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"National Research Strategy BioEconomy 2030"

Funding initiative
"Securing the Global Food Supply – GlobE"

Proposal title:

Innovating Strategies to safeguard Food Security using Technology and Knowledge Transfer: A people-centred Approach

Proposal acronym:

Trans-SEC

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1. Project topics and aims

1.1 Overall concept, objectives and impacts of Trans-SEC

Food security[1] is among the most pressing challenges to humankind. Fluctuating market situations, droughts as well as related diseases are increasing and enhancing the unpredictability and insecurity of regional food supply, especially in Africa (Foley et al. 2011; Ziervogel and Ericksen 2010). The current hunger crisis in the Sahel demonstrates the tremendous impact on the whole food system and the lack of effective strategies to secure the food supply (The Guardian 2011). The framework conditions are changing rapidly (Lotze-Campen et al. 2011; Müller 2011) and therefore there is an urgent and continuous need for a better integrated food system understanding and targeted linking of region-explicit innovations.

A number of recent international research and development projects have been focusing on increasing food security (World Bank 2012; CGIAR 2012). To achieve positive impacts and sustainable solutions, the projects increasingly focus on integrated in-depth analysis of the food system itself and its nexus elements. This encompasses a) natural and human resources, b) the use of production inputs, c) the safety and quality of food produced, d) the consumption patterns, and e) functioning of local and global markets (Foley et al. 2011). This analysis must include the specific cultural, political, social, ecological and economic environments. Only a broad participation by local stakeholders, considering site-specific conditions, can ensure success (Below et al. 2012; König et al. 2012; Reed et al. 2009). Food security is a function of food availability, food accessibility, food stability and food utilisation (FAO 2002; Ziervogel and Ericksen 2010). Different types of processes can impact food security at different spatial levels, for instance loss of soil fertility (local), urbanisation (regional, national), and global climate change (international).

The GlobE call aims at developing research networks for effectively improving African food security. The specific objective of our collaborative research project Trans-SEC “Innovating Strategies to safeguard Food Security using Technology and Knowledge Transfer: A people-centred Approach” is to improve the food situation for the most-vulnerable rural poor population in Tanzania. This project is designed to identify successful food securing upgrading strategies and/or innovations along local and regional food value chains (Gomez et al. 2011; Riisgaard et al. 2010), test and adjust them to site-specific, sustainable settings and tailor these concepts to be disseminated for regional and national outreach. After the project lifetime, the results can be implemented at different levels of policy, extension and research.

In Trans-SEC we apply the following steps in an iterative and partly recurrent procedure as illustrated in Figure 1 (see also section 1.5): (1) A stakeholder involvement process will be set up from the beginning as an integral part of most analytical steps; (2) case study sites within the focal regions Morogoro and Dodoma will be selected, set up and typologies of food value chains developed; (3) upgrading strategies (=success stories) of secure food production and/or good practice along the food value chains will be screened and inventoried; (4) an integrated in-depth analyses of food value chain components, their costs, benefits and impacts will be carried out; (5) a few of the most promising good practices with regard to positive impacts and implementation will be participatively discussed and identified for subsequent in-depth testing; (6) an in-depth participative field testing and/or analysis of selected, most promising technologies will be conducted for all food value chain components and requirements for implementation identified; (7) transferability and implementation

[1] Definitions are provided in the glossary (Annex I).

capability will be assessed for different scenarios and for future condition simulations (model analysis); (8) a meta-model analysis including risk analysis and final climate proofing will identify hot spots of most sensitive, fragile regions and the potentials for alleviating food insecurity. Hence, the Trans-SEC main focus will be on local and regional food security, but the research design implies a national outreach for Tanzania as a whole.

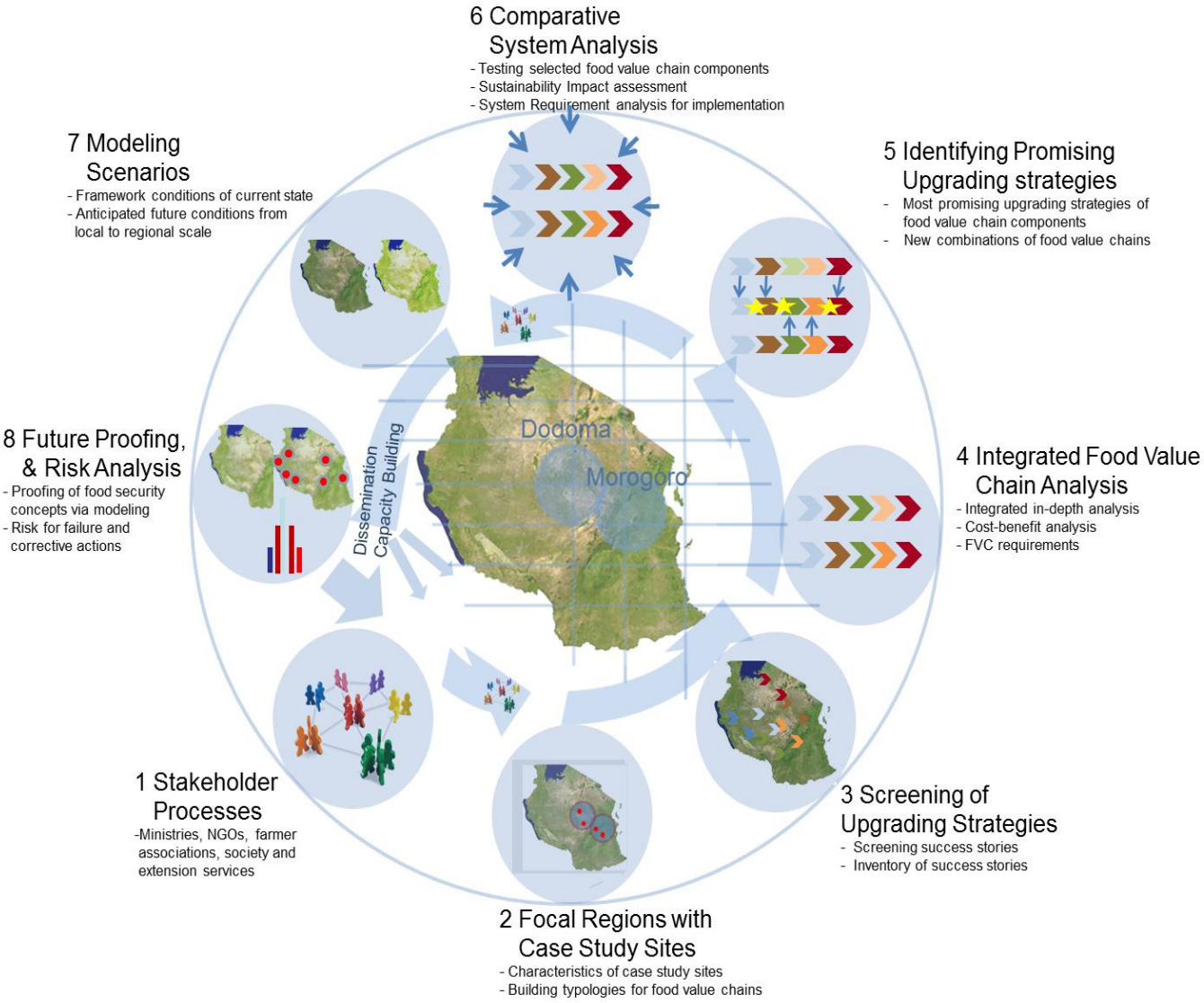

Figure 1: Relevant analytical steps of Trans-SEC

The research activities will be embedded into local and regional strategies to assess potential impacts and trade-offs and to be able to up-scale lessons learnt in a generic manner to regions with specific bio-physical, socio-cultural and economic conditions.

A success story – the Trans-SEC impacts on Tanzanian food production in 2018

People in Tanzania are significantly more food-secure and farmers are well prepared to cope with future environmental changes, even though these still remain uncertain. Linking upgrading strategies along food value chains brings added value for the involved stakeholders. Food production systems are prepared to supply sufficient food and income to feed a growing population with growing per-capita demands. Capacity building on exemplary good practices stabilizes livelihoods for stakeholders (farmers, pastoralists, processors, traders, scientists, policy makers and public administration) of the food value chain. A multidisciplinary, continuing German-Tanzanian food security research, development and implementation network (GA-RDInet) is established through bilateral agreements, unifying organisations, academic societies and public authorities. A broad, self-motivated stakeholder process was set up and is carried by bilateral contracts with a clear long-term perspective as well as by a joint office in Dodoma being partly funded by an international foundation.

Practical methods for transdisciplinary in-depth analyses of Tanzanian food systems have been assembled and applied in Tanzanian food production systems. The methods help identify and narrow down the technological and institutional productivity gaps (potential vs. actual) and determine upgrading strategies of food value chain components at different scales. This provides new options to smallholders and organisations such as NGOs and extension services.

