



# Trans-SEC

Innovating pro-poor Strategies to safeguard Food Security using Technology and Knowledge Transfer

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<b>Report of capacity building programme</b>	
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## Summary

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The Trans-SEC capacity building programme was highly active and effective on initiating and fostering knowledge exchange as well as joint learning processes between Tanzanian and German (junior) scientists.

The results and realised activities can be grouped into:

- (1) research exchange (Tanzanian scientists working in German partner institutions (Tan → Ger)
- (2) Fostered and integrated poster presentation of Trans-SEC junior scientists at Tropentag 2015 in Berlin (jointly organized by Humboldt University (HU) and ZALF)
- (3) PhD publication writing workshop at ZALF
- (4) Summer School (ZALF/ Humboldt University Berlin)
- (5) Intensive support of 12 master students
- (6) Intensive support of various PhD students
- (7) Lecture development including preliminary results of Trans-SEC by project coordinators (Dr. Sieber & Dr. Graef)

The applied exchange methods were adequate and helped to foster mutual learning processes between different levels of researchers (junior to senior). Furthermore, intercultural research skills were trained and developed to enhance results of involved researchers.

## Introduction, background and aims

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### Research exchange (Tanzanian scientists working in German institutions)

The PhD exchange program is a key component of the Trans-SEC capacity building strategy and offers Tanzanian PhDs the opportunity for an intensive research stay in various research facilities Germany. To strengthen the Tanzanian-German research and development network and to improve the knowledge transfer between our international partners, the following activities were implemented:

- Intensive research stay in Germany
- Oral as well as poster presentations at Tropentag 2015
- PHD publication writing workshop (ZALF)
- Summer School (ZALF/Humboldt University Berlin)

### Research Stay



In the period from August until the End of October 2015, five Tanzanian PhDs took the opportunity and visited two German research institutions (ZALF and University of Hohenheim) for four to eight weeks.

Name of PhD	Research stay	German Institution	Supervision
Hadijah A. Mbwana	15.09.-15.10. 2015	University of Hohenheim	Dr. Christine Lambert
Tatu Said Mnimbo	15.09.-22.10.2015	ZALF	Dr. Frieder Graef
Yusto Mugisha Yustas	15.09.-22.10.2015	University of Hohenheim	Dr Hans Oechsner
Lutengano Mwinuka	15.09-22.10.2015	ZALF	Dr. Stefan Sieber
Claude Maeda	18.08-30.09.2015	ZALF	Dr. Stefan Sieber

During their research stay, all Tanzanian PhDs participated at the Tropentag 2015 in Berlin (16.-18.09.2015), the annual Trans-SEC meeting (21.-24.09.2015) and the Summer School (24.-25.09.2015). Furthermore, Tanzanian PhDs continued working on their PhD theses under supervision of German supervisors and took the opportunity to intensively discuss ideas and research approaches as well as joint scientific publications and further project applications.

The PhD exchange program mirrored the interdisciplinary character of the Trans-SEC project as Tanzanian PhD students from multiple disciplines participated. The following research topics were addressed during the research stay and further developed/evaluated with corresponding German supervisors:

- Impact of household centered nutrition education merged with home gardening on food consumption patterns, nutrient intake and nutritional status of children and their caregivers in rural Tanzania (Hadijah A. Mbwana)
- Analysis of gender issues on food security upgrading strategies (Tatu S. Mnimbo)
- Optimizing model for the renewable energy hybrid system involving anaerobic digestion of animal wastes (nutrient cycling), wind and solar energy harnessing for smallholder farmers and households (Yusto Mugisha Yustas)
- Analysis of productivity and welfare effects of fertilizer micro-dosing (MD) for upgrading the maize and millet value chains in Tanzania (Lutengano Mwinuka)
- Analysis of efficiency potentials for commercializing and trading in the agri-food sector and connecting supply and demand centres (Claude Maeda)

In addition to the scientific working program, ZALF organized social activities for Tanzanian PhDs and conducted a guided sightseeing tour in Berlin including a visit of the German Reichstag by invitation of Harald Ebner, MdB.



## Fostered and integrated poster presentation of Trans-SEC junior scientists at Tropentag 2016 (jointly organized by Humboldt University (HU) and ZALF)

All Tanzanian PhDs prepared in cooperation with corresponding German partners a poster for the Tropentag 2015 conference in Berlin and presented them in diverse poster sessions.

