Future Rural Africa

Collaborative Research Centre TRR 228

Future Rural Africa

Future-making and social-ecological transformation

Project Summaries Third Funding Phase (2026-2029)

UNIVERSITY OF COLOGNE

Funded by

Deutsche Forschungsgemeinschaft

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Please visit our website for updated information on our team members.

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International Partners of the Collaborative Research Center

Academic Partners

1. **University of Nairobi**
   Kenya
2. **Kenyatta University**
   Kenya
3. **University of Namibia**
   Namibia
4. **Dar es Salaam University**
   Tanzania
5. **Mzumbe University**
   Tanzania
6. **University of Zambia**
   Zambia
7. **University of the Free State**
   South Africa
8. **Stellenbosch University**
   South Africa
9. **University of Capetown**
   South Africa
10. **Sokoine University of Agriculture**
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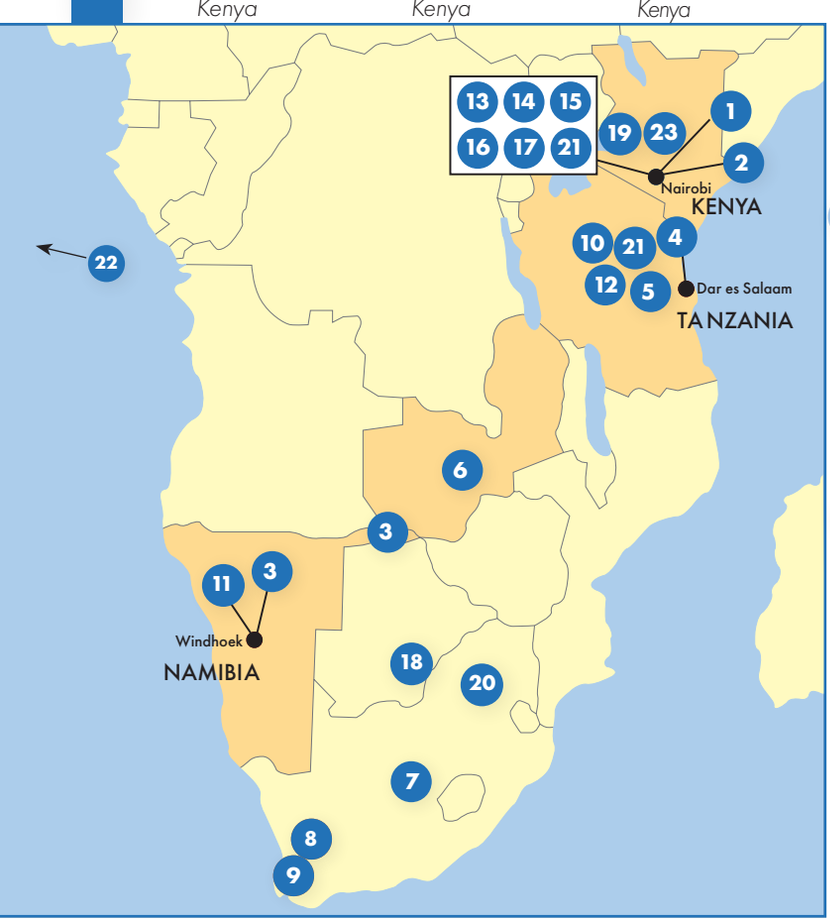
11. **Namibia University of Science and Technology**
    Namibia
12. **Kilombero Agricultural Research Center**
    Tanzania
13. **United States International University**
    Kenya
14. **Kenya Medical Research Institute**
    Kenya
15. **Kenya Agricultural and Livestock Research Organization**
    Kenya
16. **National Museums of Kenya**
    Kenya
17. **British Institute in Eastern Africa**
    Kenya
18. **University of Botswana**
    Botswana
19. **Jaramogi Oginga Odinga University of Science and Technology**
    Kenya
20. **University of Johannesburg**
    South Africa
21. **International Livestock Research Institute**
    Kenya
22. **University of California Santa Barbara**
    USA
23. **Center for Training and Integrated Research in ASAL Development**
    Kenya



Partners

Reliable and lively research partnerships with African scholars is a central pillar of the CRC's research agenda and will be essential for the planned programme and cooperative research activities. To facilitate the participation of research partners in CRC events (retreats, workshops, conferences, short-term research stays, advisory board meetings, lecture series), the CRC applied for funding of travel expenses and daily allowances of partners and guests, especially - but not only - from African countries.
The following examples highlight the role of guests from partner institutes in selected major joint research activities:

- In project A01 Namibian scientists of UNAM and UZAM will contribute to the central field experiment. For that purpose, they will have to travel between Windhoek, Lusaka and Katima Mulilo on multiple occasions.

- The combined farm/household survey of project Z03 is planned and implemented in together with partners in Kenya, Tanzania, Namibia, Botswana and Zambia.

- After the successful completion of her PhD in sub-project C03, Dr. Emma Minja continues to work closely with the project as scientific partner at the Nyerere Memorial Academy in Dar es Salaam. She complements the project's existing network of partners in Tanzania and Kenya.

- In project B05 additional empirical research will be led by local partners, designed around specific research questions that supplement and support the research of the whole project. This includes high-level interviews with various stakeholders, participatory observations and scientific papers. Additional research in the SAGCOT area is led by scientists from the University of Dar es Salaam and Mzumbe University, while research in the LAPSETT corridor is conducted by partners from Jomo Kenyatta University and Jaramogi Oginga Odinga University.

A number of collaborations with African universities and research institutions have already been established through MoUs or are in preparation. Through a regular exchange and invitation programme, some African partners have been fully integrated in the joint programme. A major obstacle faced by faculty members of African universities is their heavy work load in teaching. The University of Bonn will therefore continue to provide funds for African counterparts that will be used for temporal replacements, allowing them to devote their full time to the cooperation.

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Summary of the CRC 'Future Rural Africa'

The Collaborative Research Centre (CRC-TRR 228) Future Rural Africa aims to understand African futures and how they are "made" by investigating land-use change and social-ecological transformation in rural areas. Our conceptual framework focuses on future-making as a combination of imaginaries, narratives and social practices that shape future conditions by making them an issue in the present. This is addressed by the CRC's overarching key question:

How are African rural futures made, by whom, and for whom?

The question points at the agency, drivers, and consequences of future-making, including the complex relationship between probabilities and possibilities, between different temporalities and time frames, between past, present and future conditions, and between competing actors in their struggle for desirable futures. Throughout its three funding phases, the scientific programme and coherence of the CRC have been guided by a common conceptual framework, while the empirical focus of the participating projects became gradually more diversified based on the progress of research findings and the formulation of additional guiding questions. Accordingly, the CRC activities evolved in a stepwise manner, in the first phase concentrating on foundational research, conceptual framings, and the building of reliable partnerships, in the second phase advancing through in-depth collaborative research, and in the third phase aiming at a consolidation and synthesizing of findings, together with an engagement in policy dialogue and public outreach activities, including an exhibition project. While the CRC's conceptual interest in future-making continues to inform the collaborative research activities, the geographical focus of the participating projects has gradually widened. The CRC started with a precisely defined focus on development corridors in Kenya, Tanzania and Namibia, based on the observation that these areas stand out due to particularly dynamic changes. In the second phase, the CRC gave more emphasis to cross-scalar linkages even beyond the corridors. This broader focus will again be strengthened in the third phase by addressing emerging transformative processes in regard to transboundary relations and global connections. In line with a wider geographical focus, the CRC also broadened its empirical fields of interest.

Research Questions

In the first phase, our studies concentrated on conservation and intensification as dominant types of large-scale land-use change in sub-Saharan Africa. While conservation aims at the establishment of huge areas of nature protection and human-wildlife coexistence, intensification goes along with agricultural modernization, export-oriented agro-industrial hubs, and large irrigation schemes. Our studies demonstrated that these two types of land-use change both follow a similar economic rationale with significant consequences for local populations regarding tenure systems, livelihoods, displacements, and conflicts. Under these conditions, we were especially interested in vernacular practices of future-making and the agency of local populations. Our findings gave evidence of a wide variety of practices, including various forms of innovation, reconstruction, adaptation, avoidance, and resistance.

The research programme **of the second phase** started from the observation that land-use change is to a large extent driven by infrastructures like roads, railways, dams, power lines, or fences. We therefore included the concept of infrastructuring to address the planning, negotiating and building of material infrastructures, and how this facilitates land-use change. The third phase will build upon our recent findings, which showed that the processes of land-use change and infrastructuring are heavily influenced by globalized financial flows, international investors, economic and political shifts at different scales and changing international alliances. At the same time government-financed income is also becoming more important in many rural settings. Our research design of **the third phase** captures these global and domestic influences by foregrounding financing as the basis of a cross-cutting analytical perspective to better understand local capacities, the agency of different social groups, and the dominant drivers of conservation, intensification and infrastructuring. We therefore add the following new guiding questions to our programme:

1. What role(s) do financing processes and structures play for social-ecological transformation?
2. How do the visions and future-making practices of investors, policymakers and local actors influence each other and compete for practical influence in rural Africa?
3. What is the impact of economic and political shifts at the global level on financing and future-making in rural Africa?

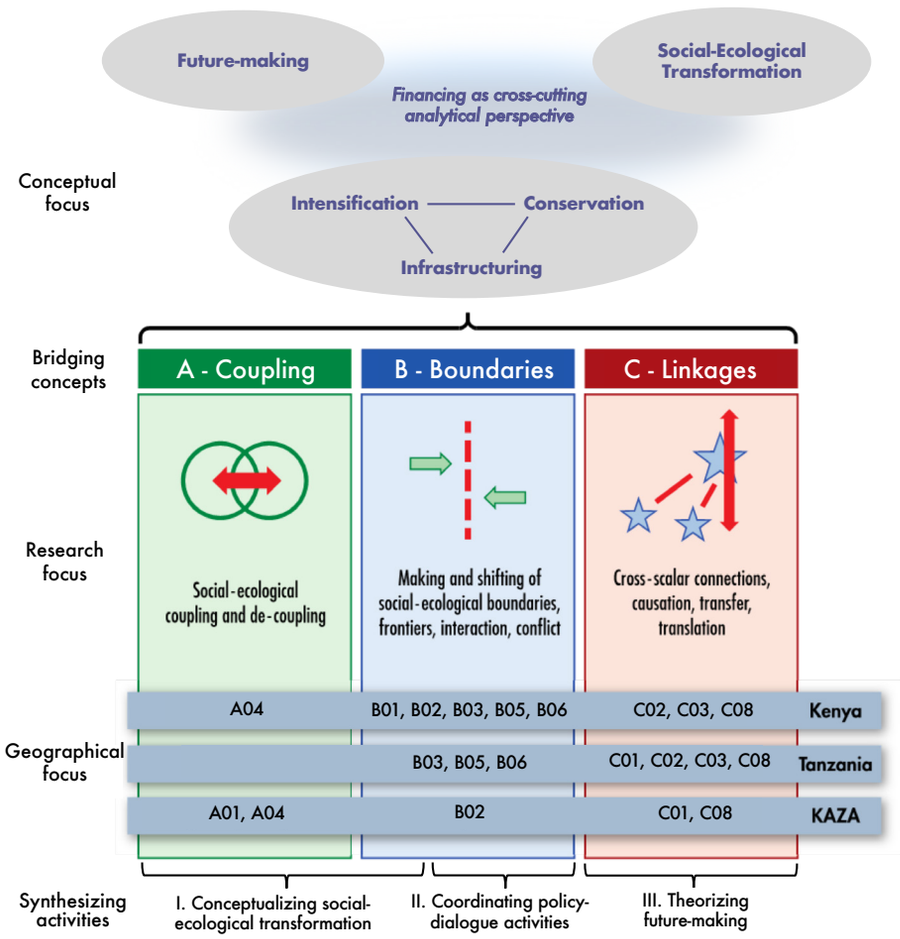

Figure 1: The conceptual focus of the CRC and its project groups

The CRC is structured in three project groups, each organized around a bridging concept that addresses specific aspects of social-ecological transformation and future-making (see figure 1).

Project group A ('coupling') studies the articulation between social and ecological subsystems, B ('boundaries') looks at the shifting zones of interaction and confrontation, and C ('linkages') explores cross-scalar drivers, connections and causations.
Empirical research focuses on development hubs in northern Kenya and the Kenyan Rift Valley (KRV), the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), the Kavango Zambezi Transfrontier Conservation Area (KAZA) and Walvis Bay-Ndola-Lubumbashi Development Corridor (WBNLDC).
The project builds upon the profound research experience of the applicants and their African partners, further strengthens the unique combination of expertise at the universities of Bonn and Cologne, fosters partnerships with scholars and scientific institutions in Africa, and consolidates Bonn–Cologne's position as a leading centre of innovative research in the emerging field of futures studies and social ecology in Africa.

The CRC's Conceptual Framework

Envisioning the Future

The title "Future Rural Africa" does not mean that the CRC aims at foretelling the future. Instead, the research programme will examine the processes and practices that reflect the future in the present or, in other words, that "fold" the future into the present, and that influence contemporary decisions and thereby prepare the ground for processes that shape future conditions. Future-making refers to the ways of how ideas, expectations and imaginations of the future inform action in the present.

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Problem Setting

Livelihoods in rural Africa are changing rapidly amidst multiple global and regional crises in a politically turbulent world. The dynamics of change are reflected in the research design of the CRC, which started in 2018 under the impression of rather optimistic outlooks supported by high economic growth rates, agricultural intensification, green development, and progressive inclusion of rural economies in global value chains. In contrast to the rather positive expectations that prevailed throughout the African continent less than a decade ago, African societies are today increasingly challenged by climate change, environmental degradation, food insecurity, fragile statehood, violent conflicts, and unforeseeable global influences. The situation is aggravated by a number of overlapping crises, such as the aftermath of the COVID shock, series of natural disasters (droughts, floods, locust invasions), rising food and fertilizer prices as sideeffects of the war in Ukraine, local and regional conflicts, an unresolved employment crisis, and, most recently, the withdrawal of the United States from financing development activities in Africa and elsewhere.