Implementation feasibility of successful upgrading strategies is being tested under site-specific conditions with local stakeholders in the Morogoro and Dodoma regions. For most Tanzanian regions the GA-RDInet provides and disseminates ex-ante impact assessments of promising food securing technologies, supporting smallholder communities.

The GA-RDInet continuously produces outreach within Tanzania by collaborating with educational and scientific associations as well as public research organizations in the respective disciplines (agronomy, socio-economy, agro-technology, food-processing, and governance). The network successfully established bi-annual mutual exchange-visits of smallholders (farmers, pastoralists, consultants, small food-processors) in Tanzania and experienced numerous capacity-building workshops conducted by involved NGOs, academic institutions (exchange programme of young African scientists) and farmers associations.

1.2 State of the art: Food security research and development in Tanzania and/or Africa

The most significant global drivers affecting farming systems are climate change (Müller et al. 2011; Strengers et al. 2010), the global energy demand (Von Braun 2007a), population growth, changing trade patterns and economic systems through trade liberalisation and globalisation (Von Braun 2007b; Lotze-Campen et al. 2010), as well as the state of health of the population (10-20% AIDS rate in East Africa). Cause-effect-chains, in which food security is involved (droughts-diseases-health-human capital), are also drivers over large regions (Ziervogel and Ericksen 2010). Most of these drivers lead to a productivity decline of food crop land available per human. They also often result in a degraded natural resource base and declining soil fertility (Graef et al. 2000).

Food supply systems of Tanzania are increasingly connected to other biomass production systems such as feed, biofuel and construction wood (Mnenwa and Maliti 2010). These Tanzanian production systems are based on complex and multiple interactions and interrelations among a wide range of different biotic and abiotic resources as well as socio-economic and cultural parameters (USAID

2008). Measures to stabilize and develop the food supply are particularly important in Tanzanian regions where the food situation is already insecure, such as in Eastern Tanzania (Mnenwa and Maliti 2010). Simulations on long- and medium-term global food and energy demands indicate that sub-Saharan regions are disproportionately affected (Haberl et al. 2011; Müller et al. 2011). Food and non-food biomass production systems provide local communities of Tanzania with food and energy, also generating income and education. If Tanzanian food and biomass production systems work sustainably, they bring benefit (Below et al. 2012; United Nations 2007). However, if the food and energy value chains are developed improperly, the effects may include increased food prices and reduced supply (Foley et al. 2011), displacement of vulnerable people from productive land, and various negative environmental impacts (Thornton et al. 2006).
Hence, developing pathways for securing food and biomass value chains in Tanzania provide potential intervention points (Gomez et al. 2011). Income alternatives to stabilize livelihoods, either through market access or using potentialities to increase the quality of life, should be considered under the precondition that food security will not be negatively affected. These development pathways comprise (1) raising agricultural productivity and sustainability of natural biotic and abiotic resources (Foley et al. 2011; Graef et al. 2002; Herrmann and Panomtaranichagul 2007), (2) enhancing integrated food and biomass supply systems (BioÖkonomierat 2011), (3) enhanced processing of food and end products (Leuenberger & Wohlgemuth 2006), and (4) economic and institutional mechanisms such as investment incentives, insurances, trade securities and policies (Arieff 2009; Godfray et al. 2010, Ziervogel and Ericksen 2010). Another development pathway is (5) creating off-farm employment opportunities, thus reducing population pressure on the land; this approach implies developing rural activities around agriculture, investing in rural infrastructure and strengthening rural institutions (Hounkonnou et al. 2012). Finally, migration (6) is another pathway and an option for some regions; it is similarly directed at reducing pressure on land. Migration, however, often is a limited option because the absorptive capacity of other areas may be rapidly exhausted.

To cope with the changing conditions in Tanzania, profound knowledge of the local and regional environmental and socio-economic systems is required for decision making, for instance, on long-term conservation of natural resources (König et al. 2012), on adequate technologies and strategies to ensure food security (Graef and Haigis 2001; Waha et al. 2011; Ziervogel and Ericksen 2010), and on how to maximize profit by producing feedstock for external markets (USAID 2008).

Trade-off food system analysis of the limited resources and human factors testing region-explicit system approaches are therefore one requirement for mid- and long-term improvement of the livelihoods of food-insecure Tanzanians. Here, a vital element is the participatory involvement of existing local knowledge on good practices in a people-centred approach with both local population and institutions (König et al. 2012; Reidsma et al. 2011; Ziervogel and Ericksen 2010). At the same time, it needs to be combined with the major national Tanzanian politic programmes on food security – the *Agricultural Sector Development Strategy (ASDS),* the *Agricultural Sector Development Programme (ASDP),* the overall *National Strategy for Growth and Reduction of Poverty (NSGRP*) – and with international African political and/or development programmes such as the *New Partnership for Africa's Development (NEPAD)*. Hence, new approaches and solutions in conducting research are required along with innovative collaboration with administration, institutions, stakeholders and other carriers of knowledge (Hounkonnou et al. 2012; Tanzanian Ministry of Agriculture, Food and Cooperatives). A crucial element is a comprehensive, multidimensional view involving different research sectors (Gomez et al. 2011; Graef et al. 2000).

1.3 Relevance to the bio-economy strategy and to the topics of the call

Relevance to the bio-economy strategy

The Federal Ministry for Education and Research (BMBF) is pursuing research and innovation to facilitate a transition from an oil-based to a bio-based industry. At the same time it aims at taking on international responsibility for global nutrition, the supply of commodities and energy from biomass, as well as for climate and environmental protection (BMBF 2011). The BMBF research strategy includes five priorities to promote a bio-based economy: global food security, sustainable agricultural production, healthy and safe food, industrial use of renewable resources and biomass-based energy sources. As these priorities may compete, interdisciplinary, holistic and integrated approaches are needed to achieve negotiated sustainable solutions. This is particularly relevant in regions of Tanzania in which the food situation is already unstable (Annex VI). The bio-economy strategy specifically supports the development of sustainable agriculture in African countries to secure a stable food supply for the local population.

→ Expected progress: Within this framework the Trans-SEC project addresses the priorities of the national research strategy "Bio-Economy 2030" (Table 1), but emphasises topics in accordance to the scope of the proposed project. This is reflected in the selected expertise of the consortium. In general, we aim at a holistic system approach with a broad and thematically diverse network. We target all five priorities of the BMBF research strategy; by installing and coordinating a German-Tanzanian R&D&I network the proposed project will also contribute to the objectives of the German Federal Government's internationalization strategy (BMBF 2008).

Table 1: Priority Topics of Bio-Economy Council and topics of Trans-SEC

Priority Topics of the research program "Bio-Economy 2030"	Relevance*	Topic of Trans-SEC	Partners
Efficient value chains E 1-2	II	X	ZALF, SUA, UHOH, IUW, all
Plant and animal breeding E 1-3	I	-	-
Multiple uses and processes E 1-5	II	-	-
High value products E 1-8	II	-	-
Consumer aspects E 1-12	II	X	UHOH, SUA, ARI, all
Innovative technologies E 1-14	II	X	All partners
Production system analysis E 2-1	II	X	UHOH, ZALF, DITSL, SUA, ICRAF, HU
High efficient and tolerant plants E 2-4	II	X	UHOH, ICRAF, ZALF
Optimisation of ingredients E 2-5	II	X	UHOH
Animal selection E 2-6	II	-	-
Animal health E 2-7	II	-	-
High-efficiency organisms E 2-8	II	-	-
Reducing post-harvest losses E 2-9	I	X	SUA, ZALF, UHOH
Sustainable soil quality E 3-1	I	X	UHOH, SUA, ARI
Water efficiency E 3-2	II	X	ZALF, SUA, UHOH
Nutrient recycling E 3-3	II	X	UHOH, SUA, ICRAF
Climate adaptation E 3-5	II	X	PIK, all
Genotype-environment interaction E 3-7	II	-	-
Bioenergy utilisation E 3-8	I	X	SUA, UHOH, ZALF
Networking E 4 -1	II	X	All partners
Communication measures E 4 -2	II	X	ZALF, ARI, MVIWATA, TFC, ACT, DITSL

*I = extremely relevant, II = highly relevant

Relation to the topics addressed by the call

The GlobE funding is based on the conviction that new knowledge embedded in a bottom-up designed network of scientists, stakeholders and policy makers will effectively contribute to improving the African food systems (Riisgaard et al. 2010). Knowledge, however, always is limited to specific target regions, each requiring specific research and development strategies. Therefore, innovative, regionally adapted research approaches and solutions must be region- and site-specific to enable their future implementation by local stakeholders. They must also combine national and local research and development competences to be further developed. The GlobE call pursues the following four central aims, a) participatory design of a German-Tanzanian R&D&I network which focuses on the food system; b) identifying and solving central problems related to the overarching food system in Africa, involving researchers and institutions of the target region through collaborative research projects; c) developing regionally adapted research solutions based on a solid situation analysis of the target region in question; and d) supporting and further developing research capacities in Germany and in the African partner institutions.