Author	Title of the Poster	Tropentag Session
Elirehema, S.; Mutabazi, K.; Tumbo, S.; Urassa, N.; <u>Mwinuka, L.</u> , Mchau, D.; Graef, F.; Herrmann, L.	Farmer's Perception on Soil Fertility Status and Soil Fertility Management in Semi-arid Areas of Central Tanzania	2.1 Soil Management and Crop Nutrition
<u>Maeda, C.</u> ; Mduma, J.; Mutabazi, K.; Biesalski, H.	Agricultural Market Integration in Tanzania: an Analysis of Select Maize Markets	5.1 Value Chain Analysis and Marketing
<u>Mbwana, H.</u> ; Lambert, C.; Kinabo, J.; Biesalski, H.	Tackling Food and Nutrition Insecurity in Tanzania: Farmers Perspectives on Kitchen Gardening as a sustainable Approach	5.2 Sustainable Livelihood Strategies
<u>Mnimbo, T.</u> ; Lyimo-Macha, J.; Urassa, J.; Mahoo, H.; Tumbo, H.	Gender on Roles, Choices of Crop Types and Value Chain Upgrading Strategies in Semi-arid and Sub-humid Tanzania	5.3 Gender Perspectives, Analyses and Strategies
<u>Maeda, C.</u> ; <u>Lutengano, M.</u> ; Mutabazi, K.; Mussa, M.	Improving Agricultural Information Symmetry through Mobile Integrated Market Access System in Tanzania	6.1 Innovation System and Networks
<u>Yustas, Y.</u> ; Silayo, V.; Tumbo, S.	Investigation of Anaerobic Digestion Backed by Solar-Wind System for Clean Energies in Rural Areas	7.3 Processing of Agricultural Products into Food and Fuel

## PhD publication writing workshop at ZALF

The ZALF team organized a publication writing workshop for three days in Fredersdorf/Brandenburg (07.-09.10.2015). Members of the ZALF team, PhDs from German Universities and the Tanzanian PhDs worked together in small teams on specific scientific publications focusing on the interdisciplinary research. This new experience was very fruitful and resulted in the following publication drafts:

- *Determinants affecting up-take and dissemination of improved cooking stoves - firewood situation, ICS technology, implementation strategies and observations of changes in practice.*  
**Uckert, G.**; Graef, F.; König, H.; Fasse, A.; Hoffmann, H.; Mutabazi, K. D.; Mwinuka, L.; Mnimbo, T.-M.; Schindler, J.; Sieber, S.



- *An integrated impact assessment framework for food value chains: a case study of rural Tanzania.*  
**König, H.;** Graef, F.; Schindler, J.; Fasse, A.; Mutabazi, K.; Lambert, C.; Ngwenya, P.; Uckert, G.; Mahoo, H.; Hattermann, F.; Sieber, S.
- *Trans-action costs on multi-disciplinary participatory action research on food security in Tanzania: reviewing three years of scientists' experiences*  
**Graef, F.;** Wambura, J.; Löhr, K.; Gornott, C.; Kuntosch, A.; Lana, M
- *To determine pathways of addressing gender based constrains for equitable and sustainable participation in profitable crop value chains*  
**Mnimbo, M.** et al.

## Summer School (ZALF/ Humboldt University Berlin)

ZALF organized a Summer School in Müncheberg for all Trans-SEC PhDs entitled “Joint Programme on Environmental Resource Economics and Food Security”. The Humboldt University of Berlin accredited successful completion with 3 credit points for students who presented a poster at Tropentag, attended to the two days summer school and submitted a final term paper. A total of 20 PhD students from Trans-SES and Humboldt University participated in the PhD summer school and focused on the question “How to feed the world?” including topics such as how to enhance food security at local, national and global level, and to find new ways to foster and pay for ecosystem services. The summer school focused on the development of a structured set of sequenced research methods that, collectively, facilitate the involvement of different stakeholders in assessments of land use policies, adaptation tactics and upgrading strategies from local to regional level.