Processes

Our research in the first and second funding phases shows that the interplay of conservation, intensification and infrastructuring as well as the associated processes of social-ecological transformation and land-use change are geographically diverse, contingent, and sometimes also contradictory, depending on the plurality of local conditions and linked to the differential impact of developments and actors at national and international levels. They include a wide variety of future-making practices, such as innovation, reconstruction, adaptation, avoidance, and resistance. For the current phase of the project, we are (again) confronted with new developments and challenges, which influence future-making in and for rural Africa—and make our research timely and important.

Why rural Africa?

The CRC views the rural not in a dualistic way as the opposite of the urban, but as a socio-spatial entity that is intertwined with 'the urban' and 'the world' through various connections, like commodity chains, agro-food systems, migration regimes, communication networks, or other global flows in the context of globalization. Boundaries between the rural and the urban are progressively blurred, with urban residential settlements mushrooming in rural areas, multi-local households, new technologies like mobile phones and digital cash transfers, etc.

Regional Focus: Study Sites

While the organization of field studies in the first phase was characterized by a strong regional focus on development corridors, our research revealed that regional integration and development are currently being redefined. CRC228 projects extended their research focus beyond the immediate spatial context of development corridors to follow the dynamics of integration and disintegration. The reasons for de-centering development corridors as the geographical focus of investigation reflect decisions in Kenya, Tanzania, and Namibia to depart from corridors as principal structures for regional development.

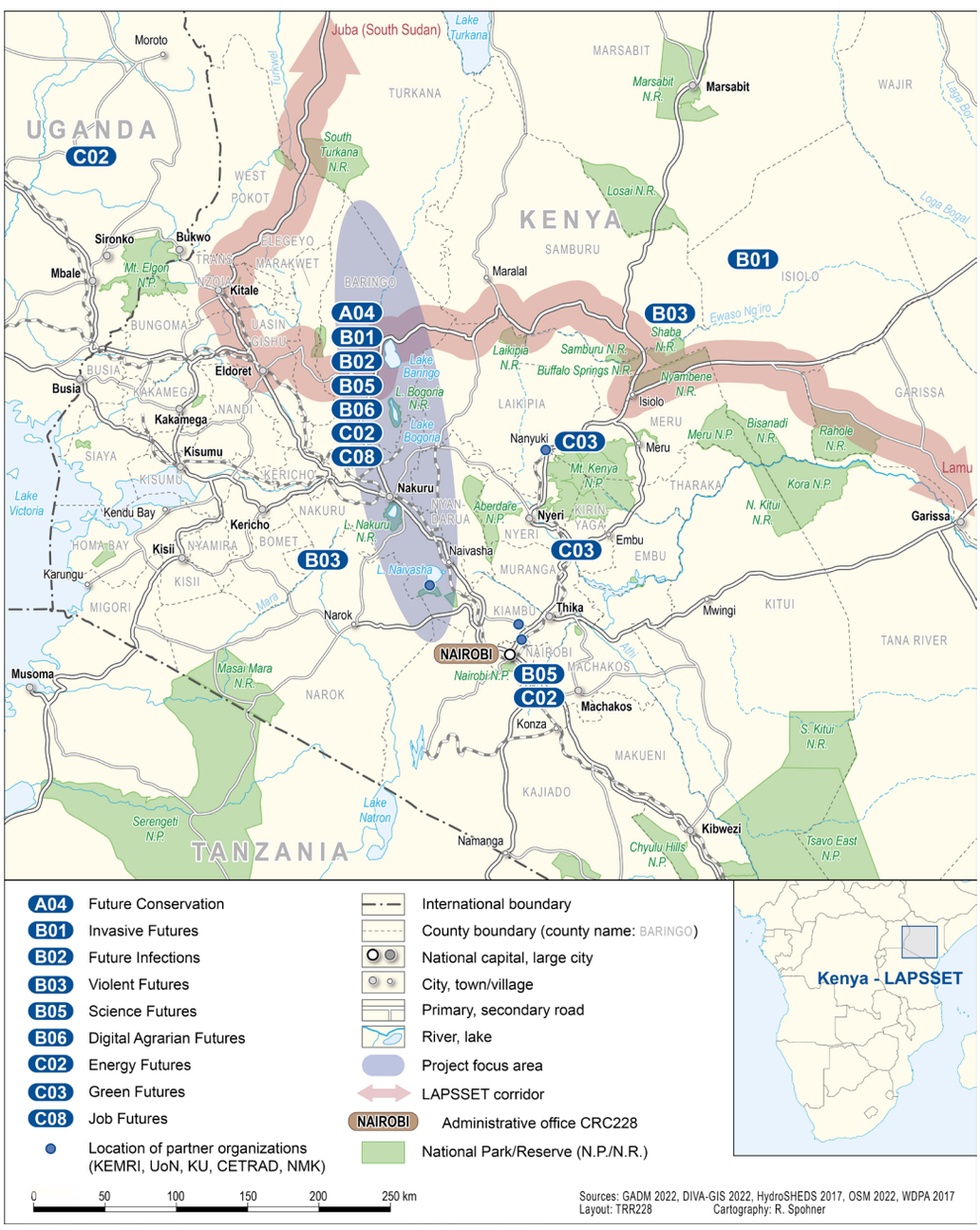
However, even if corridors and other megaprojects do not achieve their originally declared goals and promises, they do serve a purpose in the context of future-making, because they shape future imaginations and visions.

The readjusted study regions follow these cross-scalar linkages beyond development corridors, moving into new areas where necessary, but maintaining the focus on existing study regions. In the third phase, empirical research focusses on three study regions:

1. **Northern Kenya and the Kenyan Rift Valley (KRV)**
2. The **Southern Agricultural Growth Corridor of Tanzania (SAGCOT)**
3. The **Kavango Zambezi Transfrontier Conservation Area (KAZA)** and **Walvis Bay-Ndola-Lubumbashi Development Corridor (WBNLDC).**

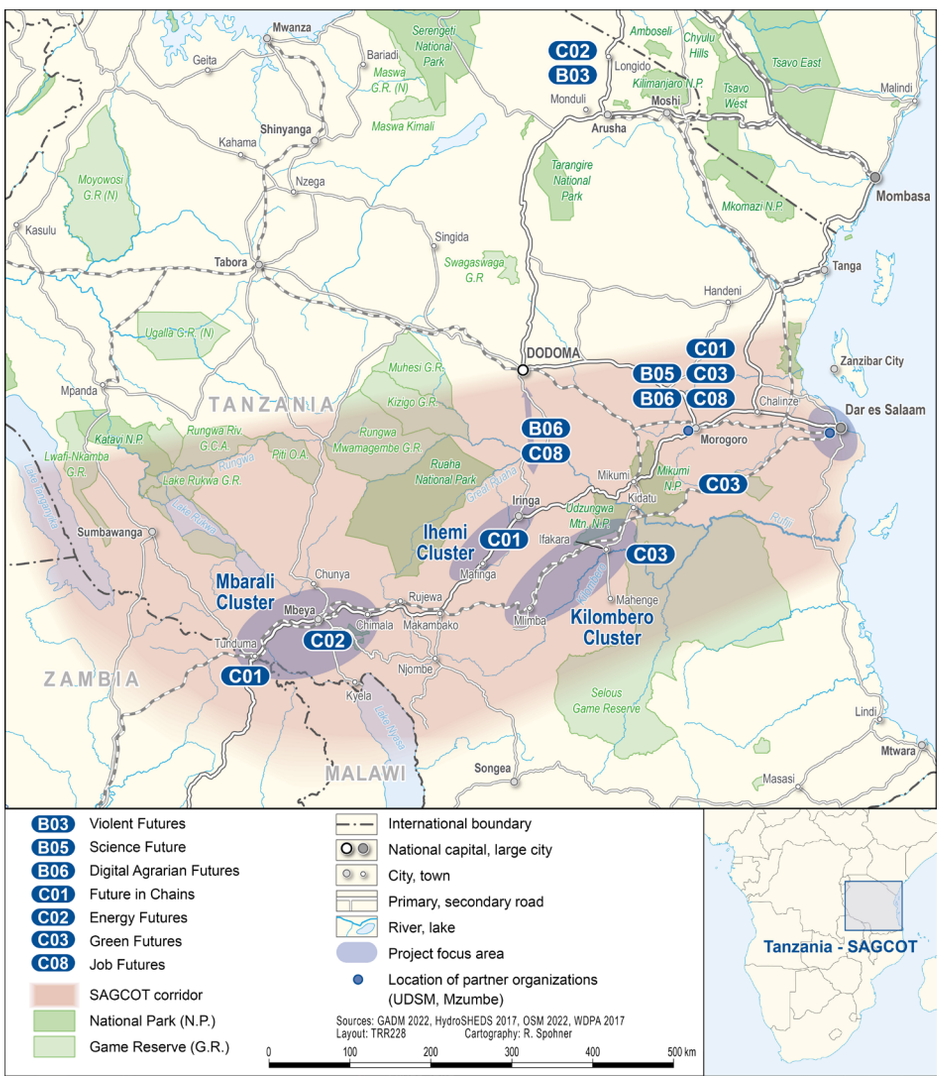
Northern Kenya and the Kenyan Rift Valley (KRV)

Northern Kenya has been a region characterized by neglect and conflicts since independence. While oil was a driving force behind the Lamu Port-South Sudan-Ethiopia Transport Corridor (LAPSSET), its actual feasibility is now more uncertain than ever. The new promise now lies in the provision of green energy. The KRV will continue to be an area of interest in the third phase, as it is home to several largescale energy projects (geothermal, wind, oil), smaller and medium-sized conservation areas and agricultural intensification projects, the western branches of the newly built Standard Gauge Railway and various plans for industrial parks. Like other regions in Kenya, the KRV remains suspended in tensions between the promises of development and modernization, and violent conflicts.



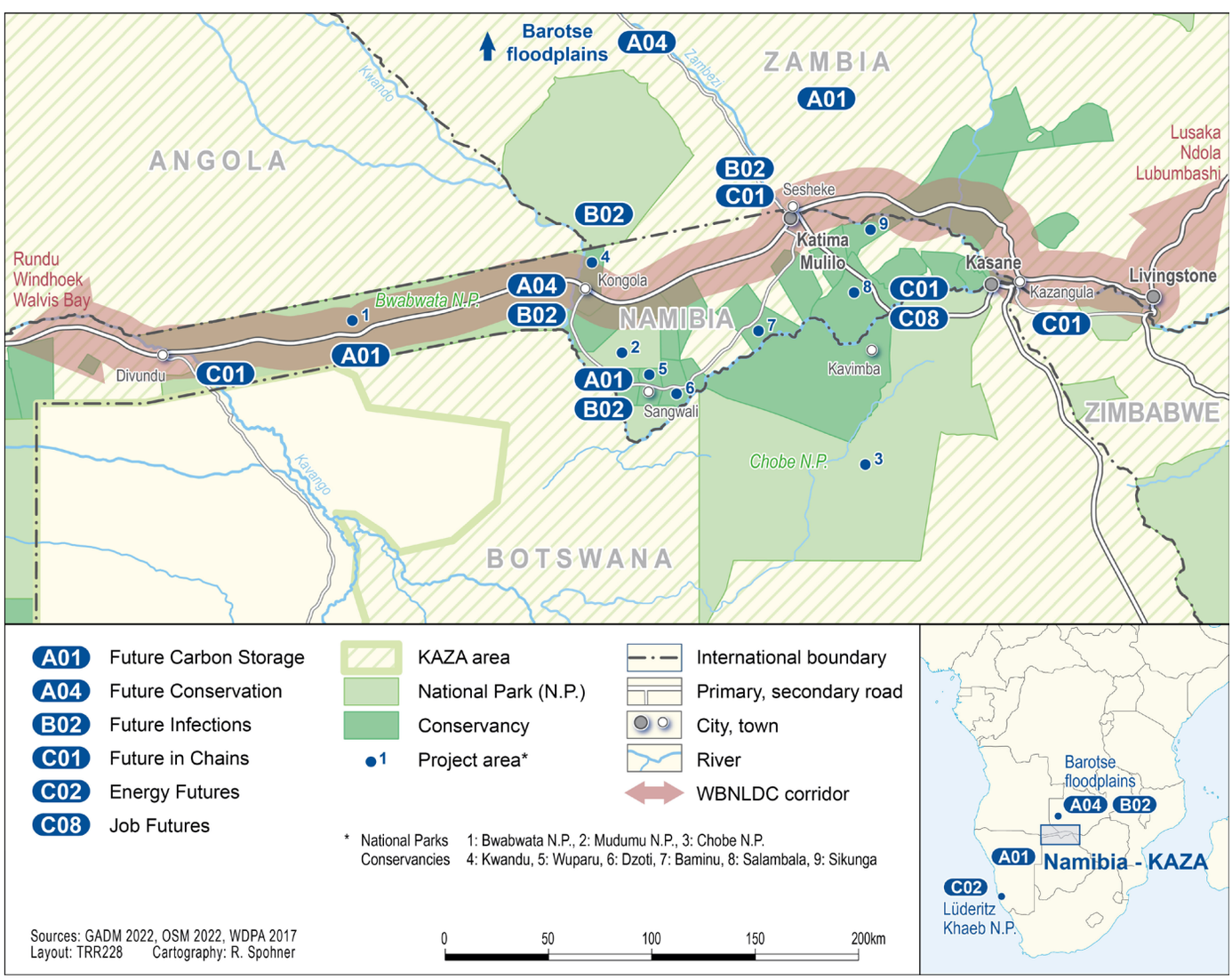
The Southern Agricultural Growth Corridor of Tanzania (SAGCOT)

While research activities in the first phase focused on SAGCOT's Kilombero and Ihemi clusters, the CRC in the second phase built upon its regional expertise and continued research within SAGCOT's clusters, but also went beyond them. In the third phase, this will allow us to explore more comprehensively the existing and emergent drivers of social-ecological transformation, which include agricultural, carbon-credit and renewable-energy projects with associated value chains, labour relations, science policies, digitalization, geopolitical turmoils and global entanglements, and their repercussions within and beyond the SAGCOT development corridor.