Table 2: Food system boundaries of Trans-SEC

Topic	Addressed issues of the call			Additional issues
	High emphasis	Considered with medium emphasis	Considered, but lower emphasis	
Natural resources	soil, water	material flows and nutrient cycles		
Production	food production, food quality	human nutrition	health	markets
Value chain	post-harvest processing	reduction of food value chain losses		waste management, food consumption
Region and gender	site- and region-specific solutions	gender-specific structures		participation, societal differences, policies, institutions
Plants			plants / plant breeding	
Biomass/energy		biomass / bioenergy		waste management
Livestock		animals in food system		waste management

A wide range of factors influencing the food system must first be analysed before solutions can be found. Moreover, the food system boundaries and their related components must be well defined in advance. The boundaries of the food system targeted by the Trans-SEC project are illustrated in Table 2. The food system depends on a) productivity as determined by the use of resources (soil, water, nutrients, energy, labour), b) the use of production inputs (technical devices, fertilizers, animal feed, seeds and plants, pest control), c) the safety and quality of food, d) the consumption and dietary patterns, e) site-adapted cropping and harvesting, f) animal husbandry, g) agro-forestry integration, h) food storage methods, and i) market access and prices. As food systems are embedded in specific cultural, political, social, ecological and economic environments, site- and region-specific solutions will be targeted.

Trans-SEC addresses the interrelating factors of the entire food system in Tanzania, thus entirely targeting the topics of the call. A number of additional research priorities of the strategy “Bio-Economy 2030” (Table 1), however, have been also integrated.

1.4 Scientific and technical aims and products

Trans-SEC over a period of five years pursues five central objectives to effectively enhance the Tanzanian food security situation. They correspond to specific project outcomes: 1) establishment of a sustainable multidisciplinary German-African R&D&I network; 2) in-depth analysis of the present Tanzanian food systems, their failures and advantages; 3) identification of successful innovations and/or upgrading strategies along the food value chain for increasing food security; 4) testing the implementation feasibility of upgrading strategies among food value chain components under site-specific conditions through action research; 5) determining the explanatory power and transferability of the Trans-SEC results to other areas in Tanzania;

1. Building a German-Tanzanian R&D&I network: A central aim of Trans-SEC is to gain and/or make available new knowledge on upgrading strategies to improve prevailing Tanzanian food systems. This is done in an innovative system approach together with African partner institutions from science, engineering, governance and education, and it follows a participatory design from the very beginning of the project. A central aim is the development of a German-Tanzanian network for research, development and implementation (GA-RDInet) focussing on food supply systems and related sectors. The infrastructure required to sustain this research network will be established. To enliven the exchange of knowledge, communication structures will be established involving the relevant stakeholders such as scientists, farmers, traders, policy makers, and other food value chain actors. The issue of possible institutional constraints to establishing activities in this network will be an additional research action. The research capacities both in Germany and in the two Tanzanian target regions will be further developed and, within the project, new partnerships will be established to develop a high-quality and sustainable agricultural research landscape in Tanzania. Besides the exchange of scientists between Germany and Tanzania, workshops will be held with stakeholders from both regions visiting the other region and discussing solutions from their experience and perspectives.
→ Product: A sustainable multidisciplinary German-Tanzanian R&D&I network that is maintained beyond project lifetime.

2. Overall in-depth food system analysis: A basic aim is to analyse the present Tanzanian food systems at different scales along major value chains. This will be done with baseline surveys and meta-analyses using existing statistical and geographical data. A hot-spot analysis of the most vulnerable regional food-systems will be conducted using models combining the knowledge of regional experts (models: SWIM[2]; LPJmL[3] (PIK), IMPACT[4] (IFPRI)). This will help identify the factors adversely affecting food security in the Tanzanian target regions and the selected case study sites. This joint analysis, requiring the full spectrum of the aforementioned GA-RDInet, will take into account regional and national research, development and politic strategies, and will provide toolboxes for regional and national research institutions and administration. This is designed to ensure continued analysis and evaluation in the future.
→ Products: (i) Agronomic and food security risk atlas at multiple spatial and temporal scales and various disciplines based on holistic situation analyses for efficient decision-making [Food Security

[2] SWIM – Soil and Water integrated model http://www.pik-potsdam.de/research/climate-impacts-and-vulnerabilities/models/swim/swim-description
[3] LPJmL - Lund-Potsdam-Jena managed Land Dynamic Global Vegetation and Water Balance Model http://www.pik-potsdam.de/research/climate-impacts-and-vulnerabilities/models/lpjml
[4] IMPACT Model - Global Trends in Food Supply and Demand; http://www.ifpri.org/book-751/ourwork/program/impact-model

Information System]; (ii) toolbox for assessing potentials to enhance the regional food security [Analysis Toolbox].

3. Identification of upgrading strategies: The basic spatial design encompasses two Tanzanian target regions each with two different case study sites (Figure 2a, 2b). They are considered representative for most agronomic environments of Tanzania, thus enabling the evaluation, up-scaling and transferability of promising upgrading strategies (= success stories, good practice) to other Tanzanian regions in a system approach and helping assess their implementation potential. Analysis of ex-ante impacts and factors limiting the overall food system will play a major role for implementation success. Trans-SEC will focus on changes in food production and on testing promising upgrading strategies by integrating existing traditional knowledge on good practices (e.g. agro-forestry integration; low-input soil and water conservation in subsistence farming).
→ Product: Participatory multi-scale synthesis framework to identify and prioritize upgrading strategies [Innovation Framework for Food Systems IFS]

4. Testing the food value chain system approach: A meta-analysis will be carried out on the Trans-SEC research approach with regard to feasibility, plausibility and reliability of results. This will involve testing the generic nature of food securing upgrading strategies identified and specific Trans-SEC products developed and tackle questions of up-scaling and dissemination to demonstrate the implementation capability. This will be done in a demand-driven participative approach including self-evaluation of stakeholders. A major aim is the real applicability of the upgrading strategies and/or innovations among the food value chain (FVC) components. Each food value chain analysed will be synthesised to an integrated food system approach that comprises information on drivers and factors influencing food security and uses existing or new upgrading strategies. These will be tested for feasibility using action research, applying them in practice and their impacts assessed. Results will be disseminated among stakeholders and involved ministries and other institutions for implementation beyond project lifetime (e.g. via farmer schools).
→ Product: Report on feasibility and impact assessment of upgrading strategies [Feasibility Analysis]

5. Assessing explanatory power and transferability: Upgrading strategies identified and/or adopted by involved actors must be adapted to local site conditions and the socio-cultural setting. This calls for a system analysis on existing upgrading strategies and a requirement analysis of adoption pathways. This stakeholder-driven approach follows principles of action research using impact assessments on FVC components identified by the stakeholders in the target regions. Local and regional institutions in science and administration with detailed insight into the food systems as well as governing bodies from the ministry level down to smallholders will be involved to ensure an efficient up-scaling and dissemination of findings on successful upgrading strategies and/or innovations (smallholders, SUA, ARI, TFC, ACT, MVIWATA, ministries).
→ Product: Decision-Support-System (DSS) for good practice transfer and dissemination [Transfer and Dissemination DSS]

1.5 Trans-SEC research design and analytical framework

1.5.1 Target regions and case study sites

The Trans-SEC project will work for five years in two target regions of Tanzania, Morogoro and Dodoma. For both regions a great amount of baseline data and knowledge is available (Annex VI). The regions will first undergo an in-depth analysis of the environmental and socio-economic conditions surrounding national food systems for identifying food securing upgrading strategies (=success stories, good practices) (Riisgaard et al. 2010). The food systems in the predominantly semi-humid (600-800 mm) Morogoro region with flat plains, highlands and dry alluvial valleys are more diverse and primarily based on maize, sorghum, legumes, rice and horticulture, partly with livestock. In the semi-arid (350-500 mm) Dodoma region with flat plains and only small hills, the food system is primarily based on sorghum and millet with a deep attachment to livestock (Mnenwa and Maliti 2010). The Dodoma region is particularly sensitive to food insecurity, while Morogoro has both food-insecure and food-secure areas. Hence, both regions together represent the majority of farming systems in Tanzania (USAID 2008). The spatial design applied in this project "two Tanzanian regions, each with two case study sites" will support upscaling and downscaling of findings and scenarios across scales. In order to achieve the principle GlobE aim of finding site-specific food securing solutions within both target research regions, two case study sites (CSS) will be established each (Figure 2a, 2b).