The two seminar days were structured as follows:

### 24.09.2015

- |             |                                              |
|-------------|----------------------------------------------|
| 9:30-10:00  | Introduction of participants, group building |
| 10:00-10:20 | Scala and the history (Dr. Stefan Sieber)    |
| 10:20-10:40 | Scala-FS (Dr. Frieder Graef)                 |
| 10:40-11:00 | Fopia (Dr. Hannes Koenig)                    |



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11:00-12:00 Defining roles within each group (see role play introduction)

12:00-13:00 Lunch

13:00-14:00 Phase 1 (see role play instructions)

14:00-14:30 Phase 2 (see role play instructions)

14:30-15:30 Phase 3 (see role play instructions)

15:30-16:00 Coffee

16:00-19:00 First discussion on Phase 4 (not finished)

## 25.09.2015

10:00-12:00 Finishing discussion on Phase 4

12:00-13:30 Lunch and short walk

13:30-15:30 Phase 5 (see role play instructions)

15:30-16:00 Coffee

16:00-17:00 Phase 6 (see role play instructions)

17:00-17:20 Feedback and term paper definition

## Support of 12 Master student

Title	Student	Supervisor	University	Year	Level of graduation
A participatory situation analysis of Tanzanian smallholder farming systems: Identifying points of entry for innovation from the farmer's perspective	Maria Höhne	Brigitte Kaufmann	Georg-August-University of Göttingen & University of Kassel	2015	Master
Potential and feasibility for implementing upgrading strategies to improve rural poor food value chains	Isa Laura Schneider	Frieder Graef	Eberswalde University for Sustainable Development, Germany	2014	Master
Innovation-driven shift towards a sustainable energy consumption of smallholder farmers - A	Johannes Hafner	Christian Franke (HU), Götz Uckert	Humboldt University	2015	Master (proposal; thesis in prepar-



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case study on improved stove technologies and increased on-farm wood production in two regions of Tanzania.		(ZALF), Anthony Kimaro (ICRAF)			ation)
Economic Analysis of Improved Firewood Cooking Stoves and their Implication to Community livelihoods in Chamwino and Kilosa districts, Tanzania	Ogossy Gassaya	Dr. Silayo (SUA); Dr. Uckert (ZALF); Dr. Lusambo (SUA)	Sokoine University of Agriculture	2015	Master (thesis in preparation)
Assessing the Role of Kitchen Gardens on the Food Availability and Accessibility at Household Level in Rural Tanzania. Case study: Changarawe and Idifu Village.	Marie Estelle Bumah	Wolfgang Bokelmann (HU), Stefan Sieber (ZALF)	Humboldt University	2015	Master (proposal; thesis in preparation)
Rural financial systems in the development context	Muratovic, A.	Dr. Anja Faße	Leibniz University Hannover	2015	Master (proposal; thesis in preparation)
Innovation, Interaction and Relation between Small-Scale Farmers and Private Actors within a Value Chain in rural Tanzania: Understanding through Actor-Network-Theory	Maximilian Schmid	Raoul Herrmann	German Development Institute DIE, University of Bonn	2016	Master (proposal; thesis in preparation)
Using role play to assess possible implications of gender and socio-cultural factors for innovation uptake decisions in Tanzanian small-farming communities	Schulz, K.	Dr. Pamela Ngwenya	Georg-August-University of Göttingen	2015	Master (proposal; thesis in preparation)
Efficiency of maize production and its impact on food security	Saaedullah	Dr. Anja Faße	Leibniz University Hannover	2016	Master (proposal; thesis in



					preparation)
Characteristics that constrain and enable the effective functioning of farmer groups in Tanzania: participatory action research with three farmer groups in Morogoro and Dodoma regions.	Fernandez, R.	Dr. Pamela Ngwenya	Georg-August-University of Göttingen	2015	Master (proposal; thesis in preparation)
Participatory monitoring and evaluation of innovation development with Tanzanian farmer groups.	Thapa, P.	Dr. Pamela Ngwenya	Georg-August-University of Göttingen	2016	Master (proposal; thesis in preparation)
Participative terrain mapping as basis for scientific field trials relating to food security in Iloilo Tanzania.	Otilie Gebhardt	PD Dr. Ludger Herrmann	University of Hohenheim	2014	B.Sc.
Perception of Environmental Changes and its Effects on Food Security and Water Availability	Lina Röschel	Dr. F. Graef; Dr. O. Dietrich	ZALF	2015	Master (proposal; thesis in preparation)