Kavango Zambezi Transfrontier Conservation Area (KAZA) and Walvis Bay-Ndola-Lubumbashi Development Corridor (WBNLDC)

Land-use transformations in the KAZA area are shaped by historical path dependencies as much as by contemporary attempts to open up the region to national and global value chains. Colonial legacies still prevent local communities in the Zambezi region from fully benefiting from being integrated into global tourism value chains compared to Victoria Falls in Zimbabwe and Chobe in Botswana. At the same time, local livelihoods that could benefit from agricultural intensification conflict with visions that emphasize the potential for tourism and wildlife conservation. The tensions between conservation, tourism, local livelihoods, and value chains took on a different quality in the second phase. While integrated, cross-border conservation efforts in the KAZA area had been largely hypothetical at the beginning of the first phase, and virtually ceased during the coronavirus pandemic, the five countries are increasingly engaged in implementing the goals of the KAZA TFCA treaty. In particular, the establishment of wildlife corridors constituted an important focus of research activities in the second phase and offers several promising research avenues in the third. There is continuity in the regional focus, and the thematic focus of our research efforts has been adapted to address recent trends in land use and conservation priorities.



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Key achievements of the second phase

The second phase of the CRC228 has been highly productive, resulting in an advanced understanding of future-making in and for rural Africa, intensified cooperation with African partners and between projects, enhanced capacity-building and greater international visibility. This is highlighted by the following key achievements:

- Interdisciplinary cooperation, especially between natural and social scientists, is an outstanding feature of the CRC228. The majority of projects is led by PLs from two or more different disciplines. The close interdisciplinary collaboration between CRC projects is exemplified by numerous joint field campaigns and workshops. It resulted in several joint special issues and edited volumes as well as roughly 75 interdisciplinary publications, accounting for over a third of all publications in the second phase (230).
- The productive cooperation with African partners is documented in more than 60 joint publications (co-)authored by CRC members and our partners since 2022. Institutional ties are expressed in six MoUs with universities in Kenya (2), Namibia (2), Tanzania (1) and South Africa (1).
- The performance of our PhD students deserves special recognition: most of our 25 second-phase PhD students (including 16 from sub-Saharan Africa) have submitted their dissertations, and they are (co-)authors of about two thirds of our publications. We doubled the share of PhD students from sub-Saharan Africa from 31% in the first phase to 64% now, and have 20 finished dissertations by first-phase PhD students (including 6 from Africa). Of these 20, several stayed in academia as postdocs in high-ranking German, African and British universities or attained prestigious positions outside academia such as at GIZ, IDOS, the World Bank or smaller development organizations in Germany and Africa.
- Our approach of repeated standardized surveys for the monitoring of long-term social and economic changes is unique. We succeeded to accomplish a second round of our farm/household survey (Z03) with more than 3,000 respondents in five countries in 2023. The complementary focus on infrastructure development proved to be very rewarding in the second phase, with various linkages to other topics, numerous publications and interesting results. A third wave of the survey will be carried out in 2027.
- The CRC plays an increasingly important role in the international scientific community of African Studies. This role becomes visible for example through the contribution to the organization of the European Conference on African Studies (ECAS) 9 Conference 2023 in Cologne, including four panels and one roundtable as well as more than 23 paper presentations and additional 25 papers presented by partners and former members of the CRC228. Our consortium was also strongly represented at the ECAS 10 Conference in Prague in June 2025 with four panels organized by the CRC, and is already preparing for ECAS 11 in June 2027 in Lisbon.

A01 FUTURE CARBON STORAGE

Synergies and trade-offs of carbon storage along pathways of land transformation

Vision

Improve our understanding of how coupling between major land uses in a coexistence landscape is co-determined by economic and natural resource dynamics in affecting whole ecosystem carbon storage, the natural resource base, and provision of related ecosystems services that rural African livelihoods are based on.

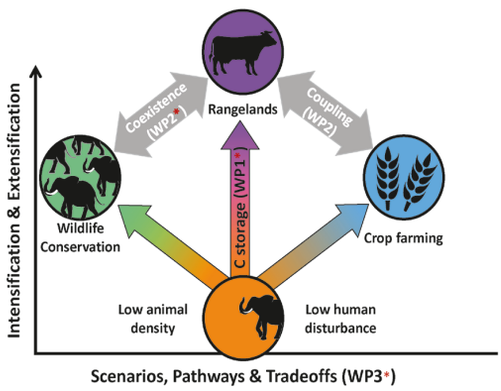
Key Questions for 3rd Phase

How do wealth and cattle accumulation influence carbon storage and other ecosystem services in rangelands (WP1)?

What factors drive the coupling of rangeland management and crop production (WP2)?

What sustainable future-making strategies can be developed based on carbon-pool management (WP1-3)?

Methods: Soil carbon stock and dynamics, macro and micronutrients, biomarkers, plant biomass, grazing offtake and fodder quality, biodiversity measurement, economic experiment, bio-economic modelling, and scenario analysis.



* African partners

Conceptual approach and work package (WP) contribution

Project Summary

This project examines future-making in rural Africa through a "carbon lens". In the first two phases of CRC228, we focused on two conflicting visions for rural development in the Southern African KAZA-region: nature conservation and agricultural intensification. We found that Community-Based Natural Resource Management (CBNRM), although positively affecting the presence of large herbivores, has led to net losses in carbon-rich savanna woodland cover at regional scale. Yet, effects were scale-dependent and varied across space: increasing elephant density redistributed carbon from vegetation to soils at local scale, while at regional scale in subregions with tourism infrastructure, CBNRM had positive effects on woodland cover. Noteworthy, ecosystem carbon was correlated with farm-household wealth in the Namibian part of our study area, suggesting a relationship with land-use access. No such relationship was found in the Zambian part of the study area, but the relatively poorer Zambian farmers appeared to actively manage fields toward preserving soil carbon and leguminous trees. We also found, however, that growing cattle populations, driven by both production and capital-accumulation motives, are increasingly linking wealth accumulation with land-use dynamics and corresponding carbon-based ecosystem services. In the third phase of CRC228, we thus study how cattle husbandry mediates interactions between conservation and intensification pathways and related economic and environmental outcomes.

Hence, we finally expand our current assessment of conservation areas and arable fields to rangelands, which store substantial amounts of carbon and provide multiple other important ecosystem services. Yet, dryland rangelands require protection from degradation, sustainable management, and ecosystem restoration to safeguard future ecosystem service provision in the face of global climate change. Cattle represent financial assets linking the social-ecological system in the region to credit markets and potentially also to global carbon-financing mechanisms. Specifically, we ask: (1) How do wealth and cattle accumulation affect carbon storage and other ecosystem services in rangelands? (2) What drives interactions between rangeland management and crop production? (3) What are sustainable future-making strategies based on carbon-pool management (below- and above-ground)? To answer these questions, we expand our current sampling approach from conservation areas and croplands to various rangeland systems in Namibia and Zambia and explicitly consider potential links to traditional management and carbon-financing mechanisms. Our focus remains on interactions between above- and belowground carbon-stock dynamics, carbon-related ecosystem services, and the livelihood strategies and respective land-use decisions of farm households at local and regional scale.

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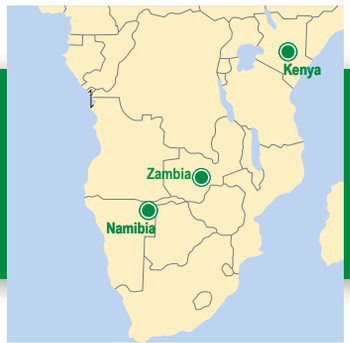
Link to project webpage with key findings and publications:



A04 FUTURE CONSERVATION

Temporalizing conservation in protected African wetlandscapes

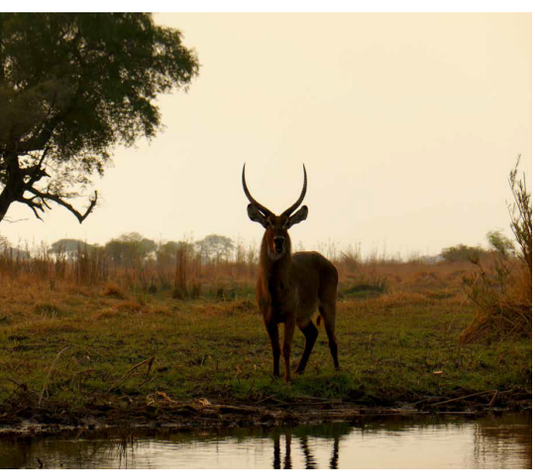
Vision

This project, researching comparatively multispecies relations under changing future-orientated conservationist regimes, processes a CRC core theme and renders the nucleus of an emergent conservation humanities focus at UoC/UoB.

Key Questions for 3rd Phase

1. How do wetland temporalities relate to conservation policy and practice in Eastern and Southern Africa?
2. How do temporal dynamics of coexistence wetlandscapes resonate with changing livelihoods?
3. How do governance and finance engage with wetland temporalities ?
4. How do different actors come to know temporal regimes in coexistence wetlandscapes?

Methods: Participant observation, interviews, archives, collaboration with local partners; focus on livelihoods, governance, knowledges, wetlandscaping, financing



A Waterbuck in Nkasa Rupara National Park

CRC researchers with Lozi experts and farmer-fishermen traversing the Barotse Floodplains, Zambia, March 2024. During regular seasons, the area would be flooded at this time of the year.

Project Summary

Conservation is a key strategy for managing ecosystems, navigating human-wildlife interactions and addressing major challenges such as climate change and biodiversity loss. However, what is conserved, and how, can vary widely. In the first phase of CRC228, A04 focused on questions of conservation history and livelihoods, institutional change and the divide between hegemonic conservation-science-based knowledge and local knowledge. In the second phase we broadened our scope to include multispecies assemblages focusing e.g. on human-elephant or human-microbe-livestock relations. We looked at the history and transformation of conservation and its impact on local communities, and then raised questions around rewilding and coexistence. In the third phase, we plan to continue in this vein, focusing on wetland conservation and its temporal dynamics. The wetlands of Namibia, Zambia and Kenya are unique ecosystems that are crucial for both agricultural production and conservation. Local communities have built livelihoods around these wetlands that require a certain degree of versatility across inter- and intra-annual cycles.

Financing, particularly from international donors, is becoming increasingly important for conservation. International NGOs and private investors, such as philanthropists, provide immense financial, technical and labour resources to monitor, govern and utilize protected areas more effectively. This heavy reliance on international funding leads to the establishment of professional, cross-regional conservation agencies. However, it also makes these areas particularly vulnerable when donors withdraw (as is currently happening with USAID). At the same time social transfers (e.g. governmental grants like income-independent pensions) are of increasing importance for rural wetland-bound livelihoods. In the third phase of CRC228, we plan to continue our intensive ethnographic work and conduct comparative research on wetland conservation in the three regions mentioned above. Participant observation, various forms of interviews and detailed survey data will remain important methods.

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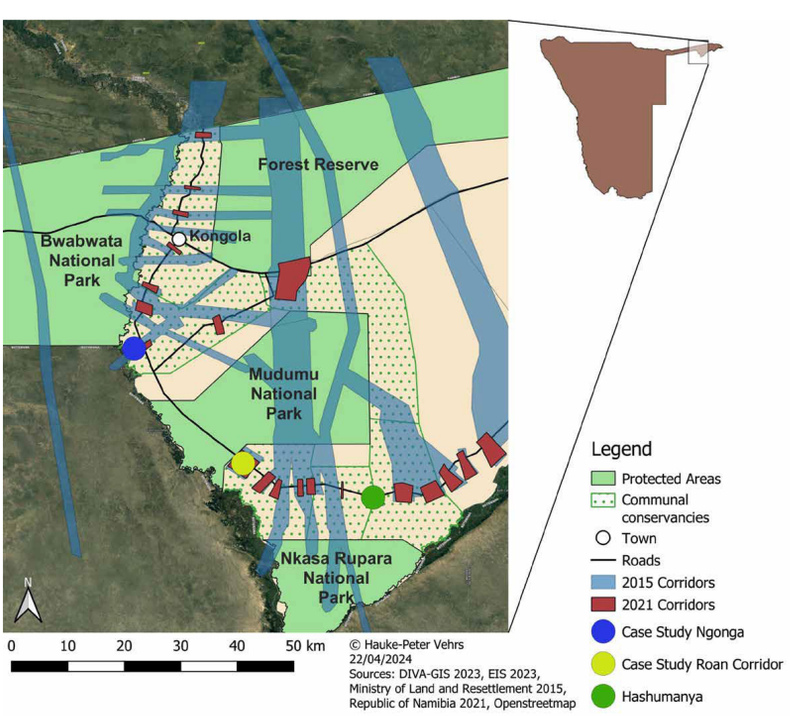
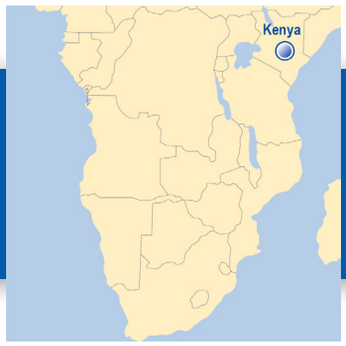


Study area in the Zambezi Region, Namibia. The conservation landscape is shaped by different types of protected areas, including forest reserves, national parks and community-based conservancies, as well as wildlife corridors that connect them.

