.

"*These benefits include the so-called provisioning services*," explains Mirzabaev. "*These are the things that are produced by the ecosystems: food and drinking water, raw materials such as wood or medicinal plants*." There are also other effects, such as a better climate, less wind erosion or pollinators services, which in turn increase the farmers' crop yields. They, too, can have a price tag attached to them today.

The results show that building the "Green Wall" is also economically worthwhile. But to which extend depends on a number of factors. As a rule, reforestation would be the most advantageous in economical and ecological terms. But it takes decades for a few hundred seedlings to grow into a forest. The investment therefore only bears fruit in the very long term.

A typical village of the Sahel region in Niger© FAO, http://www.fao.org/in-action/action-against-desertification/en

Preparation for restoration of the Green Wall in Burkina Faso© FAO, http://www.fao.org/in-action/action-against-desertification/en

The situation is different when degraded areas are converted into farmland. "*Ideally, in this case the first harvest is possible after just one year,*" says Mirzabaev. Cropland restoration can thus pay for itself comparatively quickly. Many poor smallholder farmers also prefer quick returns from their restoration activities. However, the profits that can be achieved as a result are significantly lower, as are the environmental effects.

"In our analysis, we work with different scenarios, some of which are aimed more at short-term benefits, while others have a more long-term effect," explains the agricultural economist, who is a member of the Transdisciplinary Research Area "Sustainable Futures" (TRA6) at the University of Bonn. The so-called baseline scenario, for example, includes a mixture of both short-term and long-term returns. **In this scenario, every U.S. dollar spent yields a net return of on average 20 cents**

Half of the profitable regions are too unsecure for action

However, there are huge regional variations. The most positive economic balance is for parts of Nigeria, Eritrea, and Ethiopia. **In these areas, investment in the "Green Wall" is most worthwhile.** To finance all the proposed measures in this scenario, a sum of **44 billion U.S. dollars** would be needed. **This would allow for the restoration of 28 million hectares of land.**

Nevertheless, the analysis also shows that this will probably only work in theory. Due to violent conflicts, many of the regions where it would make sense to build the "Green Wall" are simply too unsecure for such measures.

"*If we take out these areas, just 14 million hectares are left,*" Mirzabaev points out. **"This shows how much such disputes not only cause direct human suffering, but also hinder positive development in the affected regions."**

***) Publication:** A. Mirzabaev, M. Sacande, F. Motlagh, A. Shyrokaya und A. Martucci: Economic efficiency and targeting of the African Great Green Wall; Nature Sustainability; DOI: 10.1038/s41893-021-00801-8 https://www.nature.com/articles/s41893-021-00801-8

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A Sahel village near Timbuktu, Mali, on the edge of the "Green Wall"© FAO, http://www.fao.org/in-action/action-against-desertification/en

YOUNG AFRICAN RESEARCHERS DISCUSS SMALLHOLDER AGRICULTURE IN AFRICA AT WORKSHOP IN NAIROBI. ORGANIZED BY THE RIGHT LIVELIHOOD CAMPUS BONN

On October 5-9, 2021, the Right Livelihood Campus Bonn at ZEF organized its first in-person workshop in Nairobi, Kenya, together with its partner Biovision Africa Trust. The workshop was part of a new RLC project, which started in 2021 and is funded by the Volkswagen Foundation.

The workshop's topic was "**Contextualising agricultural interventions and rural development strategies: Addressing smallholders' livelihoods vis-à-vis market changes, land tenure and soil fertility**". The overall aim was to create a transdisciplinary research-practice platform on the future of East African smallholder agriculture. The platform is to be based on knowledge, expertise and networks of the global RLC network as well as of individuals and organisations who have been awarded the "Alternative Nobel Prize".

Workshop participants: An international group of experts

In total 21 young researchers from Kenya, Uganda, Ethiopia, Tanzania and Rwanda took part in the workshop together with colleagues from ZEF, Biovision Africa Trust, the International Centre of Insect Physiology and Ecology (**icipe**), the **University of Nairobi** as well as the **Green Belt Movement** and the **Wangari Maathai Institute for Peace and Environmental Studies in Nairobi**. Also joining the workshop from remote/online were the "Alternative Nobel Prize'" Laureates **Tony Rinaudo** (Australia) and **Hans Herren** (Washington DC, USA, Director of Biovision Foundation), both awarded in 2013 'for promoting a safe, secure and sustainable global food supply' as well as **Tim Crews**, representing The Land Institute (Kansas, USA). Key-note speeches were given by Prof. Lennard Olsson from the RLC Campus at the Lund University Centre for Sustainability Studies (LUCSUS) in Lund, Sweden, Dr. Jimmy Lamo from the Ugandan National Agricultural Research Organisation (NARO), Namulonge, and Alexander Repenning from the Right Livelihood Foundation, Geneva, Switzerland.

Thematic setting and excursion

The participants worked on three thematic areas, namely: a) What do farmers really want and need? Empirical findings from Uganda, Kenya and Tanzania; b) How can change be locally integrated and be pro-poor supporting without compromising exploitation of natural resources?; and c) What are the lessons learnt from agronomic and institutional actions in the context of land degradation, climate change and changing markets?

On October 7, 2021, a field trip excursion was organized to the **Grow Biointensive Agriculture Center of Kenya in Thika,** about 50 km northeast of Nairobi. After being welcomed by the Center's **Director Samuel Nderitu**, the workshop participants visited its gardens, seeds reserve and facilities. The field trip gave them an opportunity to learn about innovative, practical and productive ways to practice sustainable smallholder agriculture and to talk to practitioners and trainers 'in the field'. Lively discussions and exchange took place during this field trip as well as during the entire workshop.