## Support of 20 PhD students

### 1. Harry Hoffmann – PhD finished in 12/2015

Institution	Leibniz Centre for Agricultural Landscape Research ZALF e.V. Müncheberg Germany
Supervisor(s)	Prof. Müller (ZALF)
Partner (internal or external)	Sokoine University of Agriculture (SUA), International Food Policy Research Institute (IFPRI)
Description of PhD-Topic	Applied Method: PhD thesis is focussing on rural bioenergy provision in Tanzania. We collected data in a village survey in Laela/Rukwa region in Western Tanzania. The focus is on (1) rural biofuel production potential for decentralised electrification, (2) the potential





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impact of improved woodfuel stoves and (3) the potential impact of improved charcoal kilns. The energy challenge is crucial for food security and the forest resources because the supply of woodfuels (esp. charcoal and firewood) are declining rapidly in the case study village and beyond. Efficient cook stoves and efficient charcoal kilns can lower the pressure.

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## 2.                   **Anett Kuntosch**

Institution               Humboldt-Universität zu Berlin, Dep. of Agricultural Economics

Supervisor(s)           Prof. Dr. Wolfgang Bokelmann, Dr. Michael Brüntrup

Partner (internal or external)   Friedrich Wilhelms University of Bonn, Germany  
Biologische Bundesanstalt Kleinmachnow, Germany

Applied Method:

PhD aims at a regional impact assessment of pesticides risk at the level of Germany. For this the three models RAUMSI, ISPS and NEPTUN have been applied. Three results of risk potentials, GIS surface water body data and production data has been linked to a risk indicator on pesticide leaching.

Description of PhD-Topic

Expected result:

A regional assessment of risk potentials for pesticide leaching as a policy information tool that support decision making at regional level. Different scenarios will help to define the decision room depending on the policy instrument buffer zone programme. Final recommendations on different alternatives of analysed environmental programmes will be made.

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## 3.                   **Hadijah A. Mbwana**

Institution               Sokoine University of Agriculture

Supervisor(s)           Prof J. Kinabo & Prof H. K. Biesalski

Partner (internal or external)   University of Hohenheim

Applied Method: My PHD aims at assessing the impact of household centered nutrition education merged with home gardening on food consumption patterns, nutrient intake and nutritional status of children and their caregivers in rural Tanzania. A controlled before and after intervention study will be employed. Baseline data in both the intervention and the control villages will be collected then the nutrition education and kitchen gardening practical demonstration and training will be employed once every months for three months then impact assessment will be done eighteen months later.

Description of PhD-Topic

Expected result: Facilitation of discussions leading to planning and implementing



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effective nutrition interventions in Tanzania. Improve food consumption patterns, nutrient intake and nutritional status of household members in rural areas.

Contact hadija27@yahoo.com

#### 4. Tatu Said Mnimbo

Institution Sokoine University of Agriculture

Supervisor(s) Joyce Lyimo Macha, Urassa Justin

Partner  
(internal or external) ZALF

Description of PhD-Topic Applied Method: My PhD focuses on gendered analysis of upgrading strategies for crop value chains in sub-humid and semi-arid Tanzania. The specific objectives are: (1) To examine the influence of gender roles on the choices of crops and value chain upgrading strategies, (2) To analyse the gendered access and control of value creating technologies in crop value chains, (3) To determine pathways of addressing gender based constrains for equitable and sustainable participation in profitable crop value chains.

Expected result: To ensure gendered upgraded strategies are considered in different value chain components in the Trans-SEC project and other development programmes.

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#### 5. Yusto Mugisha Yustas

Institution Sokoine University of Agriculture

Supervisor(s) Prospective Supervisors are Prof. V. C. K. Silayo & Prof. S. Tumbo

Partner  
(internal or external) Currently not clearly identified. Prospective institution is University of Hohenheim

Description of PhD-Topic Applied Method: The PhD's goal is to formulate an optimising model for the renewable energy hybrid system involving anaerobic digestion of animal wastes (nutrient cycling), wind and solar energy harnessing for smallholder farmers and households in Chamwino-Dodoma. All major components of the system will be assessed by use of available research writings, models (like MATLAB, HOMER, CFD etc.) and other appropriate assessment tools as well as conducting relevant experiments. The results will be used for building an optimising model for the above mentioned system.

Expected result: The optimising model for renewable energy hybrid system as policy and technical tool for enhancing informed decision making at all levels of operation and management of renewable energy subsector and environment at large. Wide-spread adoption of system/technology to the energy and soil-nutrients needy



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smallholder farmers in pro-poor and some poorly grid-connected areas , may be boosted through application of the model.