Link to project webpage with key findings and publications:

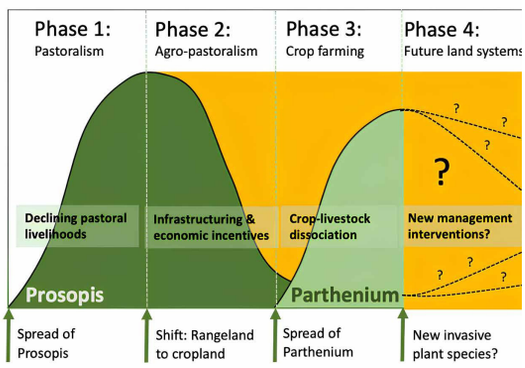


B01 INVASIVE FUTURES

Land-use transitions

Vision

Further our understanding of the dynamic interactions and causal relationships between key processes affecting land-use transitions, considering soil fertility, plant invasion control, aspirations, livelihood mobility, economic and ecological resilience.



Phases of plant invasion in Baringo County, Kenya and land-use transitions past-present-future

'Harvested' Prosopis for charcoal production

Key Questions for 3rd Phase

1. What are the spatial-temporal patterns of land-use transitions in the Baringo region?
2. How do soil fertility and land use change after Prosopis invasion and clearing?
3. What is the effect of agricultural management on Parthenium invasion, soil water dynamics, and crop performance?
4. How do aspirations, invasive spread, and soil fertility change households' resilience to future shocks?

Methods: Interviews, socio-economic randomized controlled trial, household survey, statistical and econometric analysis, physical and chemical soil analysis

Project Summary

The project "Invasive Futures" investigates the role of invasive alien plant species, specifically Prosopis juliflora and Parthenium hysterophorus, in shaping the future of land use and livelihoods in the Baringo area of Kenya. Research during the prior two project phases a) identified physical attributes, land-use practices, and infrastructuring driving the invasive spread, b) found that invasion by Prosopis in turn affects soil fertility and thereby conditions for agricultural land use, c) showed that exposure of farmers to invasive spread and other ecological shocks goes along with lowered aspirations for the future, and d) provided first evidence that aspirations affect investments into the future and change livelihood choices, thereby inducing changes in land use, and in turn invasive-spread dynamics. The findings demonstrate the close, dynamic interactions between biophysical and socioeconomic conditions and processes that jointly shape the future of invasive spread and rural livelihoods. The generated interdisciplinary knowledge allowed the conceptualizing of "phases of invasion", describing how such interactions and other external drivers lead to dynamic landuse transitions with invasive spread as determinant and result of these transitions. In the third project phase, we intend to further our understanding of the dynamic interactions and causal relationships between key processes affecting land-use transitions, specifically related to soil fertility, plant invasion control, livelihood mobility, and economic and ecological resilience. Specifically, in the third project phase we will (1) document the dynamic, spatially differentiated invasive spread and associated land-use transitions by a comprehensive mapping and statistical exercise that will enable comparisons with developments in other invasion-affected regions; (2) analyse how the removal of Prosopis will change soil properties, agricultural productivity, and land use, using ecological experiments; (3) investigate how agricultural management practices affect Parthenium invasion and soil water dynamics based on a survey, an RCT, and analyses of soil properties and crop performance; (4) assess how economic resilience of households directly or indirectly depends on invasive-species spread and what role aspirations and externally financed infrastructure play for livelihood choices determining resilience using a three-wave household-panel dataset.

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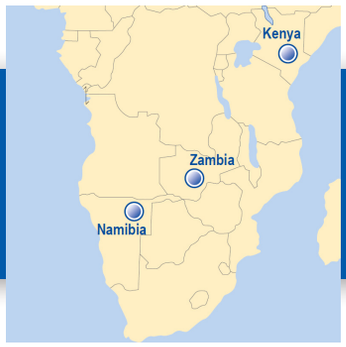
Cattle grazing in a field invaded by Prosopis and Parthenium

Link to project webpage with key findings and publications:



B02 FUTURE INFECTIONS

Linking social-ecological transformation, land surface changes and arthropod-borne Infections

Vision

To advance our understanding of climate and land-cover/use impacts on mosquito-borne diseases in Africa for predicting outbreaks and protecting vulnerable communities through innovative research.

Key Questions for 3rd Phase

1. How do urbanization, invasive plants, and climate change impact mosquito-born diseases in KAZA and KRV?
2. How do droughts, heat waves, and floods affect invasive plants mosquito communities and disease transmission?
3. Can modeling of mosquito abundance and arboviral prevalence under different climate and land-cover scenarios help to predict disease outbreaks?

Methods: Mosquito-borne disease ecology studies implementing advanced remote sensing techniques, combined with demographic population, climate change, and land surface modelling.

Project Summary

The spread of infectious mosquito-borne diseases, significantly impacting human well-being and futures, is driven by land-cover and land-use changes, including shifts in livestock and human densities, along with socio-ecological transformations. Additionally, climate change, specifically rising temperatures, shifting rainfall patterns, and extreme weather events like floods, alter vegetation growth and its spatial distribution and affect human and livestock health by increasing mosquito populations and consequently increasing risks of disease outbreaks. Agricultural changes, including irrigation, intensification, and invasive weeds, further heighten these risks. In the previous phase, we observed a shift in mosquito communities between conserved landscapes and human settlements. In the Kavango-Zambezi Transfrontier Conservation Area (KAZA), mosquitoes fed on wildlife in conserved areas but switched to humans and livestock in rangelands, where pathogen-transmitting species were more abundant. Mosquito diversity declined with wildlife refaunation, resembling that found near human settlements, particularly in high-elephant-density areas, highlighting the need for balanced ecosystem restoration. We detected arboviruses like West Nile virus (WNV), Bagaza virus, and Rift Valley Fever virus (RVFV) in livestock in Namibia and Kenya, indicating human exposure.

However, agro-pastoralist communities in the Kenyan Rift Valley (KRV) lacked arboviral knowledge. Additionally, invasive alien plants (IAPs) like Parthenium and Prosopis enhanced mosquito survival, with Parthenium DNA found in plant-sugar-fed mosquitoes. These factors – shifting mosquito communities, arbovirus circulation, and expansion of IAPs – suggest rising human infection risks in changing landscapes. In the next funding phase, we will examine the impacts of urbanization, IAPs, and climate change on mosquito-borne diseases in KAZA and KRV by using and developing advanced remote sensing (RS) techniques. Combining RS and land surface modelling, we will assess how droughts, heat waves, and floods interact with IAPs to influence mosquito communities and their disease transmission. Understanding risk factors and human exposure to arboviruses is crucial, particularly through socio-anthropological studies. Rainfall intensity, open-water longevity, air temperature and humidity are key factors in mosquito breeding and disease spread. Using modelling, we will simulate changes in mosquito abundance and arboviral prevalence under different climate and land-cover scenarios, including dynamics in dominant plant functional types. To analyse disease-spreading insect distribution, we will map vegetated habitats in drought- and flood-prone areas, focusing on invasive plant-driven land-cover changes. Spaceborne and drone-based RS will be employed to evaluate the role of IAPs, particularly Parthenium hysterophorus, in future disease prevalence. These insights will enable us to better predict outbreaks of mosquito-borne viruses, allowing key stakeholders in the KAZA and KRV to take preventive future actions.

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Mosquito trap in a village, KAZA

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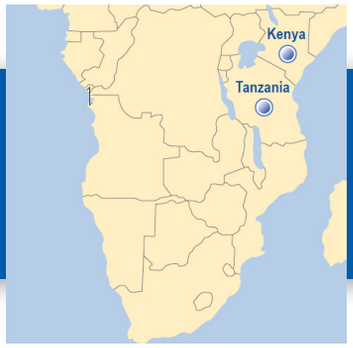
Link to project webpage with key findings and publications:



B03 VIOLENT FUTURES?

Contestations along carbon frontiers in East Africa

Vision

Our vision is to demonstrate how carbon credit projects can be co-designed with communities in a meaningful and participatory manner to overcome local conflicts by transforming extractive frontier ventures into inclusive climate finance models that are responsive to local knowledge and grievances.

Data collection in Kenya

Key Questions for 3rd Phase

Overarching research question:

- To what extent and how do different types of entrepreneurs produce carbon frontiers?

Sub-questions:

- What approaches do different frontier entrepreneurs employ to establish carbon credit projects?
- To what extent do frontier entrepreneurs mitigate or intensify direct and structural violence?
- How do carbon-credit projects need to be conceptualized to prevent violence and to overcome frontier constellations?

Methods: Interviews, focus-group discussions, ethnographic observations, document analysis

Frontiers' violence/ Actor types	Private companies	State institutions	(I)NGOs
Ignorance	strong	medium	weak
State of exception	medium	strong	weak
Dispossession	medium	strong	weak
Conflicts	medium	strong	weak

(Hypothesis) Frontier involvement by actor types

Project Summary

With the global urgency to address climate change, carbon-credits schemes are promoted as a market-based tool to reduce uncertainties about the future. Due to its rich natural resources and ecological diversity, Africa is identified as the new "frontier" of carbon-credit markets. The CRC project B03 "Violent Futures" examines the impact of future-oriented carbon-credit projects on local conflicts in Kenya and Tanzania using the frontier approach. B03 conceptualized the frontier approach in the first phase of the CRC to address the linkage between future-making and violent conflicts and subsequently applied it to large-scale infrastructure and conservation projects in the second phase of the CRC. Our research during the second phase revealed the increasing relevance of carbon-credit projects in East Africa. This is why we decided to focus on carbon-credit projects in the conservation sector in the third phase of the CRC, by putting an actor-oriented perspective at the centre of our frontier approach. We aim to understand how frontier entrepreneurs – a) private companies; b) state agencies; c) (international) non-government organizations ((I)NGOs) – are promoting and conducting carbon-credit projects in locations inhabited by marginalized people such as pastoralists, forest dwellers, and small-scale farmers.

Our hypothesis is that the type of frontier entrepreneur is decisive for the implementation of carbon-credit projects as well as for the likelihood of unintended consequences: at the one end of the spectrum, carbon-credit projects are likely to intensify violent conflicts, if frontier entrepreneurs ignore the needs of local communities and take advantage of a state of exception. On the other end of the spectrum, carbon-credit projects will be accepted by local communities when their livelihoods and future aspirations are considered accordingly. To test our hypothesis, we will carry out in-depth field research in three concrete field sites in Kenya and Tanzania where carbon-credit projects were implemented. We will apply qualitative research methods such as interviews, focus-group discussions, and participatory observations. In addition, we aim to carry out a horizontal study scrutinizing available data on carbon-credit projects and conflicts in East Africa to understand to what extent the in-depth results of our case studies can be generalized. Next to its research activities, B03 will, through bicc and together with PLAAS and IDOS, facilitate and coordinate the policy-dialogue activities of the CRC.

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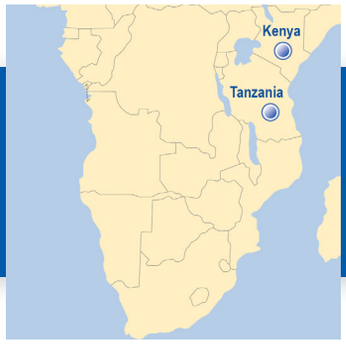
Northern Rangeland herder

National Police Reservist (NPR) in Northern Kenya

Link to project webpage with key findings and publications:



B05 SCIENCE FUTURES

The role of science-policy interfaces in co-producing rural futures

Vision

Our vision is to empirically grasp and conceptualize how scientists and policymakers co-produce "rural futures" through scientific and non-scientific knowledge production.

Key Questions for 3rd Phase

1. How are science-policy interfaces (SPIs) structured in official frameworks (de jure) and how do they function in practice (de facto)?
2. Which organizations, groups and actors are influential in these interfaces?
3. What kind of knowledge and expertise travels successfully between the spheres of science and politics, and how is this knowledge developed further?
4. Where are vested interests carried into advisory formats and how do national governments negotiate the dynamics between subject-oriented expertise and interests?

Project Summary

"Science Futures" studies science-policy interfaces (SPIs) in Kenya and Tanzania. Building on the preceding project (2022-2025), we examine science-based policy advice, transfer and dialogue between researchers and decision-makers in those rural development contexts that have been most intensively worked on in the CRC. We ask what constitutes different forms and formats of science-based policy advice, and how it is structured and practised in the three domains of agriculture, infrastructure, and education. Conceptually and empirically, we distinguish two channels of knowledge transfer: (a) the leading national research universities and their role in mediating national advisory processes, e.g. by enabling faculty and associated researchers to engage in communication and consulting activities, and (b) the role of international organizations, NGOs and international research institutions in advisory processes to the governments of Kenya and Tanzania. With this two-pronged approach to empirically studying SPIs in both countries, our project will enable a better understanding of how scientists and policymakers conceptualize and co-produce "rural futures". While universities contribute various forms of knowledge to high-level science-based policy advisory processes nationally, they also train future change-makers and decision-makers – i.e., those actors that stand in the centre of theories of change. This science-to-society transfer shapes the SPIs from within the nationally embedded systems of expertise, while international actors shape the SPIs from the outside. As found during the first project phase, international organizations ranging from financial institutions (e.g., World Bank) to bilateral implementing organizations (e.g., USAID, DFID) and international research institutes (e.g., the Consultative Group on International Agricultural Research, CGIAR) were involved in the design and implementation of the Southern Agricultural Growth Corridor of Tanzania (SAGCOT).