1.5.2 Scoping study for determining target regions and case study sites

An extensive scoping study was carried out by Tanzanian scientists to determine the four CSS among the target regions. The total study is provided in Annex VI. The main criterion for distinguishing the two regions Dodoma and Morogoro was the clearly differing semi-arid and semi-humid climate conditions. Within the regions the two CSS were selected for having a) similar climates; b) differing market access; c) rainfed crop–livestock systems; d) village sizes with 800-1500 households. If possible, villages were chosen were MVIWATA (smallholder farmer association) is active and were no other large projects intervene. Other criteria included the number of stunted children below 5 years as an indicator for food insecurity, available logistics, infrastructure and facilities, differing wards, soil types, and population density.
Both regions are relatively under-populated with the population density less than 50 persons per km². According to URT (2006) Dodoma is characterized with higher level of outmigration compared to Morogoro. Inter-regional migrations tend towards the agro-ecologically high potential areas. Dodoma (80%) is leading in terms of the percentages of stunted children under 5 years compared to other regions. This stunting level combines both moderate and severely stunting. The level of child stunting in Morogoro is marginally above the national average of around 60%.
Within the Morogoro region the Kilosa district was selected and in the Dodoma region the Chamwino district was selected because of its easy accessibility and other criteria. For both districts a detailed socio-economic agricultural profile is available (Annex VI). Within the districts the selection of the CSS was done systematically following the criteria mentioned above and involving district key officials. Administratively, below the district are divisions, wards are constituents of divisions, and villages fall within wards.

In Kilosa, the Mazanze and Ulaya divisions were selected. Under Masanze division Masanze ward was selected and from Ulaya division Ulaya ward was selected. In Masanze ward, Changarawe village was selected and in Ulaya ward Ilakala village was chosen (Figure 2a, 2b). Changarawe has

relatively good market access and is relatively better off in terms of food availability while Changarawe has relatively poor market access and has growing food security problems. Not much variation exists in terms of rainfall. The main subsistence crops are maize, rice, cassava, sorghum and banana, while the main cash crops are cotton, coconut, cashew, sisal, sugar cane, and vegetables.

In Chamwino, the Mvumi division was chosen with its Muungano and Idifu wards. Under Muungano ward Ilolo village was selected and under Idifu ward Idifu village was selected. Ilolo is relatively better positioned in terms of market access compared to Idifu. Chamwino district produces sorghum, maize, and cassava. Other crops grown include grapes, sunflower, sesame (simsim), groundnuts, bulrush millet and paddy. Livestock keeping is ranked very high. All four villages were visited and coordinates taken.

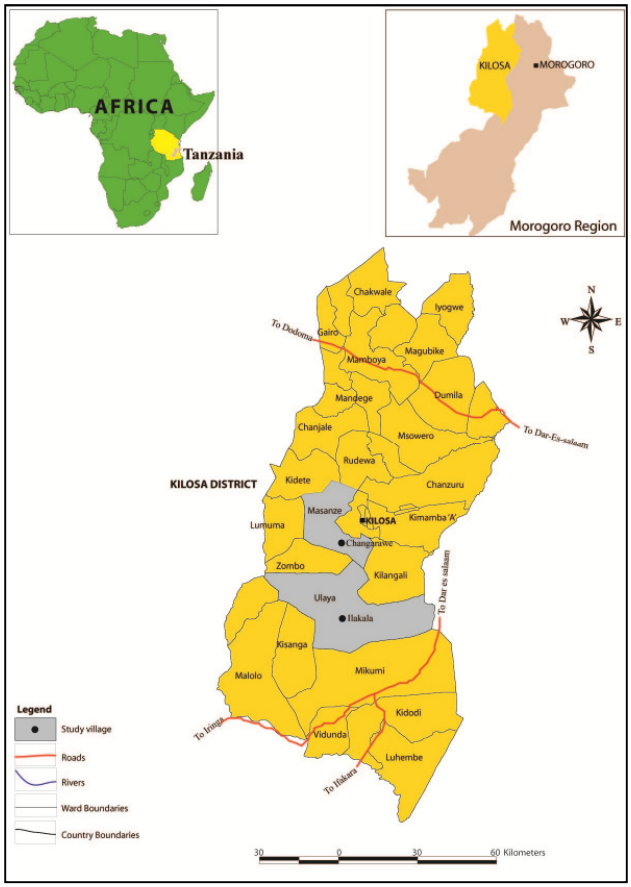

Figure 2a: Maps of CSS in Kilosa District

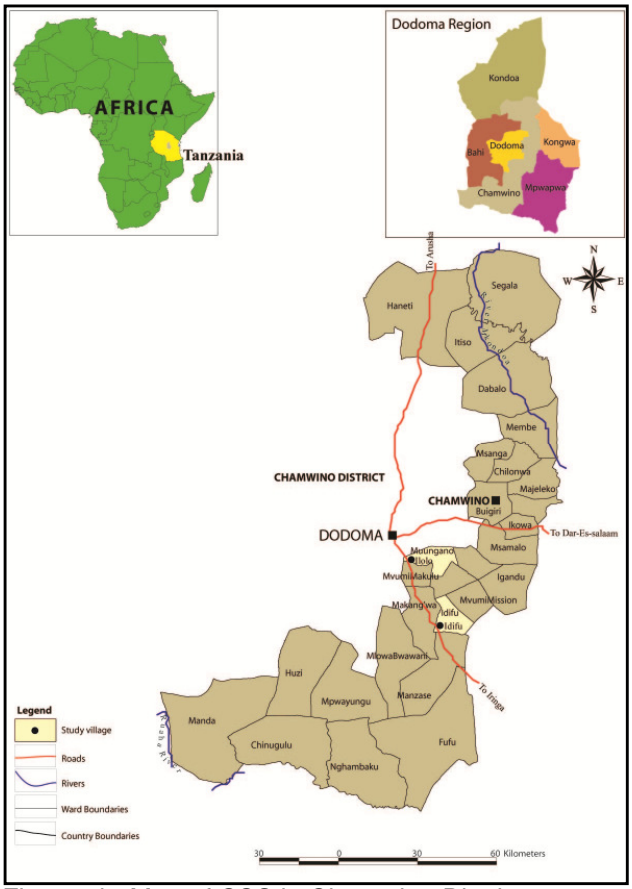

Figure 2b: Map of CSS in Chamwino District

1.5.3 Food value chain analytical framework

The Trans-SEC food value chain analytical framework will be a stepwise process, partly with recurrent activities (Figure 3). Each case study site (CSS) consists of at least one local market place and the surrounding 2-3 villages and has partly access to markets for cash crops. As described in the previous chapter the two CSSs within the target regions are selected to differ with regard to climate and market access. Other minor important factors that may differ are population density, land availability, soil types, infrastructure, facilities, and capital access. This creates a design with sufficiently comparable and at the same time diverse environmental and socio-economic conditions for investigating food securing upgrading strategies (=good practices, success stories) along food

value chains (FVC). It will also enable testing their transfer to a large range of other Tanzanian regions with comparable environments for maximum outreach.
For each CSS an inventory (data base) of the present state will be established for each of the five main FVC components (natural resources, food production, processing, markets, consumption), providing most of the variability of FVCs.
→ Promising food securing upgrading strategies will be screened and identified among each FVC component in the target regions, the CSS, and beyond.
In a participative process involving most Trans-SEC partners and the CSS stakeholders, only one promising food securing upgrading strategy per FVC component will be identified according to expected impact on food security as defined by Trans-SEC partners and stakeholders and identified through requirement analyses. This procedure, driven by iterative focus groups and alternative methods (e.g. Delphi method, workshops, etc.) as indicated in Figure 3, takes place in and across all four CSSs, leading to a maximum possible and manageable number of five most promising upgrading strategies per CSS.