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## 6. Laurent N. Kaburire

Institution Agricultural Research Institute (ARI) Hombolo

Supervisor(s) Prof. Mattee, A.Z. (SUA), Dr. Nombo, C. I. (SUA)

Partner (internal or external) ZALF

PhD focuses on assessing the "Role of Multistakeholder Platforms in the Promotion of Agricultural Innovations for the Food Value Chain in Tanzania". The study aims to assess how multistakeholders' engagement processes used to bring together various actors enhance to performance of MSPs to achieve the intended outcomes at both MSP and FVC levels. Specifically, the study aims to:

Description of PhD-Topic

1. Determine the modalities for the establishment of MSPs of specific FVCs
2. Identify key factors that influence the performance of MSPs in achieving their objectives along the FVCs
3. Analyse the effects of different stakeholders' engagement processes on the implementation of FVCs upgrading strategies and innovations
4. Determine the relationships between the performance of MSPs and the outcomes at the FVC level

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## 7. Paul S. Saidia

Institution Agriculture Research Institute (ARI) Ilonga

Supervisor(s) Prof. Rweyemamu, C.L (SUA), Prof. Semoka, JMR (SUA), Dr. Kimaro, A. (ICRAF)

Partner (internal or external) UHOH

Description of PhD-Topic

Applied Method: My PhD is focusing on "effects of nitrogen and phosphorus microdosing on maize-pigeonpea intercrops grown under different soil moisture management practices". Aim of the study is to improve crop productivity through intergrated soil fertility and moisture conservation to smallholder farmers. Expected result: Drought and declining soil fertility are becoming very challenging to small scale farmers, fertilizers are very expensive at recommended rates, hence:

1. microdose rates for nitrogen and phosphorus in maize crop will be



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- determined
2. Nitrogen and phosphorus microdose under maize and pigeonpea intercropping systems in different soil water conservation options in the field will be evaluated
  3. Residue effects of fertilizers will be assessed and amount of fertilizer to apply for next cropping season determined

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## 8. Lutengano Mwinuka

Institution Sokoine University of Agriculture (SUA), Morogoro, Tanzania

Supervisor(s) Dr. Khamaldin D. Mutabazi and Dr. Jeremia Makindara

Partner (internal or external) University of Hohenheim (UHOH), Agricultural Research Institutes (ARI)

Description of PhD-Topic Applied Method: Mwinuka will examine productivity and welfare effects of fertilizer micro-dosing (MD) for upgrading the Maize and Millet value chains in Morogoro and Dodoma, Tanzania. His study assumes that, feasible value chain upgrading strategies such as fertilizer MD are vital for creating a quick-win situation for farmers and other agents in the commodity market. A total of three hypotheses will be tested related to productivity, economic surplus and adoption rate for both sub-humid and semi-arid conditions.

Expected result: apart from other things and through an economic evaluation, his study will systematically prove or refute the claim that fertilizer micro-dosing may or may not be a profitable practice given labour intensity of localized application. Due to food systems diversity, success stories of the technology from case study sites would easily be disseminated to other regions within the country.

Contact mwinuka.lutengano@gmail.com

## 9. Emmanuel Amos Chilagane

Institution ARI Hombolo-Tanzania

Supervisor(s) Tentative Prof C.L Rweyemamu

Partner (internal or external) UHOH

Description of PhD-Topic Applied Method: PhD studies aim at determination of proper pearl millet - groundnuts cropping pattern with emphasis on nitrogen and phosphorus fertilizer dosage and water management practices in Dodoma. Three levels of cropping patterns (pearl millet -groundnut intercropping, sole pearl millet cropping and sole groundnuts cropping) will be tested under three levels of moisture management



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practices (infiltration pits, tied ridges and flat/famers practices) with three fertilizer dosage (recommended rate, microdose and zero rate fertilizer/ farmer practices). The essence of this study is to improve crop productivity through integrated soil fertility management and proper moisture conservation options for small scale farmers in Dodoma.

Expected result: The best performing pearl millet-groundnut cropping pattern for optimal yield will be evaluated

1. Fertilizer dosage for optimal yield for each cropping pattern will be determined
2. The best water management option for yield maximization for each cropping pattern will be evaluated.