To analyse these processes, we ask in the third phase of the CRC: how are the SPIs structured officially (de jure) and how do they function in practice (de facto)? Which organizations, groups and actors are influential in these interfaces? What kind of knowledge and expertise travels successfully between the spheres of science and politics, and how is this knowledge developed further? Where are vested interests carried into advisory formats and how do national governments negotiate the dynamics between subject-oriented expertise and interests? Conceptually, the research will draw on discussions in Science and Technology Studies (STS), Higher Education Studies, Science Policy and Innovation Studies, and the Sociology of Knowledge Approach to Discourse (SKAD) employed already in the previous project phase. Methodologically, the project relies largely on qualitative social science methods, ranging from semi-structured (expert) interviews and participant observation, to discourse and document analyses. In addition, a bibliometric analysis will be conducted to capture the scope and structure of scientific and non-scientific knowledge production – including forms of local knowledges. Using multiple sources, it will assess which stocks of expertise, lines of argument and policy narratives "travel" in the sense of guiding actors in their decision-making processes and co-producing "rural futures". Finally, B05 takes on a coordinating role in cooperation with B03 and B06 in the field of policy dialogues and transfer activities of the CRC as a whole.

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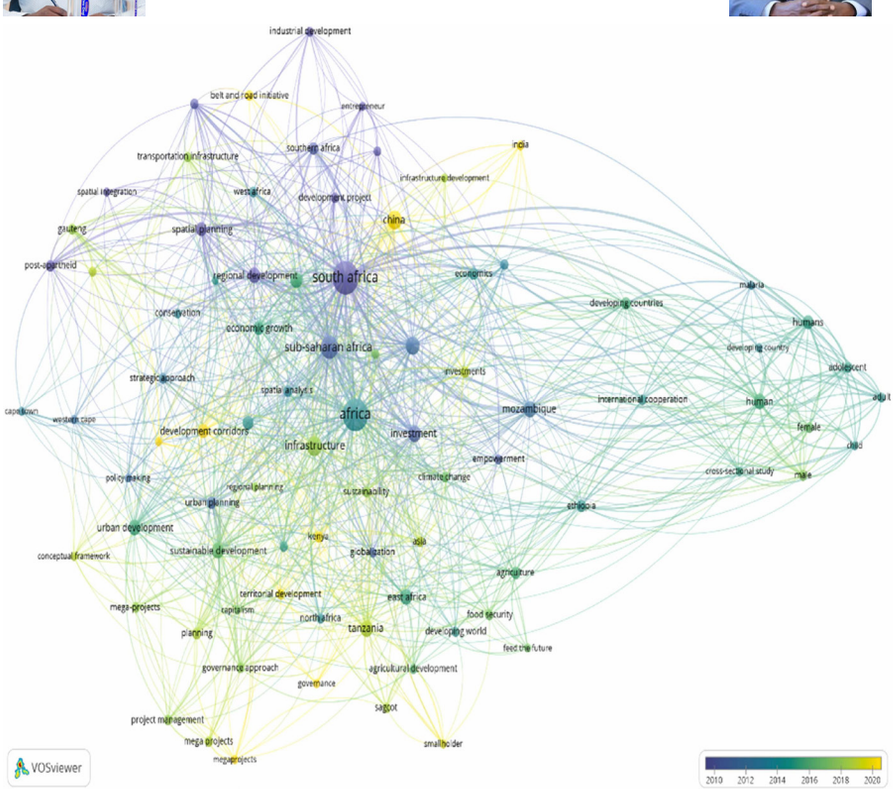
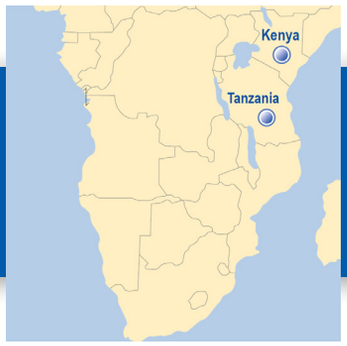


Knowledge co-production. Workshop at a farmers cooperative, Mbeya region, Tanzania 2024

Link to project webpage with key findings and publications:



B06 DIGITAL AGRARIAN FUTURES

The political economy of the implementation of new technologies

Vision

To understand and explain the current unfolding of digital agrarian futures and their politics. To contribute with our academic findings to international decision-makers and the broader society.

Key Questions for 3rd Phase

- **Drivers:** What and who drives digitalization of food systems in rural Africa (e.g. different businesses and policies)?
- **Intervening variables:** Which factors contribute to the adoption of, or resistance to digital technologies for food production, distribution and consumption (e.g. policy environment, agrarian structure, infrastructure for tech, agency and response)?
- **Outcomes:** What are the outcomes of digitalization on the food system? What are the implications for farmers and (farm and food) workers? Can digitalization contribute to a just and socio-ecological transformation of food systems? And if so, how? How does digitalization reshape labour markets and labour power, including class, gender, migrants etc.? How are young people implicated and responding? What aspects of current food systems does digitalization stabilize? Which aspects does it change or even disrupt? To what degree can we see challenges of data ownership or data grabbing?

Methods: mixed method approach based on interviews, document analysis, participant observation, analysis of survey results

Project Summary

Digitalization is one of the key drivers of future-making worldwide and the basis for many utopian and dystopian visions in Africa. The digital revolution in global agriculture has begun, and it is largely driven by international companies including large agricultural businesses, multinational software and big-data companies, but also by international donors and local start-up companies. In rural areas, we are currently seeing the implementation of a variety of digital tools, ranging from applications to test the creditworthiness of smallholder farmers, to precision agriculture and decision-support tools at farm level, and online marketplaces. Already, its proponents present digitalization as the solution to achieving food security and other sustainable development goals. This optimistic vision contrasts sharply with a more critical view of the impacts of the digital revolution. Critiques emphasize the danger of an expansion of corporate power through digitalization, disemployment effects, and the loss of farmers' autonomy and knowledge. While the interpretations and visions linked to these technologies sharply diverge between a climate-smart utopia and a corporate-controlled, data- and machine-centred, industrialized food-system dystopia, empirical studies on the actual social and ecological impacts of these technologies in the global South and particularly in Africa are still missing, and older studies are getting rapidly overtaken by new developments. The project therefore seeks to analyse, explain and evaluate current digital-tech developments in African agriculture and close the gap within the CRC since the end of project C04 (Smart Futures) after the first phase. We identify digitalization as an important element of future-making. Digital and smart technologies are a way of ordering and making legible agrarian systems. Our study will pick up on elements of prior CRC work in C04, moving beyond the "ICT4D" frame, to address digitalization involving big data, artificial intelligence, and precision farming through the "internet of things". To understand the current unfolding of digital agrarian futures and their politics, our objectives in this project are to analyse and explain the related financialization and data ownership, labour and class, gender and generational relations as well as corporate power and food-system transformation. Beyond this analytical and explanatory approach, we want to contribute with our academic findings to international decision-makers and the broader society via international policy-dialogue activities and organize the planned CRC policy-dialogue forum in Namibia. Digitalization is strongly associated with higher-value crops, with export crops, and with horticulture more than other sub-sectors of agriculture. We therefore propose a study across horticultural sectors in two countries, which will allow for comparison of different structures of agrarian production relations, food systems, digital infrastructures and policy environments. An important element of our study is to study value-chain linkages through the digital ecosystem, from sites of digital deployment to digital development. Here we will build on results of C04, which identified problematic attempts by European companies (e.g. in Morogoro) to capture capital and data via investments in digital agriculture.

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Utopian and Dystopian Visions of Digital Agriculture (Generated with openai)

Link to project webpage with key findings and publications:

C01 FUTURE IN CHAINS

Socio-economic impacts of growth corridors

Vision

Explain impacts of multiple crises, response strategies and their implications on regional resilience from a Southern perspective to deepen our understanding of future-making along growth corridors.

Key Questions for 3rd Phase

1. How do multiple and intersecting crises impact value chains along development corridors?
2. What are the strategies of different regional and external actors in changing landscapes (economic, political, environmental), with what intentions, and how do these strategies impact the value chains?
3. How do the different identified strategies influence regional resilience?

Methods: CRC household survey, interviews & focus group discussions (crises impact, responses, implications), regional stakeholder workshops, secondary data

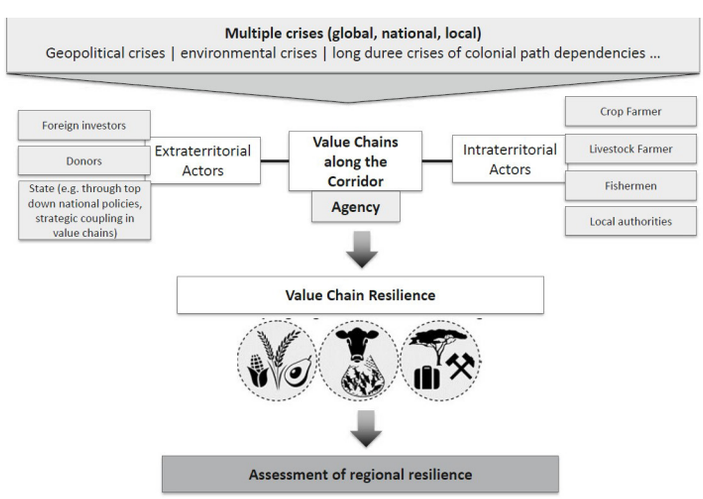
Project Summary

Against the background of these overlapping challenges, our third research phase adopts a resilience-focused approach, examining multifaceted responses from various actors to impacts generated by intersecting challenges, disruptions, and long-duration crises at multiple scales. This will enable us to understand short-term adaptation and long-term adaptability (Neise, Revilla Diez and Garschagen, 2018), which is inherently linked to future-making. In the face of growing risks and uncertainties, building regional resilience and preparing the region for future crises is a crucial and necessary way of actively shaping the future. Therefore, we will expand our conceptual framework on corridor and value-chain analysis, integrating insights from local and geopolitical dynamics, cross-border interactions, and regional (meaning the sub-national scale) resilience.

Our research will address three research questions that are critical to exploring pathways to resilient future-making: (a) how multiple, intersecting crises affect value chains along the two selected growth corridors, (b) which capacities and strategies different stakeholders (local, regional, national, global) implement to cope, adopt or even transform with these crises and why, and (c) how these strategies influence regional resilience.

This includes exploring stakeholder agency and assessing how shifts in policy regimes, domestic investments, and international financial flows affect value chains from both top-down and bottom-up processes. A key advancement will be using survey data from the first two phases to trace developments since 2019 and explore emerging future paths aligned with the CRC's future-making perspective. Continuing with a comparative approach across both regions, this dynamic method will deepen our understanding of future-making amidst multiple crises from a Southern perspective.

How do multiple crisis affect the resillience of different agricultural value chains?



Regional resilience along growth corridors

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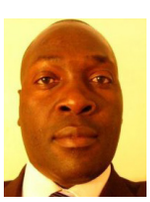

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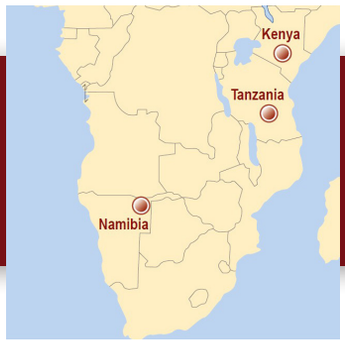
Link to project webpage with key findings and publications:



C02 ENERGY FUTURES

Infrastructures and governance for renewable energies

Vision

Develop a better understanding how Kenya's superior renewable-energy resources become associated with green industrialization and how their valorization leads to socio-economic changes for affected populations.

Key Questions for 3rd Phase

1. What are the visions and strategies associated with money and investment (opportunities) in geothermal project areas?
2. How do these visions and strategies translate into future-making especially saving, borrowing and (green) investment?
3. How do different visions, future-making practices and actors compete and lead to conflict over geothermal futures in Kenya?

Methods: Interviews, document analysis, participant observation, analysis of survey results

Geothermal exploration in Baringo-Silali, Kenya

Project Summary

In the **third phase of the CRC228**, project C02 will extend its research on renewable-energy futures and widen its scope to include related industrial developments and further economic and financial impacts, particularly along the geothermal value chain, and based on three case studies. Given that Kenya continues to develop into a global role model for renewable-energy transformation and generates almost 90% of its electricity from renewable sources, it is essential to study the (local) economic consequences of this success story in more detail.

In two **economic-geography case studies**, we will look at how the production of renewable electricity as well as geothermal heat and steam become the basis for future-making in the form of (green) industrial development visions, plans and investments in geothermal project areas. This can include the planning and establishment of nearby industrial parks, direct-use activities of various kinds as well as green-hydrogen production and further use along industrial and agricultural value chains. In the two case studies – direct use and green hydrogen – we will analyse who are the actors and institutions driving and developing, or criticizing and opposing, these visions and plans. We will examine conflicts and controversies around these developments, whether and how they are financed and implemented (or not), what are the expected or realized benefits and who are the (potential) beneficiaries.

We will explore these issues from a multiscalar and comparative perspective to scrutinize the renewable energy–green industrialization nexus, associated value chains and their cross-scale geographies of supply and demand, financing and policy support.

In the **anthropology-case study,** we will focus on the household and community level, and on how geothermal project developments affect local communities economically and financially. To this end, we will do an in-depth ethnographic study on how the Baringo-Silali development, the largest geothermal exploration area in Kenya, shapes and is shaped by local social, economic and cultural circumstances. An assemblage perspective will be adopted in order to understand, how monetary transactions in the context of geothermal and ancillary infrastructure dynamize and change relations between people and between people and their environments.

Overall, our research will contribute to a better understanding of visions of geothermal, and more generally renewable-energy, futures and related future-making practices, and how they lead to land-use change and social-ecological transformation as well as intended and unintended socio-economic changes, and how local communities (can) benefit from or become negatively affected by these developments.