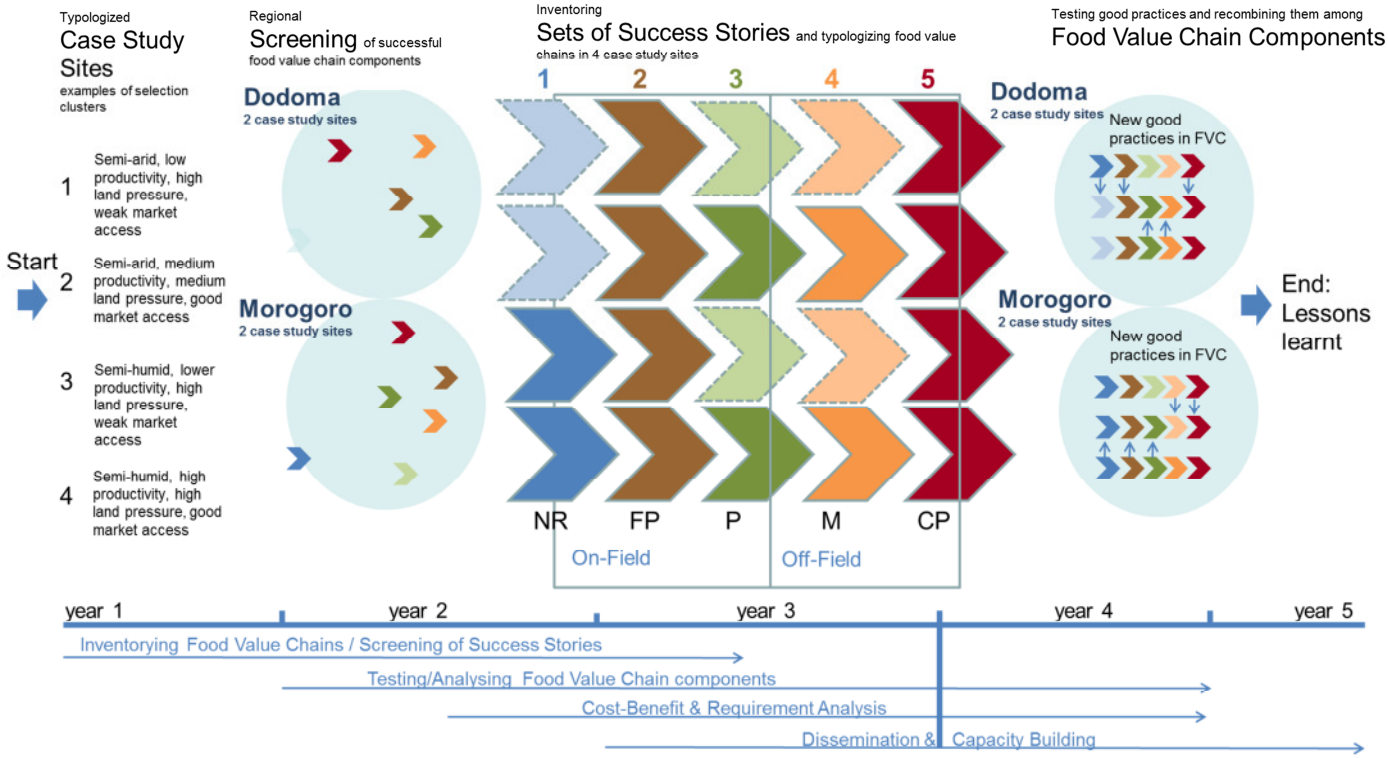

Figure 3: Food value chain analytical framework and chronology (NR – natural resources, FP – food production, P – processing, M – markets and institutions, CP – consumption; more description given in text)

→ In the next step these promising upgrading strategies are subject to theoretical in-depth analysis
= Level I analysis: In-depth participative analysis and ex-ante impact assessment (without trials) based on existing data, stakeholder and scientists' experience and other expert knowledge
→ A core of only 2-3 most promising upgrading strategies will be selected for each case study site to be practically tested and/or analysed in more depth during three growing seasons
= Level II testing/analysis: The selected core 2-3 promising food securing upgrading strategies will be participatively tested with field trials in CSS (natural resources, food production, processing) or in-depth analysed on CSS- and market level (processing, markets, consumption). Impacts on food security and interrelations with other FVC components will be investigated).

→ Care will be taken that for each FVC component at least two level II testing/analyses are done throughout both target regions.
→ Options will be investigated for enhancing, adapting and/or recombining level I and II food securing upgrading strategies among single and between FVC components across the CSS. The findings from level I and II analyses will be continuously discussed and assessed by involved partners and stakeholders. Storylines on promising upgrading strategies and possible new combinations of FVC components will be prepared for dissemination.
→ Models simulating different environmental and socio-economic conditions will provide inputs for ex-ante impact assessments of upgrading strategies for most likely future scenarios.
→ Most successful upgrading strategies among FVC components will be disseminated via the German-Tanzanian R&D&I network and via stakeholder organizations through capacity building workshops at policy, extension and farmer school levels.

1.5.4 Upgrading strategies and selection criteria

The Trans-SEC partners created preliminary selection criteria for and examples of upgrading strategies (= success stories, good practice) in Tanzania that may be tested and/or analysed within this project. Both upgrading strategies and their selection criteria will be further completed and refined together with the full range of involved stakeholders at the project start.
Overall criteria for upgrading strategies include a) the expected positive impact on food and livelihood security and b) knowledge and data availability of previous implementations. Other more specific criteria are c) feasibility of analyses/testing in the project life time, d) rapid response to inputs, e) wide applicability and scale-up potential, f) compatibility with other interventions, g) long-term (> 5 years) success, h) good cost/benefits ratio, i) success in focus region proved, j) environmental sustainability, k) long-term resilience to climate change, l) social and cultural acceptability, and m) focus on not increasing social differences or conflicts.
The following preliminary list of potential upgrading strategies within the Trans-SEC project were screened by all partners and assigned among the five FVC components (Figure 3), but without discussing the selection criteria in more depth:
1) Natural resources: water harvesting (for semi-arid Dodoma); ripping and other minimum tillage techniques; agroforestry (erosion control and nutrient cycling) ; ridging; nutrient mining from waste; biochar utilisation; drip irrigation.
2) Food production: mineral or organic fertiliser input; intercropping; improved animal feed; cover crops; improved crop varieties; pest and disease control; new crop types; new livestock breeds.
3) Processing: Improved solar drying of foods and vegetables; conservation technics; fortification; oil extraction; cassava drying.
4) Markets and institutions: Savings and credit cooperative societies (SACCOS); warehouse receipt systems (storage, speculation); certification; horizontal and vertical coordination; outgrower schemes; contract farming; communication techniques; rural energy.
5) Consumption: Diet diversification; nutrition awareness training (showcases for meal recipes); adapting new food habits; school feeding.
Other upgrading strategies cross-cutting all FVC components are better education, capacity building and credit systems.

2. Work packages and tasks

Trans-SEC comprises eight work packages (WP), which reflect the requirements of the tasks and products of the project and demonstrate at the same time the logic of the project design (Figure 3). Trans-SEC has the following unique characteristics:

- An *integrated holistic food value chain approach* involving the different sectors.
- Use of *existing local and regional knowledge* on site conditions, for instance on resource conservation, food production, processing and markets/society ("not to re-invent the wheel").
- The level of *participation* is extraordinarily high, since *all* relevant key stakeholders along the food value chains are involved. ("South-South and North-South learning is critical for success").
- Trans-SEC applies *action research*, which allows for subsequent effective implementation. ("testing implementation capability is the key for success in practice").
- We ensure *future implementation by integrating impact assessments* and political, cultural, societal, environmental, economic risk factors in markets and food value chains; in particular, reasons for success and lessons learnt from failure ("Liebig`s law of minimum constraints").
- Three world-wide *well-known models* (PIK: SWIM, LPJmL; IFPRI: IMPACT) will be used to analyse Tanzanian hot spots for present and potential food insecurity.
- *Dissemination strategies* and *up-scaling practices* cover large parts of Tanzania and guarantee high spatial impact ("Use efficiency potentials for maximum outreach").

Figure 4 summarizes the logic of the WPs. WP1 coordinates the project and establishes the overall analytical framework. WP2 and 3 represent two cross-cutting pillars of Trans-SEC, involving and overlapping all other WPs. In WP4 to 7 the different food value chain components will be analysed. WP8 synthesises all result components from other WPs and focuses on dissemination.

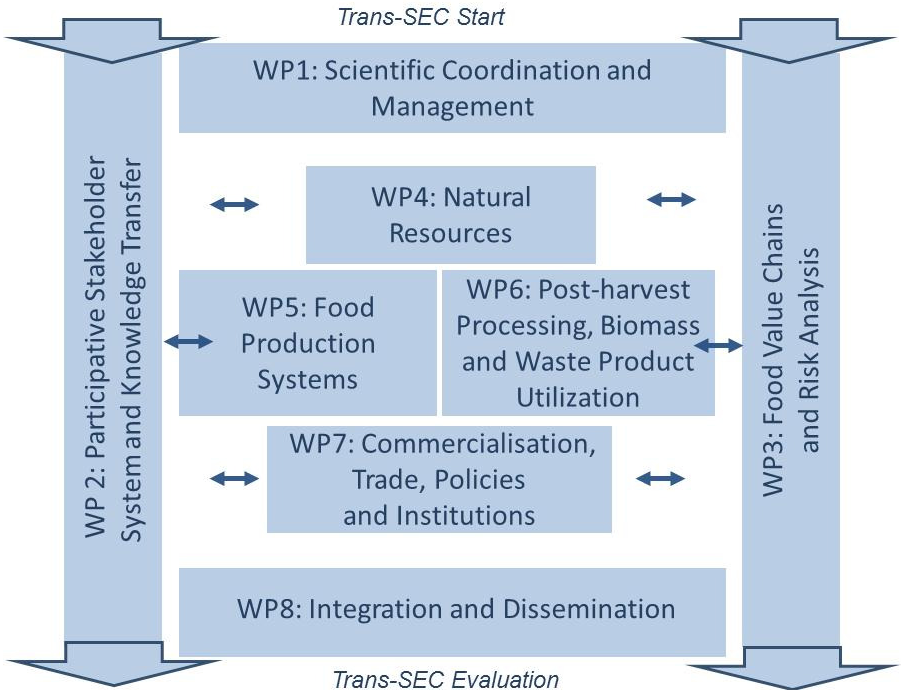

Figure 4: Work packages of Trans-SEC, information flow

Work package 1	Scientific Coordination and Management							
Participant number	**1**	2	3	4	5	6	7	8
Participant short name	**ZALF**	UHOH	IUW	HU	DIE	PIK	DITSL	IFPRI
Person-months per participant	89,3	11,7	4,8	1,5	3,5	0,9	2,2	0,6

Participant number	9	10	11	12	13	14			
Participant short name	ICRAF	SUA	ARI	TFC	ACT	MVIWATA			
Person-months per participant	7,4	81,8	8,5	1,8	1,8	10,2			

Objectives

The WP1 aims to (1) establish and maintain a sustainable GA-RDInet within the entire Tanzanian research landscape[5], (2) efficiently manage the large consortium and perpetuate communication flows, (3) generate an intrinsic work atmosphere, (4) accomplish operational feasibility in the event of unforeseen problems by conflict management among the diverse cultural and/or societal mentalities, (5) ensure output-oriented research findings using a combination of central and subordinate organisation development, (6) apply new management, coordination and supervision/mediation tools to ensure success, (7) apply means for dissemination and marketing. (Deutsche Welle TV, film documentary, video interview clips) beyond traditional ones.