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## 10. **Jana Schindler**

Institution ZALF, Humboldt Universität zu Berlin

Supervisor(s) Prof. Dr. Müller, Dr. Frieder Graef, Dr. Hannes König

Partner (internal or external) SUA

This dissertation aims at the analysis of the potentials of ex- ante Impact Assessment in order to develop Upgrading Strategies that are suitable and sustainable within the local context, having beneficial impacts on the local food security situation of smallholder farmers in Dodoma and Morogoro Region, Tanzania.

Description of PhD-Topic Procedural steps:

- Development of a normative decision making support method: a participatory impact assessment framework in order to select suitable and sustainable measures towards food security.
- Application of the method at 4 case study sites in rural Tanzania: 2 villages in Dodoma Region: Ilolo and Idifu and 2 villages at Morogoro Region: Changarawe and Ilakala.

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## 11. **Christoph Gornott**

Institution Potsdam Institute for Climate Impact Research (PIK)

Supervisor(s) Prof Dr Hermann Lotze-Campen (PIK, HU), Dr Fred Hattermann (PIK), Dr Frank Wechsung (PIK)

Description of Comparison of statistical and process-based yield models for agricultural crops at



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PhD-Topic regional level in Tanzania. Regional assessment of yield vulnerability and its influencing factors for different climatic, pedospheric, and economic production conditions.

Contact [www.pik-potsdam.de](http://www.pik-potsdam.de)

## 11. Jane Wambura

Institution ZALF, Humboldt Universität zu Berlin

Supervisor(s) Prof. Dr. Müller

Partner (internal or external) Europa-Universität Viadrina, Frankfurt (Oder)

Description of PhD-Topic The study strives to explore effective CPM-System strategies and implement them into the Trans-SEC food security project. The research will therefore explore the effective way to introduce and develop CPM-System, apply it and evaluate the effectiveness and efficiency when deployed in a multicultural team-environment.

Contact [jane.wambura@zalf.de](mailto:jane.wambura@zalf.de)

## 12. Claude Maeda

Institution Department of Economics, University of Dar es Salaam (UDSM), Tanzania

Supervisor(s) Drs John Mduma (UDSM), Khamaldin Mutabazi (SUA)

Partner (internal or external) Dr Stefan Sieber, Amjath Babu

Institutions ZALF (Müncheberg, Germany), IFPRI (Washington DC, US), D.I.E (Bonn, Germany)

Description of PhD-Topic Applied Method: The PhD study is set to find out efficiency potentials for commercializing and trading in the agri-food sector, connecting supply and demand centres. How increased agricultural production will not result in declined prices but increased income? How adoption, productivity and market development can go at par? What can be done to increase market size and access to small-scale producers? The study will outline how to shape policies and institutions such that they support commercialization pathways for Agricultural food systems.

Expected result: Smallholder agriculture commercialization levels, market integration (Status and levels) and correction mechanisms will be established. The study will review policies and prices for inputs and the agricultural commodity as it moves along the food value chain (FVC) across various places in the study areas (gendered trader survey).

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## 13. Simon Munder

Institution University of Hohenheim, Institute of agricultural engineering, tropics and



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subtropics group

Supervisor(s) Prof. Dr. Joachim Müller

Partner (internal or external) SUA / ZALF

Description of PhD-Topic

- Physical, chemical and mechanical properties of high oleic (HO) sunflower seeds
- Drying kinetics and sorptional behavior of HO sunflower seeds
- Airtight storage HO sunflower seeds
- Enzyme assisted aqueous extraction of oil and protein from HO sunflower seeds

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## 14. Nadja Reinhardt

Institution Universität Hohenheim, Dep. of Soil Science and Pedology

Supervisor(s) PD Dr. Ludger Herrmann

Partner (internal or external) Prof. Siza Tumbo (SUA, Morogoro, TZ)

Description of PhD-Topic Gamma ray spectrometry shall be validated and improved for soil mapping. It is used to create maps of the CSS in Dodoma region.

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## 15. Frank Joseph Wambura

Institution University of Potsdam

Supervisor(s) Prof. Gunnar Lischeid, Dr. Ottfried Dietrich

Partner (internal or external) ZALF, Institute of Landscape Hydrology

Description of PhD-Topic

Analysis of Land use change and Climate variability impacts on the hydrologic cycle in the Wami river basin This study is intended to make efficient use of now available extensive remote sensing data in assessing the relationship among the factors affecting the hydrologic cycle of the Wami River basin. In this case the time series of precipitation, temperature and remotely sensed land cover will be analysed against the remotely sensed evapotranspiration as a proxy of water balance changes in the basin. Then, the spatial-temporal patterns of remotely sensed evapotranspiration will be used to constrain a physically-based hydrological model, which in turn will be used to assess impacts of irrigation expansion and the introduction of infield rainwater harvesting agriculture (Trans-SEC upgrading strategies) under extreme climate condition scenarios on water availability in the Wami River basin.