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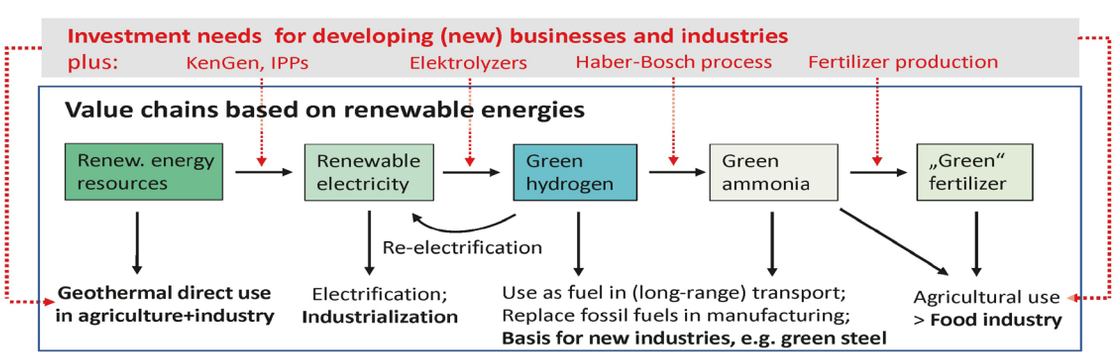
Geothermal Infrastructure in Hells Gate National Park, Kenya



Value chains based on renewable energies

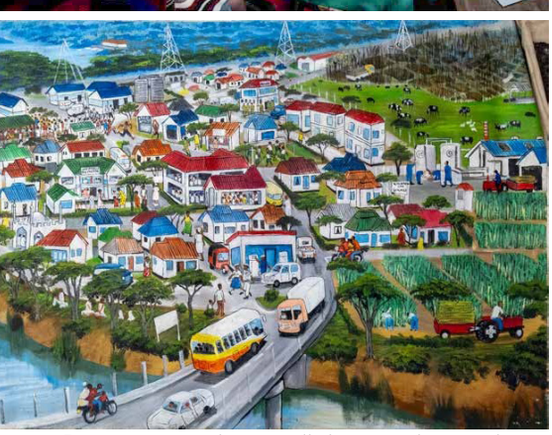
Link to project webpage with key findings and publications:

C03 GREEN FUTURES

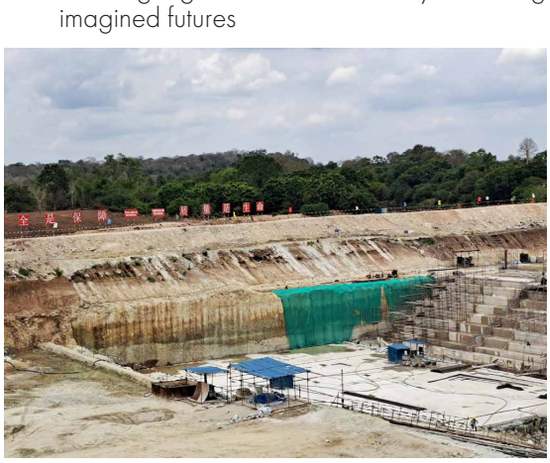
The transformation of rural waterscapes in East Africa

Vision

- Third mission: public outreach through contribution to the exhibition project
- Synthesis: Coordination of theorizing activities (in collaboration with C01 and MPIfG)



Drawing together - collaboratively visualising imagined futures



Kidunda dam (Tanzania) under construction

Key Questions for 3rd Phase

- How does the redistribution of water to urban, industrial and energy uses shape the futures of rural areas and populations in Kenya and Tanzania?

Guiding questions:

1. What are the political and economic drivers and dynamics of water redistribution across geographical scales?
2. How do rural people actively engage with plans for new infrastructure to redistribute water?
3. How do rural people articulate their own visions for water-related development, and how do they endeavour to materialize such visions through their capabilities and labour?

Methods: Drawing together – collaboratively visualizing past memories and imagined futures

Project Summary

Project C03 focuses on the role of water in shaping future-making in Kenya and Tanzania. The aim is to explore how the development of hydraulic infrastructure (dams, boreholes, irrigation schemes) is reshaping waterscapes in the two countries, and how this affects the visions and opportunities of rural people. Limits to water availability, distribution, and access are increasingly felt as challenges, yet national development plans that envisage climate-resilient economic growth hinge upon the intensification of water resources development for energy and agricultural production, both of which are supported by substantial (and often international) financial flows. In this context of increasingly intense competing demands over water, there is a risk that rural populations' own visions for water uses, institutions, and cultures become overridden by external political and economic pressures.

The research design builds upon findings of the first two phases, i.e., the relevance of green economy narratives (first phase) and the study of dams as arenas of future-making (second phase). In the third phase, we expand our focus to a broader set of water infrastructures that seek to develop new sources of water or redistribute existing sources, thereby addressing the interface between water, energy, and agriculture. These infrastructures produce complex interdependencies that are connected by water at multiple scales, determining distribution, availability, and accessibility. We employ the term waterscape to denote how flows, infrastructure, institutions, and discourses are shaped by political, social and economic relations, and, in turn, how the materiality and cultural meanings of water also influence these relations. This analysis will enable us to better understand rural people's relationships with water resources and governance (i.e., the structures, processes, and practices for decision-making around water), and how these underpin their own visions and capabilities for future development. We will shift the focus in the third phase to water as a key resource that is bound up in social-ecological transformation and the push for climate-resilient economic growth in ways that are significantly reshaping rural areas, especially where these harbour potential sources of water for urban centres, industry, and energy production.

LINKAGES

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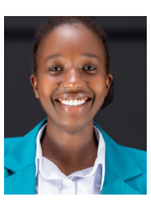

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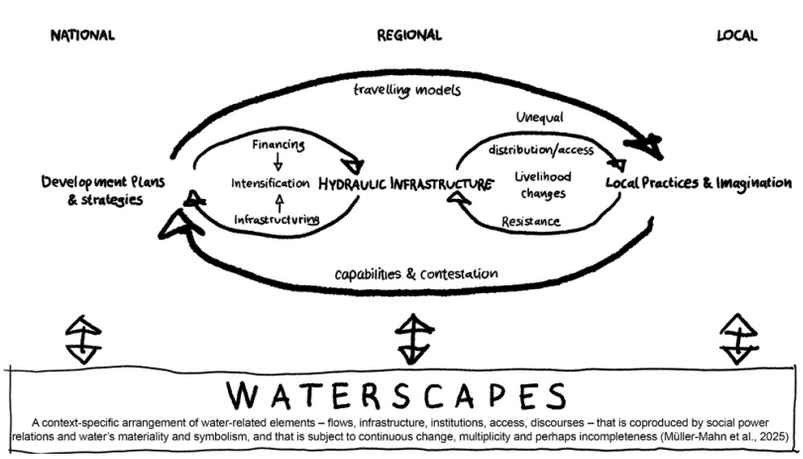


Conceptual framework of 3rd phase

Link to project webpage with key findings and publications:

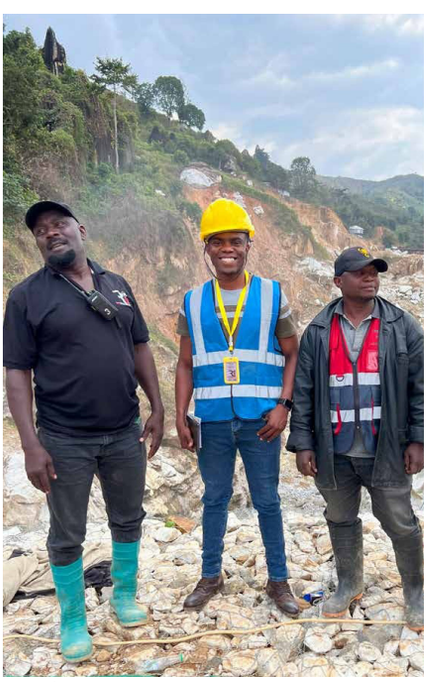
C08 JOB FUTURES

Livelihood effects, digital innovations, and household dynamics in Africa

Vision

By analysing employment in rural Africa, we generate evidence to inform systems that empower diverse populations, foster resilience, and promote labour as a force for equity.

Bean harvest in Kenya. Women provide the majority of family farm labour in many parts of Africa



This gem mine in Morogoro, Tanzania is a main employer in one of the study areas and was part of the employer survey

Key Questions for 3rd Phase

- What are the effects of different types of jobs on key socioeconomic outcomes at the individual, household, and village level?
- What factors influence job satisfaction, and how is job satisfaction linked to people's well-being?
- Do digital financial tools enhance the use of off-farm income for future-oriented farming activities?
- How are people's decisions about work and skills acquisition shaped by their vision for the future through aspirations, expectations, hopes, and worries?

Methods: Quantitative analysis utilizing Z03 household survey from five countries, complementary qualitative approaches for some research questions

Project Summary

Employment plays a central role in shaping people's livelihoods and broader social structures. While agriculture remains the backbone of rural economies in Africa, non-agricultural employment and income have been gaining in importance. The growing diversity of jobs in rural Africa is associated with new opportunities, but also with challenges. Access to decent employment remains a critical issue. This project will continue its research on current and future jobs in various parts of rural Africa. It will explore how different types of work in agricultural and non-agricultural sectors influence key dimensions of people's well-being, including poverty, equitable income, food security, and job satisfaction. Social factors such as gender, age, and decision-making power, as well as infrastructural conditions, often influence access to employment opportunities and individual benefits. The project, therefore, aims to better understand how labour choices impact wellbeing, explicitly acknowledging and modelling differences among household members with the goal of identifying strategies that enable individuals to improve their livelihoods in ways that reflect diverse needs and preferences. We will also investigate to what extent off-farm income influences agricultural investments among male and female farmers, and the mediating role of digital financial services such as mobile wallets, digital savings platforms, and agri-tech tools. These new digital technologies offer avenues for enhanced financial inclusion, especially among women and younger workers, enabling them to have more effective control over financial resources. The combination of offfarm work and digital solutions holds potential for creating stronger connections between economic activities and investments in support of farming, nutrition, education, and health. Furthermore, we examine how individuals and households make decisions about work, shaped by their aspirations, expectations, hopes, and worries. These factors likely influence not only job choices but also investments in skills, community relationships, and strategies for building resilience. We will use household- and individual-level panel data from five study countries – Botswana, Kenya, Namibia, Tanzania, and Zambia – and econometric modelling techniques. The quantitative analysis will be complemented with qualitative data to be collected in Kenya and Tanzania. The project aims to provide a deeper understanding of how households and individuals navigate the shifting terrain of labour markets in rural Africa. By focusing on local perspectives and priorities and by accounting for intra-household power asymmetries, it is designed to generate knowledge to support more inclusive, resilient, and empowering futures. The findings will highlight opportunities to build systems that reflect the needs and aspirations of diverse rural populations, ensuring that labour remains a driver of sustainable and equitable development.

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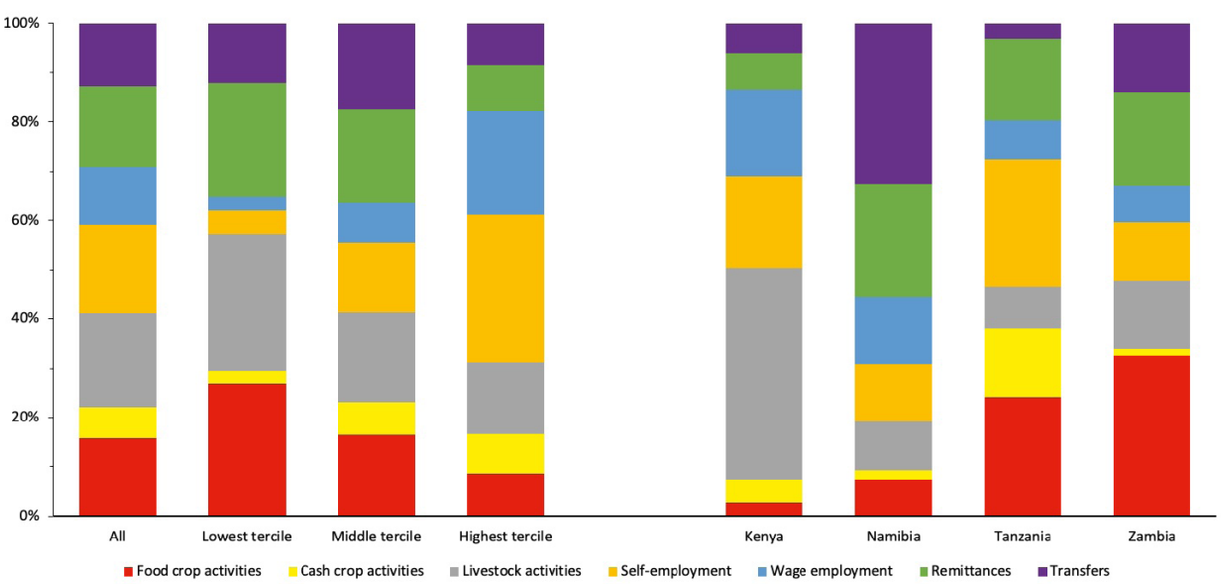


Composition of income sources in 2023 across income groups and study sites

Link to project webpage with key findings and publications:

Z01 CENTRAL ADMINISTRATIVE PROJECT

General Task

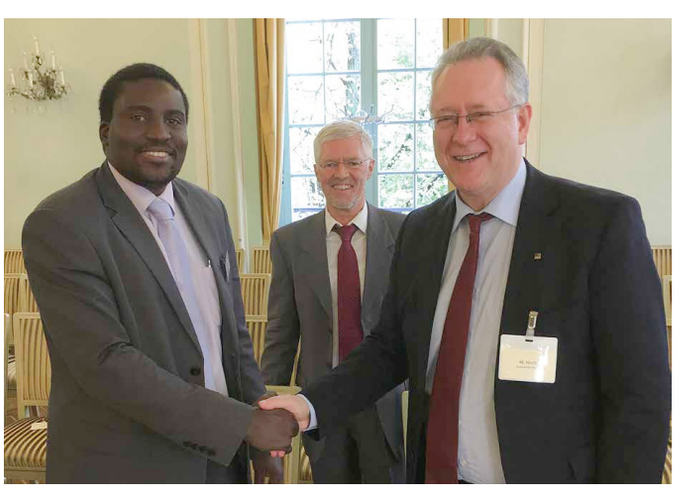
Next to the administration of funds, the coordination of research permits and the vehicle fleet, Z01 also oversees the public outreach of the CRC, including the website, social media, flyers and brochures, and special outreach events, such as dissemination workshops and programmes for the general public. Z01 also plans and facilitates the CRC's monthly Jour Fixe meetings as well as the public lecture series of the consortium.