The management and coordination system around the GA-RDInet will develop an analytical framework that allows structuring all work packages into a consistent frame to streamline existing assumptions (e.g. IPCC scenario A1, B2 scenarios) and conditions of food value chains. Key indicators and definitions will be made compatible across work packages, and input-output relations between the work packages will be defined as an analytical guide for Trans-SEC partners. The analytical framework enables building work flow and processing analysis for correct timing of deliverables. This guide for the Trans-SEC consortium will be made transparent on the Trans-SEC website in a knowledge centre. The risk control measures and supervision / mediation task will be synchronized with the resulting work flow analysis; critical pathways will be identified and online surveys reducing delays carried out. To achieve these aims, WP1 will include the following activities:

- establish a well-balanced GA-RDInet between involved institutions with a long, trusty partnership.
- define and guide all scientific processes by applying an *analytical framework* to harmonize the partners' contributions towards one analytical approach for all in- and outputs (Figure 3).
- ensure an excellent scientific coordination targeted to milestone achievements and to safeguard timely delivery of results and/or products and to develop long-term strategic goals including (top-up) funding.
- build cooperation with other existing research networks to use synergies of capacities and funding activities and ensure the sustainable maintenance of the Trans-SEC network beyond project lifetime.

[5] A comprehensive formal Memorandum of Understanding (MoU) between ZALF and the SUA to establish student exchange programs and operational support in research was finalized in spring 2012.

- establish an efficient financial, administrative and operational management system for efficient information flows.
- apply a wide range of capacity building measures especially for NGOs, young scientists (exchange program between Germany and Tanzania, Seminar for Rural Development (SLE)) and a summer school after three years of research within Trans-SEC.
- control risks by a bundle of tailored measures and declared obligations of binding in-time deliveries as well as in-depth observations and reactive measures for critical pathways.
- carry out supervision and mediation for conflict prevention to ensure good human and inter-cultural relations, high-quality communication and low transaction costs.
- evaluate the efficiency of work and communication processes by applying internal and external revision through experts in organisation development.

Description of work:

WP1 defines management and scientific rules available to all project partners. The coordination is dynamic over time and will be continuously adapted to new circumstances and evaluation results. Efficient backstopping, reporting, documentation of work processes and problem-oriented capacity adaptation to unforeseen incidents will take place at any time in the Trans-SEC project.

Task 1.1: Setting-up and ensuring the network, management and scientific coordination within Trans-SEC
(**ZALF, SUA**)

Trans-SEC will establish a well-balanced research network including altogether 14 institutions, some of which have long-standing partnerships. Two German and two Tanzanian partners build the core group. Other institutions will have important tasks with regard to specific expertise. Three Tanzanian ministries involved with the National Food Security Programme, NGOs and agricultural/societal organisations as well as research institutions will guarantee the outreach of results. Additional funding will be sought to safeguard and enlarge the network (see task 1.3).

A project advisory board (PAB) will be set up consisting of two international and Tanzanian experts giving advice to the coordinators and partners. They will give advice at the annual meetings.

The management and scientific coordination will consist of two subordinate management centres (ZALF, SUA), one overall coordination (ZALF) and an electronic coordination and knowledge centre using the Trans-SEC webpage for administrative, financial and online survey applications. This will also serve for up/downloading of information and deliverables. The coordination establishes a methodological and analytical framework to harmonize all partners' contributions. Short-, mid- and long-term financial, administrative and scientific management will safeguard timely delivery of results and/or products. An exit strategy for a possible project end after three years will be developed.

Transparent management coordination rules, systematic responsibility assignments of processes and outputs, as well as measures of incentives, rewards and sanctions will be introduced at the level of tasks and work packages (WP leaders). Non-communication of envisaged delays will be sanctioned up to payment stop; incentives are co-authorship invitations for joint publications and embedment of partners in joint project applications.

Task 1.2: Risk control of deliveries, supervision of processes and mediation for inter-cultural understanding for all Trans-SEC tasks
(**ZALF, SUA**)

Trans-SEC will establish a set of innovative and well-proven measures to coordinate and safeguard timely delivery of research outputs as well as create a work environment with high motivation of involved researchers and stakeholders.

Rules and responsibility assignments for processes and outputs will be institutionalized by a consortium agreement (see task 1.1). A work process-flow system will be applied in order to identify critical pathways to detect bottlenecks of process flows and support these pathways. Critical pathways will be monitored and documented through in-depth interviews.

Work package leaders will be regularly queried, using iteratively conducted online checklist surveys, to help ensure on-time deliveries. Binding deadlines will be visible on the internal webpage. Supplementary phone/face-to-face in-depth interviews will take place to solve problems and take corrective actions if required.

Innovative supervision of Trans-SEC processes and actors (conflict prevention) and shuttle, anonymous and open mediation within workshops (conflict resolution) will ensure good human relations, high-quality communication and thus enable low transaction costs. The Trans-SEC organisational development (OD), partly by calling upon (external) communication experts, will generate efficiency of work and communication processes for WP leaders and coordinators.

Task 1.3: Academic capacity building, knowledge transfer and sustainability of the Trans-SEC consortium
(**ZALF, SUA**, all partners) and Ministry of Agriculture, Food and Cooperatives

Trans-SEC will set up a range of capacity building measures for knowledge transfer to disseminate and sustain the 'think tank' of Trans-SEC results. Methods will be developed to transfer knowledge generated to the academic world beyond Trans-SEC.

Capacity building will be applied at the level of young researchers (offspring) and NGOs (MVIWATA, TFC and ACT). An exchange program with a 25.200 Euro budget will allow African young researchers to stay in Germany. This programme will apply to both PhD and Master students. Finally, a summer school will be held after three years of Trans-SEC activities. Experts will guide researchers to develop targeted methods for transfer of knowledge to specific academic actors.

One important task will be to enable the durability of the GA-RDInet and to safeguard financing and scientific expertise during and beyond project lifetime: Trans-SEC will apply a twofold strategy a) by exploiting research results to apply supplementary funds in smaller entities (topping-up) and b) by developing an overall long-term funding strategy of the GA-RDInet. The Ministry of Agriculture, Food and Cooperatives will provide the knowledge and institutional frame for continuation of the GA-RDInet. After three years, a topping-up fund should be realized which can be also considered as part of an exit strategy. In year four and five, long-term funding applications will be followed and put into practice.

Deliverables:

D1.1.1 Short report on the research framework with work and communication flows including potential changes (months 2, 16) (**ZALF**, SUA, supported by all partners)

D1.1.2 Trans-SEC website including the restricted knowledge centre and descriptions for the wider public (month 6) (**ZALF**, SUA, supported by all partners)

D1.2.1 Report on risk control management, supervision and conflict management. Regular updates to report undertaken actions and progress (months 8, 12, 24, 36, 48) (**ZALF**, SUA, external experts)

D1.3.1 Report of capacity building programme (months 12, 24, 36) (**ZALF**, SUA).