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## 16. Katharina Löhr

Institution ZALF/HU Berlin

Supervisor(s) Prof. Dr. K Müller (HU Berlin)/ Prof. Dr. L Kirchhoff (EUV)

Partner (internal or external) Europa Universität Viadrina (EUV), ZALF

Description of PhD-Topic The Development of a Conflict Prevention and Management (CPM) System for an agricultural research project in Tanzania: the case of Trans-SEC: Innovating pro-poor strategies to safeguard Food Security using Technology and Knowledge Transfer in Tanzania

The research objective of this dissertation is to academically accompany the design and implementation process of a CPM-System within Trans-SEC. By establishing project members' needs, recommendations and feedback on conflict management measures, it is the overall aim to document research outcomes and CPM effects and to develop a blue-print model for conflict management in research which can be transferred to comparative research projects.

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## 17. Luitfred D. Kissoly

Institution Institute for Environmental Economics and World Trade (IUW), Leibniz Universität Hannover, Germany

Supervisor(s) Prof. Dr. Ulrike Grote

Partner (internal or external)

Description of PhD-Topic Applied Method: The focus of my PhD work will be on the interactions of rural household livelihoods, food security and welfare of smallholder farmers in Morogoro and Dodoma in rural Tanzania. Assessment of livelihoods' integration in small-scale agricultural value chains will be done. Aspects of rural finance, shocks, vulnerability to food insecurity and resilience will also be analyzed. Using primary household survey data, descriptive and econometric approaches will be used in the analysis.

Expected result: Better understanding of relevant forms of livelihoods integration to small-scale agricultural value chains, levels and extent of shocks and vulnerability to food insecurity and resilience of rural livelihoods.

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## 18. Kathleen Brüssow





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**Institution** Institute for Environmental Economics and World Trade (IUW), Leibniz Universität Hannover, Germany

**Supervisor(s)** Prof. Dr. Ulrike Grote, Dr. Anja Fasse

**Partner**  
(internal or external)

**Description of PhD-Topic** In Tanzania, small-scale farmers largely depend on natural resources for income and consumption. The natural resources utilized are either based on own properties (land, agroforestry, soil etc.) or public resources such as forests, community land, rivers, lakes. The focus of this PhD-thesis is to analyze the importance of natural resources such as non-timber forest products for small-scale farmers. Thereby, a closer look will be taken at the role of natural resources for food security (directly and indirectly), their regional and temporal differences in utilization, sustainability of utilization and their role as a safety net in the case of shocks occurring. The research will be based on primary household survey data. Methods applied are based on econometric and spatial models.

**Contact** bruessow@iuw.uni-hannover.de

## 19. **Jacob Kaingo**

**Institution** SUA

**Supervisor(s)** Prof Siza Tumbo and Prof Boniface P. Mbilinyi

**Partner**  
(internal or external) PD Dr Ludger Herrmann (Universität Hohenheim, Dep. of Soil Science and Pedology)

**Description of PhD-Topic** Applied Method: PhD research is focused on modelling of spatial variability of soil hydraulic properties within agricultural systems. The approach involves application of geostatistics, artificial intelligence and remote sensing methods. Expected result: Improved predictive capacity and utility of crop simulation models, through better scaling of soil hydraulic properties from plot, region to higher levels to provide spatially-explicit decision support in food crop production management at various scales.

**Contact** jacobkaingo@gmail.com

## 20. **Angela Schaffert**

**Institution** Inst. of Plant Production and Agroecology in the Tropics and Subtropics, University of Hohenheim

**Supervisor(s)** Prof. Dr. Folkard Asch, Dr. Jörn Germer

**Partner** Leon Mrosso, Elirehema Swa, Prof. Dr. Siza Tumbo, Prof. Dr. Henry Mahoo



# Trans-SEC

Innovating pro-poor Strategies to safeguard Food Security using Technology and Knowledge Transfer

(internal or external)

Institution ARI Makutupora, SUA

The PhD study aims to test the suitability of sorghum, pearl millet, sunflower, upland rice and maize in the research regions, Dodoma and Morogoro. A focus is to analyze the effect of two management practices, time based weeding and tied ridges on the soil water status and the performance of the crops.