Gender equality and equal opportunity measures

Gender equality is aimed at throughout the CRC for all stages of academic qualification. Offers aiming at gender equality and the support of early career researchers (ECRs) exist at both universities. Together with the CRC's board for gender equality and diversity, and the universities' administrations, Z01 assists in the implementation of equal opportunity measures.

Collaborations and guests

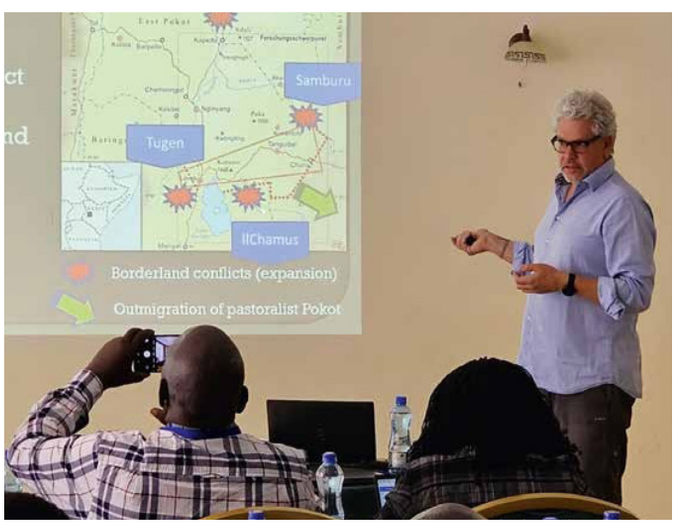
Reliable and lively partnerships are essential for the planned programme and cooperative research activities. Together with the universities' administrations, Z01 establishes partner-contracts and ensures eyelevel collaboration with African scholars. Furthermore, the central administration project facilitates guest communications and travel in line with the CRC's research agenda.



Signing of the MoU between the University of Namibia and University of Bonn

Additional Tasks

The CRC's public outreach consists of the presentation of the research activities and results via print and social media, internet presence, and public events such as workshops and kickoff events. Apart from media output, the CRC continues to organize a number of events, specifically aimed at presenting the research centre to a wider public. In addition to kick-off symposia in Namibia and Kenya, the CRC, together with scientific partners, also organizes a number of stakeholder and scientific workshops, as well as training sessions on methods and data analysis.



Prof. Dr. Clemens Greiner at the dissemination workshop in Kabarnet, Kenya

Project Specific Workshops

Kick-off workshops, the annual project retreat, survey meetings, as well as meetings fostering the work within projects and regional groups will enhance work flows and coherence between and within projects. Z01 supports the organization and implementation of workshops and conferences of member projects, as well as those organized by the ECRs. Furthermore, Z01 is working closely with Z04 in the planning and implementation of summer schools.

Link to project webpage with more information:

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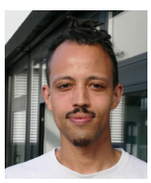

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Project Summary

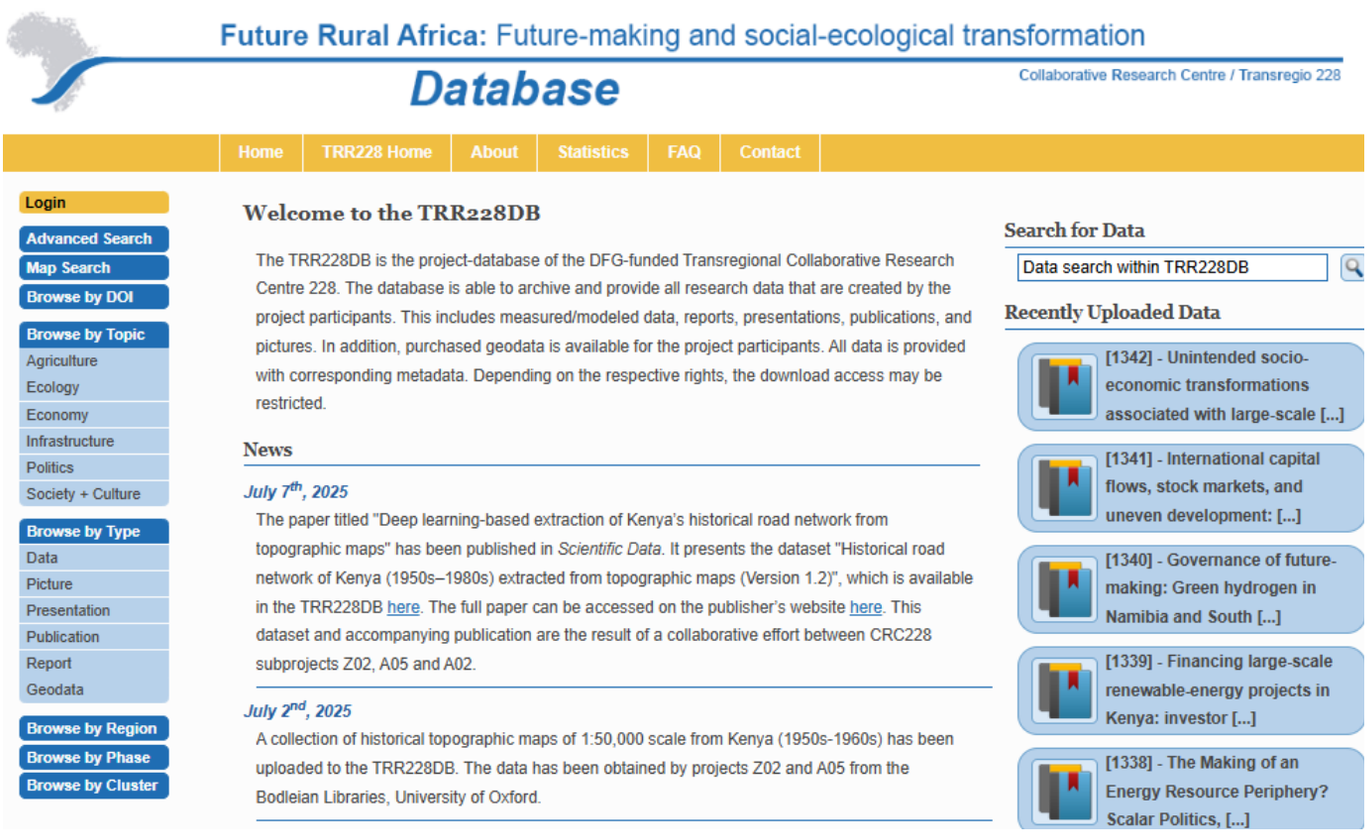
The CRC spokesperson Prof. Klagge will be the project leader for the central administrative project Z01. She gives general directions concerning work flows and responsibilities, is responsible for the management of part of the funds, and has managerial oversight over the staff employed in the project.
The scientific coordinator of the CRC oversees the allocation of funds applied for in this project. In collaboration with other members of the CRC, the coordination office is responsible for the organization of workshops (kick-off, CRC retreats, conferences, summer schools), partner invitations, and related arrangements. Members of the office act on behalf, or as representatives of, the executive board concerning logistical tasks and communication with service providers. Furthermore, the day-today managerial tasks within the CRC are handled through the office (i.e. press releases, public relations, etc.). Kick-off workshops and training sessions on methods and data analysis are planned to present the research programme and rationale to participating institutions, researchers, and other interested parties. To the CRC's own researchers these workshops provide an opportunity to present their research plans and discuss them with local counterparts to plan joint exercises and to identify aspects where synergies can be achieved. Next to these, the CRC continues to conduct workshops and retreats to take place among all members, as well as PLs and PhDs respectively to allow for in depth discussions of ongoing research, preliminary results, the joint preparation of publications and conference contributions, etc. Although both host Universities (Bonn and Cologne) do already have structures in place to allow for the training of early career researchers, the CRC seeks to add to these offers by providing the¬matically suited workshops and trainings (see also Z04, IRTG). The central project Z01 is also tasked with increasing diversity in academia which includes, but is not limited to, gender equality. A key aim of the CRC is to offer equal opportunities in this highly diverse research setting. To do so, (1) the strong patriarchal bias of both social and academic structures characterizing our research contexts in Sub-Saharan Africa will be taken into account. Moreover, (2) while hosting and collaborating with a large number of fellow academics from all over the world, it is of great significance for us to form research teams that see diversity as a distinct resource. (3) Finally, we wish to address the issue of gender equality on a more local level by specifically targeting the challenges in our German academic setting.

Z02 DATA MANAGEMENT AND SERVICES (INF)

Project Plan for 3rd Phase

- Further maintenance and updates of the TRR228DB
- Continuation of training and support in TRR228DB handling and RDM tasks in cooperation with C³RDM
- Development of a static version of the TRR228DB that will require minimal maintenance for post-funding accessibility in close cooperation with the ITCC
- Geo-and satellite data provision, processing, analysis, and license administration
- Further acquisition of historical topographic maps from the mid-20th century for other key areas of the CRC228
- Land-use/land-cover analyses from current and historical remote sensing and geodata for selected study areas

Services provided for CRC members



User interface of the TRR228DB (www.trr228db.uni-koeln.de)

Link to project webpage with key findings and publications:

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Project Summary

In the third phase, the Z02 research and service activities will focus on three main areas: (i) maintaining and further developing the TRR228 Database (TRR228DB), (ii) acquiring and analysing remote sensing, geo-, and historic topographical data, and (iii) developing and implementing a static version of the TRR228DB, known as the "TRR228DB-Box", to ensure a post-funding accessibility of the project data. Ongoing collaboration with the IT Center University of Cologne (ITCC) will ensure that the TRR228DB (www.trr228db.uni-koeln.de) is further developed to meet the specific requirements of the final phase. Initially adapted from the CRC-TR32DB and successfully implemented during the first phase of the CRC228, the TRR228DB was created to manage interdisciplinary research data within the CRC228. The second phase focused on updating and reprogramming several database features to more modern programming standards with the aim of improving the user experience and minimizing technical challenges. Several database features have been overhauled, such as the data upload to support the upload of larger datasets via the website, or the metadata editor to incorporate current metadata standards, streamline the input of specific metadata fields, and implement a more advanced system to verify metadata entries. Finally, CRC members have received training and support for using the RDM system. Additionally, several GIS and remote sensing activities have been conducted during the second phase. We have acquired high-resolution satellite imagery, such as Pleiades Neo, and gathered more than 6 TB of PlanetScope imagery covering Kenya, Tanzania and Namibia, the three primary focus areas of CRC228. Additionally, the historical road network of Kenya from the 1950s to the 1980s has been extracted with deep learning techniques from more than 500 historical topographical maps. The created dataset is a valuable resource for future research within the CRC on historical infrastructure in Kenya as it is the first highly detailed digital representation of Kenya's road network from that era. The dataset is openly accessible in the TRR228DB. Building on the work done in the second phase, the goal for the third phase is to establish an encompassing collection of historic topographical maps for Kenya and other areas of the CRC to support the research of other sub-projects on socio-economic and ecological studies that are related to historical infrastructure development and land-use changes.

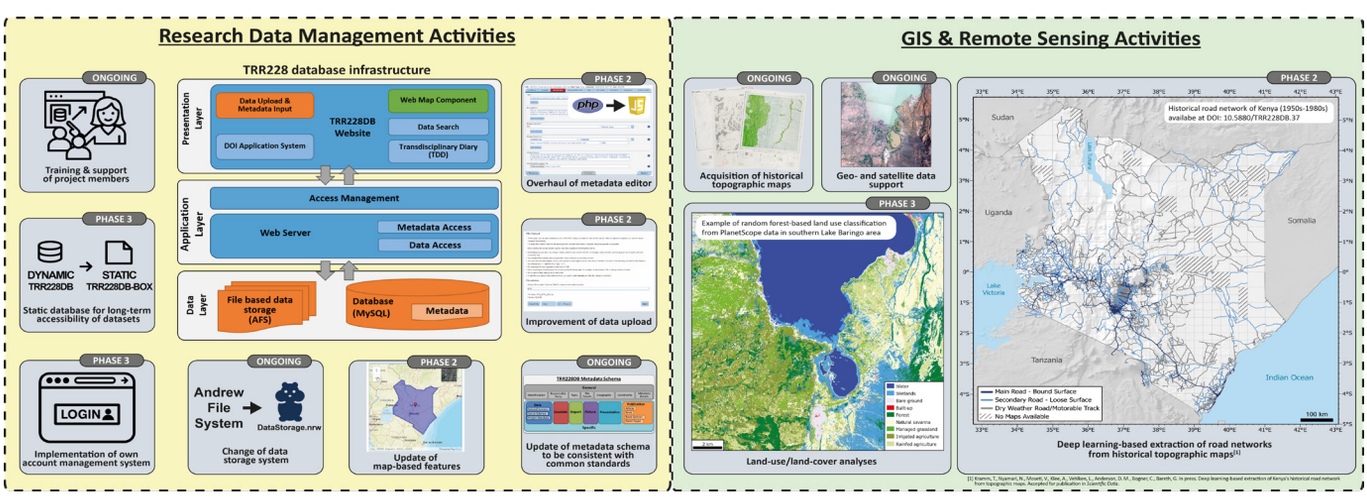
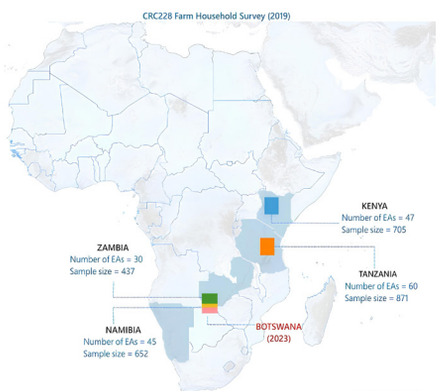


Illustration of Z02 data management and services (INF) activities in Phase 2 and 3

Z03 COMBINED FARM/ HOUSEHOLD SURVEY

Vision

Advance cross-country research on rural future-making by coordinating longitudinal data collection, enabling comparative analysis, and fostering collaborative knowledge dissemination within and beyond CRC228.