D1.3.2 Report on the measures to sustain the GA-RDInet (months 36, 60) (**ZALF**, SUA, ARI)

Milestones:

M1.1 Analytical framework, consortium agreement on management, and annual meetings (M2,12,24,36,48,60)

M1.2 Trans-SEC website design and concept (M2), implementation and launch (M4), and revision (M18)

M1.3 Risk control measures defined (M6), revised (M12) and supervision and optional conflict management (M12,24,36,48)

M1.4 Capacity building programme: Exchange visits with two months duration of African young scientists in German partner institutes (M12,20,24,34,36,48)

M1.5 Capacity building programme: Summer school (credit based master programme) for European and African young scientists in Morogoro “Food Security Africa: Linking Innovations along value chains in agricultural systems” (M40)

M1.6 Continuation of GA-RDInet: establishing a funding, public relations and institutional strategy including Trans-SEC, NGOs and involved ministries (M24,36,48,60)

Work package 2	Participative Stakeholder Systems and Knowledge Transfer							
Participant number	1	2	3	4	5	6	7	8
Participant short name	ZALF	UHOH	IUW	HU	DIE	PIK	DITSL	IFPRI
Person-months per participant	14,3	4,7	1,9	0,6	3,5	0	28,4	0

Participant number	9	10	11	**12**	13	14			
Participant short name	ICRAF	SUA	**ARI**	TFC	ACT	MVIWATA			
Person-months per participant	0,3	40,9	141	18	18	81,6			

Objectives

This is a cross-cutting WP involving specifically tailored stakeholder groups within each WP. To develop site-adapted solutions enhancing food security and their adoptions, it is vital to explore and involve local and regional stakeholders among all WPs and research sectors along the FVC. A series of stakeholder dialogue meetings will be conducted here to integrate the many potential socio-cultural, environmental, traditional, economic, gender and legal specifics into the research knowledge. Demand orientation is fundamental for successfully tailoring implementation in practice beyond project lifetime. We integrate this aspect by (1) establishing a permanent stakeholder group with continuing key actors for identified FVC components; they will feel committed to contribute to the project success and have own incentives due to decision rights to steer the research design (Reed et al. 2009); (2) developing common solutions until - on a consensus basis among all participants - equilibrium between researchers' output and demand of local stakeholders' needs is reached; (3) approaching this consensus iteratively: a) at the beginning, researchers learn about problems/needs from local stakeholders, b) researchers develop/supply solutions together with local stakeholders, c) local actors evaluate, agree or request further adjustments. Gender and other social differentiations are central in delivering equitable agricultural growth. This WP will investigate gender constructions and processes together with other social differences in the FVC framework. The objectives of WP 2 are to:

General objective

- Carry out multidisciplinary research in semi-arid and semi-humid regions of Tanzania with the engagement of multiple stakeholders for improving household food security.

Specific objectives

- map stakeholder groups for engagement in participatory action research.
- develop knowledge sharing and communication strategies for various stakeholders involved in the entire food value chain.
- identify and prepare action research based on prioritisation for different upgrading strategies identified among food value chain components.
- conduct local and regional stakeholder workshops for the various Trans-SEC tasks.
- guide the process of characterizing household typologies, land uses, farming system typologies, and marketing and gender systems using a participatory approach.

- develop a monitoring and evaluation (M & E) framework for evaluating the performance of the stakeholder involvement process among WPs and for initiating corrective measures if required.
- Identify, analyse and monitor gender and socio-cultural differences along the FVC and the Trans-SEC tasks.
-

Description of work:

WP2 will explore and engage multiple stakeholders at various levels to work together to identify problems and to develop solutions and disseminations of upgrading strategies tailored at addressing issues of food security in Tanzanian food systems. All other WPs are an integral part of WP2. Accordingly, an effort to build a spirit of collective team work to steer research is crucial. WP2 will explore different dissemination platforms for sharing of findings through the use of face-to-face consultation meetings, workshops, demonstrations, trainings, seminars, field days, farmer exchange visits, farmer field schools, exhibitions, printed and electronic materials, and live media (drama, poetry).

Task 2.1: Identifying stakeholder groups, developing organisation plans for stakeholder involvement including defining their roles and tasks
(**ARI**, **MVIWATA**, **SUA**, ZALF, ACT, TFC, DITSL, supported by all)

A preliminary organisation plan and time schedule for participative stakeholder involvement in the Trans-SEC tasks will be developed. This will be discussed and refined during the first Trans-SEC inception workshop that will involve all stakeholders. The refined organisation plan and time schedule will include the following tasks: 1) developing methodological approach/tools and realisation of baseline surveys and stakeholders consultations; 2) creating awareness and preparation of training modules and materials for distribution to the end users; 3) screening and identification of good practice technologies based on baseline survey analysis; 4) planning of action research; 5) developing knowledge sharing and a communication plan on research findings; 6) developing a monitoring and evaluation framework for stakeholder involvement; 7) defining roles of different actors identified based on stakeholders' consultations and refining action research; 8) conducting training on Trans-SEC processes and tools involving stakeholders; 9) field and other practice learning visits to assess project impacts; 10) developing dissemination strategies; 11) monitoring and evaluation of disseminated technologies; 12) developing documentary videos.

Roles and decision rights of different stakeholders groups and actors as well as the allocation of specific research questions to expert groups of stakeholders will be identified among the different FVC components together with the involved NGOs. This is supported by both natural and social scientists to enhance complementarities and synergies and ensure that key stakeholders are fully engaged in the entire process of knowledge generation, sharing and dissemination. This process is realized using baseline survey and consultation reports. Farming system typologies will be generated in both target regions to serve as a basic planning base for other WPs. To ensure effective knowledge generation and dissemination processes, this task will use innovation systems (IS) and learning platforms/alliances.

Task 2.2: Establishing stakeholder groups; planning and conducting all local and regional workshops, focus groups, rapid appraisals for all other WPs
(**ARI, MVIWATA,** TFC, ACT, SUA, DITSL, supported by all)

Stakeholder groups of actors will be established based on the stakeholder roles and tasks defined in task 2.1. Existing stakeholder networks, communication structures and strategies, meeting point locations, and areas of engagements will be identified. This will help determine what, where, when,

who, and how should be communicated. To enhance the synergies and complementarities, an Innovation Platforms (IP) approach should be introduced in order to focus research actions as well as ensure sound dissemination and scale-up of local FVC results. Permanent stakeholder subgroups will be formed and engaged. The subgroups will comprise multiple stakeholders, namely farmers, Trans-Sec partners, extension services, researchers, community-based organizations (CBOs), NGOs, traders, processors, government officials and agro-dealers.

Stakeholder workshops will be conducted at multiple occasions and at different locations to a) create awareness, b) generate and share knowledge with regard to specific FVC issues, c) identify and/or adapt upgrading strategies to be further investigated and/or tested using Participatory Action Research (PAR) in WP4-7. Workshop experience and stakeholder knowledge will directly link and provide inputs to impact assessments of best practice technologies among other WPs and tasks. Participatory stakeholder involvement will be monitored and evaluated throughout the Trans-SEC lifetime.

Task 2.3: Operational preparing, setting-up and conducting on-farm trials in case study sites and (few) on-station trials for validation
(**ARI**, MVIWATA, UH, SUA, ACT, TFC, DITSL, supported by all)

Using the information generated by identifying and defining FVC and upgrading strategies (task 3.1) and the baseline survey (task 3.2), a set of on-farm research activities will be conducted: On-farm research packages will be developed in collaboration with the key stakeholders. Criteria will be set out for farmers and other involved stakeholders of the FVC who will be participating in the research process. Representative testing sites for conducting the experiments will be identified in a participatory approach. Farmers and other involved stakeholders will be selected and farmer groups formed. It is envisaged that several groups will be formed across the entire case study areas. Research packages will be prepared and adapted according to group typologies. Farmers directly involved in the research process will be trained to understand the research procedures required to solve the food security problems identified. Participatory action field research will be conducted (farmer-managed and researcher-supervised). This will involve the use of farmer field schools and mother/baby learning plots. Research findings will be analysed and best bet upgrading strategies jointly assessed. Alongside the action research above, on-station experiments will be conducted at ARI and SUA to validate on-farm results under controlled conditions. Therefore, ARI will be responsible for identifying suitable sites, data collection and other farm and research station activities needed as identified by any partner involved. Demonstration field trials will be conducted for scaling out of the promising upgrading strategies. This will go hand in hand with promotion materials and farmer exchange visits. Dissemination materials such as brochures, fliers, posters and policy brief documents will be prepared. Annual meetings/workshop for planning research activities and sharing of research findings will be conducted.

Task 2.4: Analysing and considering gender and socio-cultural differences
(**DITSL, SUA, ARI**, DIE, TFC, ACT, MVIWATA)

The identification of social, political, cultural and gender-specific factors upon which behavioural change depends is key for effective development of food value chains. Therefore the general purpose of this task is to devise a methodology that considers stakeholders' decision making behaviour on whether or not to adopt certain practices and that allows testing how these practices in turn influence social relations. A key element of the methodology is the development and application of a Role-Playing Game (RPG), which permits testing future scenarios and probable implications. This approach can reveal the impact of identified good practices on gender and socio-cultural differences. For example, activities related to FVC development may have a bearing on land-related

issues; on dependency on private corporations with monopoly power; on opportunities of labour migrants; or on marginalized ethnics. The RPG opens possibilities to reflect and express these particular concerns. This often underestimated factor might promote the success of promising technologies for securing food systems. Incorporating stakeholders' perspectives will influence the choices of practices, also with regard to technological neutrality, in the sense of not excluding socio-cultural minorities and avoiding negative effects on household nutrition.

For the RPG, grounded-based scenarios will be developed together with stakeholders (NGOs, government agencies, extension workers, women, youth, entrepreneurs, etc.) and in direct collaboration with task 8.1. In-depth knowledge on local livelihoods, on cultural aspects and political contexts will be taken into consideration in the game-design. Through collaborative reflection on expected scenarios and probable implications generated by the project, awareness can be created on their possible outcomes. This also provides information on how the roles of the stakeholders might change if these scenarios materialize.