Four consecutive trials are conducted at ARI Makutupora, Dodoma. In the dry season climatic scenarios are mimicked through drip irrigation and combined with drought events. In the rainy season rainfed conditions, life saving irrigation and full irrigation treatments are combined with weeding strategies and tied ridging.

This study is expected to facilitate a climate sensitive selection of crops in regions where unpredicted rainfall occurs, to explore the suitability of alternative crops and to validate current crop water models. Furthermore, the outcome is expected to facilitate an efficient planning of irrigation water, its amount and timing of application, used in addition to rainfall.

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In total, six (7) Tanzanian PhDs are co-supervised by German Trans-SEC partner institutions. To develop a sustainable research structure, Trans-SEC is closely linked to the German-Tanzanian research projects STARS and Scale-N ([www.scale-n.org/](http://www.scale-n.org/)).

Furthermore, Trans-SEC successfully achieved the acquisition of two additional research projects financially supported by the German Federal Office for Agriculture and Food (BLE) (PhD program of the Federal Ministry of Food and Agriculture (BMEL); “Bilateral Researchers Exchange”) which will be implemented together with Tanzanian PhD students.

## Lecture development including preliminary results of Trans-SEC by project coordinators (Dr. Sieber)

Where	Description/title	When	Who
Humboldt University	Environmental sociology, environmental policy in the context of food security <sup>①</sup>	2015-2016	Dr. Stefan Sieber
Alice Salomon University of Applied Science	ICM “Intercultural Conflict Management” <sup>②</sup>	2013-2014	Dr. Stefan Sieber
Humboldt University	INRM “Integrated Natural resource management” <sup>③</sup>	2012-2013	Dr. Stefan Sieber



① Objectives: The students will be expected to demonstrate gained knowledge on theory by seminar papers including presentations as well as active group work and role plays. In detail to become familiar with

- Basic aspects of human-nature interactions (including theoretical models of environmental sociology)
- The role of lifestyles and consumption patterns as drivers of natural resource use and as important domains of sustainable development
- Climate change as key example for global environmental change
- The role of cities both as drivers and as solution spaces for climate change
- Environmental Policy I: Theory of resource economics with regard to externalities, the aspects of historical development of the EU
- Environmental Policy II (food security): The major challenges of global food security and its drivers as well as the diversity of conflicts and thematic topics with examples from Sub-Saharan and Latin America projects.

② The lecture has the following objectives: The two conceptual approaches of the living laboratory, i.e. the habitual knowledge generation, and the application orientation are complemented with the action research approach. Module 4 “Social Research” and module 5 “Methods of Conflict Resolution and Community Intervention” form the application-oriented core of the Master program in that they provide for the reflection and implementation of the theoretic foundations laid in the first semester. These two modules are to enable students to introduce research methodologies to target groups such as affected persons, social actors, organizations, and institutions, neighbourhoods etc. while taking into account their respective expertise; as well as to conduct research and convert results of the research to actual actions.

③ The students learn about:

- the role of lifestyles and consumption patterns for natural resource use and concepts and approaches dealing with nature-society interactions,
- the framework of the Common Agricultural Policy (CAP) of the European Union (EU) in the light of agri-environmental policies and services,
- the historical development of the European Union (EU) and its decision-making processes the nature of current climate change adaptation projects in Europe, India, Africa and Latin America including how climate change can be deciphered as a complex socio-natural process,
- sensitizing the special responsibility of urban areas for climate policy, the view on sustainable development as a social transformation process and current modelling approaches for sustainability impact analysis in the frame of policy advice.



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## Conclusions, recommendations, messages

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Trans-SEC successfully achieved a vital exchange between Tanzanian and German (junior) researchers. The participation of over 30 Trans-SEC researchers at the Tropentag 2015 impressively underlined the scientific excellence of the project and the successful research exchange on equal levels. The writing workshop was additionally perceived as outstanding instrument for improving structure and writing style with regard to scientific publications as backbones for the PhD theses. Likewise, the research stay of African researchers at a German partner organisations widened scope of research and experience of involved African scientists.