Project Plan for 3rd Phase

- Conducting a third wave of the CRC228 household survey in 2027 by revisiting the households surveyed in the baseline and second waves
- The project will first focus on questionnaire development, followed by survey planning and survey implementation
- The survey will help answering the following overarching research questions:

  1. How do conservation, intensification, and infrastructuring interact and shape future-making and social-ecological transformation?
  2. How do uncertainties and disturbances affect these practices and social-ecological systems?
  3. How does future-making link visions, possibilities, and probabilities, shaped by agents' positionalities?
  4. What do these insights reveal for a critical understanding of "development"?
  5. How is future-making shaped by global processes such as foreign direct investment and globalized commodity and financial markets?
- Community-outreach events in collaboration with local partners in 2029

Project Summary

The Z03 project plays a key role in supporting all other CRC228 projects by coordinating and implementing quantitative farm-household surveys across all study regions. We are building a unique socio-economic panel dataset in terms of scope and distribution, which provides valuable information on the determinants and outcomes of future-making in rural Africa over time. In the second phase of the CRC228, Z03 successfully led the second wave of the farm/household survey in collaboration with seven projects, collecting panel data from almost 2,700 households across Kenya, Tanzania, Zambia, and Namibia, as well as baseline data from 453 households in Botswana. Data of the first and second phase are currently widely used by CRC228 researchers and affiliates, publicly accessible through a central database. Building on this shared resource, Z03 organized a writing workshop at the UoC, in which partners from Botswana, Kenya, Namibia, Tanzania, Zambia, and CRC228 researchers from Germany collaborated towards a comparative study analysing longitudinal survey data from 2019 and 2023 under the theme "Future Making in Rural Africa in Times of Crisis". In the third phase, Z03 will support project teams in designing and implementing new data-collection efforts, coordinate data processing and documentation, and facilitate cross-country comparative analyses. A key focus is the rollout of a third wave of the farm-household survey to create a three-wave panel dataset (2019, 2023, 2027). This unique socio-economic panel will enable the CRC228 and future research initiatives to better analyse trends and temporal dynamics as well as causal relationships between determinants and outcomes of rural future-making in and across the CRC228's study areas. A special focus of the third wave will be on the linkage between future-making in our study areas and different global processes, such as foreign direct investment as well as globalized commodity and financial markets. Beyond supporting data collection and data use, Z03 will facilitate cross-country and cross-partner collaboration towards leveraging the three waves of survey data (2019, 2023, and planned 2027) for publications and knowledge dissemination. This will include taking a leading role in organizing a writing workshop and coordinating community-outreach events in collaboration with local partners and stakeholders. The events will focus on sharing research findings, fostering collaborative discussions, and addressing topics relevant to local interests and challenges.

Country	Number of enumartion areas	Sanple size of Wave-1	Sample Size of Wave-2
Botswana	6	–	453
Kenya	47	705	703
Namibia	45	652	652
Tanzania	60	871	871
Zambia	30	437	437
All Countries	188	2,665	3,116

Sample sizes for survey waves 1 and 2

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Link to project webpage with key findings and publications:

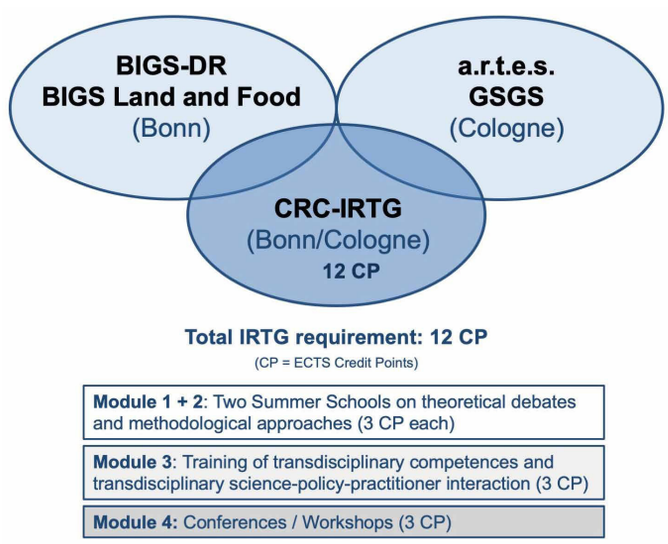
Z04 INTEGRATED RESEARCH AND TRAINING GROUP (IRTG)

Integrative IRTG

The proposed IRTG will build on existing PhD programmes at both partner universities, but complements them with a training programme that addresses the particular design and interests of the CRC. The IRTG will thus enhance the exchange and coherence within the interdisciplinary yet thematically focused CRC and provide opportunities for ECRs to strengthen disciplinary skills in the context of well-established programmes.

Organization of the IRTG

The IRTG will be established during the first General Assembly of the CRC, where its statutes shall be approved by all members of the CRC. The IRTG shall include a student representative who will also be part of the executive board of the CRC. The scientific coordinator of the CRC will coordinate and assist in the organization of IRTG activities. PLs Borgemeister and Bollig will be responsible for coordinating the communication with and structural developments to BIGS-DR and a.r.t.e.s.



Embedded structure of the IRTG

Training Plan

Module 1:

Provide ECRs with training to enhance their theoretical knowledge and jointly explore the conceptual potential of Future Studies, particularly in relation to the thematic focus of the CRC. (Summer School 2026*, Nairobi)

Module 2:

Train a new generation of scholars transcending disciplinary boundaries to understand, discuss, and handle diverse methodological approaches and respective formats of data generated across social and natural sciences. (Summer School 2027*,Nairobi/Windhoek)

Module 3:

Encourage the participation of ECRs at external workshops and conferences as well as the organization and reflection of CRC-related lecture series, workshops and reading weeks. (Summer School 2028*,Bonn/Morogoro)

Module 4:

General academic and transferable skills to enhance ECRs' employability across academic, industrial, public, and educational sectors will be covered within the existing structured doctoral programmes. CPs may however also be obtained by the ECRs for organizing workshops themselves.

* The summer schools will be open to and actively involve ECRs from the partnering African universities.

Group discussion during self-organized ECR workshop, 2023

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Project Summary

As in the prior two funding phases of the CRC, the proposed IRTG will build on existing PhD programmes at both partner universities, but complements them with a training programme that addresses the particular needs of the CRC. In the third phase this programme will be enhanced by a close-knit collaboration with the existing DAAD Global Climate and Environment Centre AFAS with its focus on MA and PhD education hosted at the UoB and UoC. Furthermore, we will expand our PhD students' transdisciplinary perspective by exploring synergies with the organization of policy-dialogue activities by projects B03, B05 and B06 (see section "The way forward II: Synthesizing activities" in 1.2.2) and thus introduce them to science-policy-practitioner interaction. Over the last decade, a variety of structured doctoral programmes have been established at the universities of Bonn (UoB) and Cologne (UoC). The Bonn International Graduate School in Development Research (BIGS-DR) based at ZEF builds on a long tradition of graduate education in the context of development research, with many of its graduates focusing on the field of African Studies. Additionally, the BIGS Land and Food of UoB's Faculty of Agricultural, Nutritional and Engineering Sciences (AEI) also provides a structured graduation context for PhDs working on topics related to agrarian questions in the Global South, particularly Africa. At the UoC, the a.r.t.e.s. graduate school serves as the educational basis for all doctoral students of the Faculty of the Humanities, supported by the German Excellence Initiative (until 2019) as well as the German Academic Exchange Service (DAAD). Furthermore, the Graduate School for Geosciences (GSGS) at the UoC offers a structured PhD programme. In all four schools, the interdisciplinarity and internationalization of academic research play a decisive role, so that they form an ideal institutional background for the graduate training of the CRC. Doctoral researchers of the CRC must join one of these graduate schools, but have the choice to join the graduate schools and the specialized classes at either one of the two universities according to their disciplinary specialization, needs and interest.

In addition, to strengthen cohesion and to deepen exchanges with PhD students in collaborating institutions in Africa it remains crucial for the CRC to create structures that facilitate and foster exchange and discussion among all the early-career researchers (ECRs) involved in the project. For the IRTG, a number of mandatory modules amounting to 12 Credit Points (CP) have been developed in order to guarantee and encourage exchange between the CRC graduates, who will all be enrolled in either the BIGS-DR, BIGS Land and Food (both UoB), a.r.t.e.s. or GSGS (both UoC). The first two modules are designed as CRC summer schools and coordinated jointly by the PIs and postdocs of the CRC. They will provide ECRs with training to enhance their theoretical knowledge and jointly explore the conceptual potential of Future Studies, particularly in relation to the thematic focus of the CRC, and train a new generation of scholars transcending traditional disciplinary boundaries to understand, critically discuss, and handle diverse methodological approaches and respective formats of data generated across the divides between the social and natural sciences (Modules 1 and 2). With the third phase focusing on transdisciplinary science-policy-practitioner interaction we will add a further module to the IRTG's programme that introduces to and reflects upon diverse transdisciplinary engagements and challenges and provides ECRs with transdisciplinary competences and options for engagement with the policy-dialogue activities (Module 3). As in the second phase, we continue to acknowledge and encourage the participation of the ECRs at external workshops and conferences, as well as the organization and reflection of CRC-related lecture series, workshops, and reading weeks (Module 4). General academic skills as well as transferable skills shall be addressed within the existing structured doctoral programmes. In this way, the IRTG will enhance the exchange and coherence within the highly interdisciplinary yet thematically focused CRC, while at the same time providing opportunities to strengthen disciplinary skills in the context of well-established programmes.

Z05/Ö NEGOTIATING AFRICAN FUTURES

An Exhibition Project

Goals

The exhibition project aims to create a space for envisioning and enacting African futures rooted in multiplicity, solidarity, respect, and mutual learning, while fostering a shared understanding of the grand challenges of the 21st century. This entails a close collaboration with African scientists, artists and communities, incorporating participatory "worldbuilding" workshops in order to gradually develop and translate the CRC228 themes and insights into an appropriate curatorial concept and exhibition formats geared towards a broad audience.

Preparatory workshop at Futurium with researchers from the CRC and creatives from Africa in November 2024

Vision

The exhibition project "Negotiating African Futures" weaves together and brings individual stories, regional developments, global challenges, and shared visions of the future to a broad audience in an immersive, decolonial, and participatory manner.

Content foci

The exhibition illustrates key themes of CRC228 through selected case studies:

- "How elephants make politics": conservation and human wildlife coexistence in KAZA TFC
- "Full steam ahead": energy futures around Lake Baringo and beyond
- "Rosy futures": global connections and local contestations in the Lake Naivasha economy
- "Water dreams and nightmares": contested water infrastructures in Morogoro and Pwani/Tanzania

Project Summary

The exhibition project "Negotiating African Futures" represents a collaborative effort between the CRC228 "Future Rural Africa" and the Futurium – House of Futures in Berlin. Its overarching goal is to translate key findings from the CRC228 into engaging science communication, making research on rural African future-making accessible to broad audiences in Europe and Africa in the form of an exhibition project in the Futurium. By embracing insights from more than ten years of collaborative research the exhibition project facilitates a reflection process within the CRC228 about its key messages and invites a wider audience to reflect on the interconnectedness of futures and future-making in and beyond rural Africa. The exhibition does not aim to comprehensively represent "African futures" but rather to foster reflection on the diverse visions, challenges, and global connections shaping future-making processes. The four main objectives include: (1) Present exemplary research experiences and findings to a broad audience; (2) Raise awareness of diverse and alternative futures in Africa; (3) Foster a shared understanding of Afro-European futures; (4) Highlight individuals and communities from the African continent as active agents and "future-makers".

The exhibition project aims to create a space for envisioning and enacting African futures rooted in multiplicity, solidarity, respect, and mutual learning, while fostering a shared understanding of perspectives on the grand challenges of the 21st century. This entails the gradual development and translation of the CRC228 themes and insights into an appropriate curatorial concept and exhibition formats in close collaboration with African scientists, artists and communities, incorporating participatory "worldbuilding" workshops. Major themes – infrastructures, conservation, intensification, and financing – will be illustrated through interactive installations and case studies from Kenya, Namibia, and Tanzania. The final exhibition will open at the Futurium in 2029, with satellite activities in Africa. Core work packages include conceptual alignment, narrative development, production of visual media, exhibition implementation, and long-term archiving. Feedback from "critical friends" from different African countries and the diaspora will guide all project phases.

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Z05 team and Kairos Futura in front of Wanjukuu Arts gallery, Nairobi

Researchers from the CRC and Kairos Futura exploring the Exhibition at Futurium, Berlin

Link to project webpage with key findings and publications:

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