Take-away messages

Some of the take away messages from this workshop are the need to re-green mind-sets in order to re-green landscapes and to adapt research more to local contexts. Moreover, to **cite Prof. Wangari Maathai, "Alternative Nobel Prize" Laureate of 1984 and the first woman from Africa receiving the Peace Nobel Prize: "***You cannot protect the environment unless you empower people, you inform them, and you help them understand that these resources are their own.***"** For 2022, the RLC project is planning another workshop on sustainable smallholder agriculture in East Africa. Hopefully in-person again**.**

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IN BRIEF: NEW ZEF RESEARCH AND PROJECTS

FUTURE RURAL AFRICA: ZEF TO BE PART OF THE SECOND PHASE OF THE COLLABORATIVE RESEARCH CENTRE

The Collaborative Research Centre (CRC) "Future Rural Africa" (www.crc228.de) will receive **funds fom the German Research Foundation (DFG)** for four more years for the project's second phase (2022-2026). Taking an inter- and transdisciplinary perspective, the **CRC investigates the socio-ecological transformation along development corridors in Kenya, Tanzania and Namibia.** Together with researchers from the University of Bonn and Cologne as well as many external partners, especially in the African research countries, ZEF has been and will be playing a prominent role in the CRC. Professors Christian Borgemeister and Jan Börner were already principal investigators (PIs) in the first phase, whereas Jun.-Prof. Lisa Biber-Freudenberger will join them as a third PI from ZEF in the second phase.

In the upcoming phase the three PIs are going to look into **different aspects of socio-ecological transformation and future rural development ranging from infectious diseases, to ecotourism and road development.** In the first phase the CRC has been looking at conservation and intensification as important processes determining future rural development. In the second phase, "infrastructuring" will be considered a third process interacting with the other two. "*The development of roads is shaping the development and future of many rural areas across Africa in a significant way.* **I am looking forward to the opportunity to better understand how road development affects biodiversity and livelihoods and thus to playing a role in this second phase of the CRC**," says Lisa Biber-Freudenberger.

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THE CONSEQUENCES OF BIODIVERSITY LOSS AND LAND USE CHANGE ON INFECTIOUS DISEASE EMERGENCE

A new research project will take a look at the role of biodiversity loss and land use change in the emergence of zoonotic infectious diseases in Uganda. The project is funded by the German Research Foundation (DFG) and will start in spring 2022. Lisa Biber-Freudenberger will lead and conduct the research in collaboration with an international and interdisciplinary consortium from the Charité in Berlin and Makerere University in Uganda. While studies have found that the transmission of zoonotic diseases is influenced by biodiversity loss and land use change, there is little knowledge about the initial dynamics of disease emergence.

The researchers will study these dynamics by detecting, analyzing and modeling arbovirus infections (those viruses transmitted for example by mosquitoes e.g. Rift Valley fever virus, West Nile virus, Dengue virus, Chikungunya virus, Zika virus or Yellow fever virus) considering land-use change, climate change, population density, agricultural activities as well as biodiversity loss. The team will investigate **how and under which conditions viruses were able to infect new hosts** including humans or farm animals for the first time (so-called spillover infections) to understand their genetic adjustment. This information will provide the basis to model hot spots of **diseases emergence under different climatic and land-use change scenarios** and to develop policy recommendations for early detection, effective prevention and risk reduction of zoonotic infectious diseases.

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IN BRIEF: NEW ZEF RESEARCH AND PROJECTS

THE AFRICAN CLIMATE AND ENVIRONMENT CENTRE - FUTURE AFRICAN SAVANNAS (AFAS) KICKED OFF

On February 4, 2022 **more than 130 people** from Europe and Africa joined the virtual kick-off event of ZEF's new capacity development project African Climate and Environment Centre - Future African Savannas (AFAS). AFAS is one out of **eight Global Centers selected and launched by the German Academic Exchange Service (DAAD)** in April 2021. See more information on our website here. **The ZEF-led AFAS Center will focus on Improved livelihoods through nature-based solutions - Linking science, policy, and practice** and will be carried out in partnership with the African Center of Excellence on Climate Change, Biodiversity and Sustainable Agriculture **(CEA-CCBAD**), Université Félix Houphouët-Boigny (**UFHB**), Abidjan, Côte d'Ivoire; Institute for Climate Change and Adaptation (I**CCA**), University of Nairobi, Kenya; and the Global South Studies Center of University of Cologne, Germany. Doctoral students and postdocs will also be integrated into the program, in close cooperation with the DFG-funded Bonn-Cologne Collaborative Research Center (CRC) Future Rural Africa, among others.

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Photo: Henning Sommer

STRENGTHENING BIODIVERSY CAPACITIES IN AFRICA: CABES FOLLOWING UP ON WABES

"Capacities on Biodiversity and Ecosystem Services (CABES)", a new ZEF-led project, will continue ZEF's work on building capacities for biodiversity and ecosystems services in Africa. **The International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU) will provide eight million Euros in funding over the next eight years.** Together with 38 partner countries in Africa, CABES aims to strengthen the interfaces between science, policy and practice on the continent. Moreover, CABES will support networking activities with the international work of the **World Biodiversity Council (IPBES)**. Another goal of the project is to train early career scientists as intermediaries. To this end, **new Master degree programs** are being established in Côte d'Ivoire, Ethiopia and the Democratic Republic of Congo.

CABES will follow up on and extend the WABES project (https://wabes.org/index_en.html), a capacity developement project run by ZEF (2017-2022) working on similar issues and goals in West Africa.

Read more about CABES at https://bit.ly/CABESunibonn and https://bit.ly/ZEFnewswebCABES

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