Since each scenario involves locally-specific stakeholders and contexts, the singularity of a particular target region will be incorporated into the research process. In order to test different behaviour frames, the tool shall be applied with different groups (e.g. only women, mixed gender, mixed combination of stakeholders) in the four case study sites. The different scenarios will be jointly analysed with task 8.1; they will be compared according to the potential risks, opportunities and benefits for the different groups associated with the activity (i.e. good practices) selected for development in the case study site. Feed-back workshops to share the findings will confirm or reject findings but also open up alternative pathways.

Deliverables:

D2.1.1 Report on organisation plan for stakeholder involvement and roles and tasks of stakeholders (month 2) **(ARI, SUA**, **ZALF**, supported by all)

D2.1.2 Report on farming system typologies in both target regions (month 8) **(ARI, SUA,** ZALF**)**.

D2.2.1 Reports on workshops and focus groups conducted (months 6, 12, 18, 24, 30, 36, 42, 48, 52) (**ARI,** ZALF, SUA, IUW, UHOH, and all).

D2.2.2 Monitoring reports on stakeholder involvement and necessary adjustments needed over time (months 12, 24, 36, 48, 56) (**ARI,** ZALF, SUA, supported by all).

D2.3.1 Baseline consultation reports for implementing on-field Participatory Action Research (month 8) (**ARI, ZALF**, **SUA**, supported by all).

D2.4.1 Reports on roles and implications of gender and social differentiation on FVCs, (months 18, 24, 36, 48, 56) (**DITSL**, **SUA**, ARI, ZALF, MVIWATA).

Milestones:

M2.1 Stakeholder roles and tasks defined (M2)

M2.2 Framework for executing action research on upgrading strategies (M3); carrying out conceptual research workshops (M6,12,18,24,30,36,42,48,54)

M2.3 Stakeholder workshops and focus groups on field trials and other upgrading strategies (e.g. markets, food processing) (M6,12,18,24,30,36,42,48,54)

M2.4 Gender focus groups and role playing games interacting with the other stakeholder workshops including dissemination of applied measures (M6,18,36,42,48,54)

Work package 3	Food Value Chains and Risk Analysis							
Participant number	**1**	2	**3**	4	5	6	7	8
Participant short name	ZALF	UHOH	**IUW**	HU	DIE	PIK	DITSL	IFPRI
Person-months per participant	35,7	16,4	40,0	0	8,5	0	4,4	2,9

Participant number	9	10	11	12	13	14			
Participant short name	ICRAF	SUA	ARI	TFC	ACT	MVIWATA			
Person-months per participant	3,0	40,9	28,2	0	0	20,4			

Objectives

WP3 cuts across WP4 to WP8 because in all these analytical WPs the typologized value chains are a key research focus. The value chains of interest are selected in a participatory approach. For that purpose, a qualitative scoping study based on stakeholder and expert interviews as well as on-site visits will be conducted to identify the typical FVCs conditional on the project criteria (e.g. households vulnerable to food insecurity, unsustainable livelihoods). Each targeted value chain includes the steps from food production to market delivery and consumption. This calls for understanding the relationships between (1) producers, (2) processors, (3) middlemen/markets and (4) final consumers as well as (5) interrelated systems and institutions beyond pure agricultural sectors. Subsequently, for each identified value chain, a detailed analysis (panel survey) on vulnerability to food insecurity and the sustainability of livelihoods will be conducted. This will cover risks and shocks of households and their related coping strategies. In collaboration with the other WPs and local experts, those suitable value chain upgrading strategies (related to knowledge, technologies, market access) for livelihood improvements will be identified that are relevant drivers for economic growth, poverty alleviation and food security adapted to the local situation. Finding upgrading possibilities to increase adding value, e.g. increasing efficiency and productivity as well as food safety (e.g. certification), is a major objective of Trans-SEC. Furthermore, information on environmental impacts of the value chain strategies is needed to evaluate the sustainability of the selected strategies. Questions on gender will be considered by analysing the integration of women in value chain activities as well as their role of food culture / habits.

The objectives of WP 3 are:

- To screen the extent to which value chain activities have been successful or failed to improve livelihoods and food security of households across all relevant work packages (WP4 to WP8).
- To identify and define potential upgrading strategies of households within value chains to improve food security and livelihoods in a participatory approach (all partners).
- To consolidate a questionnaire for a two-year panel survey covering the socio-economic and environmental impact of relevant food value chain activities across all relevant work packages (WP4 to WP8).
- To profile groups who are chronically and transitorily vulnerable to food insecurity. This is designed to answer the questions: Who and how many people are vulnerable to food insecurity and where are they located?
- To assess the food value chain effects on vulnerability of food insecurity and sustainable

livelihoods of producers, middlemen and other participating stakeholders. What are the determinants of food insecurity related to value chain activities?
- To develop 'good practices' related to value chain upgrading strategies to promote sustainable livelihoods and food security (all partners). To assess the impact and potential spill-over effects of upgrading value chain strategies on households, especially women.
- To analyse the demand of consuming and producing households for food safety.
-

Description of work:

WP 3 requires the involvement and ideas of WP4-WP7 to screen, identify, evaluate and develop upgrading strategies and best practices of value chain activities and institutional frameworks which can be evaluated in an impact assessment (Figure 3). WP3 requires a continuous feedback between WP4-WP7 to adapt the further course of action. This ensures an efficient and adaptable modus operandi during the project. The targeted value chains will be identified with strong participatory stakeholder involvement. The value chains are aimed at covering domestic markets, enabling the link to the objectives of national food security policy of Tanzania and its vision 2025. A panel survey will be conducted to assess the impact of value chain activities on vulnerability to food insecurity.

Task 3.1: Identifying, defining and typologising FVC and upgrading strategies to establish a comprehensive Tanzanian inventory (data base)
(**SUA, ARI, IUW, ZALF, UHOH, MVIWATA,** DITSL, TFC, ACT, ICRAF)

Participatory situation analysis of existing food value chains will be done by screening and identifying those food value chains that are impacting food insecure households in the target region. Value chain mapping will be conducted including the relevant stakeholders, (household) activities, and the governance structure. Describing the regional characteristics of the target value chains enable testing the transferability and representativeness for the country. This helps assessing good practices of linking food insecure households to the market as well as revealing intervention failures. Suitable examples for upgrading the value chain for the target groups will be developed in a participatory stakeholder involvement on the technological, institutional, socio-economic and environmental levels.

The upgrading strategies may relate for instance to a) resources conservation (soil, water, nutrients), b) use of production inputs (technical devices, fertilizers, animal feed, seeds and plants, pest control, energy, labour), c) site-adapted cropping and harvesting, d) animal husbandry, e) agro-forestry integration, f) food storage methods, g) market access and related price building, h) safety and quality of food, and i) consumption and dietary patterns. The results of task 3.1 are passed to the other WPs to complement their ex-ante impact assessments and will be utilized to prioritize potential value chain upgrading strategies. These strategies will then be adapted to the local needs of food insecure households to sustainably improve their livelihoods (together with WP7).

Task 3.2: Analysing the current situation (baseline) by socio-economic, natural resource-oriented household surveys in the four case study sites: wave 1
(IUW, ARI, SUA, IFPRI, ZALF, DIE, all), and Ministry of Agriculture, Food and Cooperatives

The livelihood strategies of food insecure and food secure households will be assessed (together with WP6) by conducting the first wave of a representative quantitative household panel survey. This will be accompanied by qualitative methods of focus-group discussion and workshops with value chain stakeholders. Data on income generation, livelihood strategies and the integration of

producers within value chains will be collected. Food consumption data are of special interest and will be gained via a seasonal monitoring. The household survey serves as a baseline for all work packages. Pathways of households' integration into value chains will be quantified to evaluate success and risk of selected value chain strategies. Stakeholders' demand for food safety standards will be assessed to evaluate the implication of certification systems within Tanzania.

Task 3.3: Assessing and analysing the impact of upgrading strategies within FVC by socio-economic household surveys: wave 2
(IUW, ARI, SUA, IFPRI, ZALF, DIE, all), and Ministry of Agriculture, Food and Cooperatives

Based on the second wave of the panel survey, an impact assessment of implemented value chain upgrading strategies on food security and sustainable livelihoods will be carried out. Based on the panel survey, households' vulnerability to food insecurity and their related risks and shocks will be assessed. Potential improvement or decline of households' food insecurity due to the implemented upgrading strategies will be assessed and if possible quantified. Additionally, potential spill-over effects will be analysed. Hereby, individual knowledge, information pathways, the role of opinion leaders and social networks play a key role.

Deliverables:

D3.1.1 Report and inventory on typologised FVC, their components and upgrading strategies in the case study regions including value chain maps, related stakeholder and participants, institutional framework and their activities. Evaluation and ranking of examples of good practices and FVC failures on the household level: (month 8) (**SUA, ARI, IUW, ZALF, MVIWATA,** TFC, ACT, UHOH, ICRAF)

D3.2.1 Report on baseline household survey, wave 1: Characterization of households in the study region related to FVC activities, livelihoods and food security. The characterizations will be done along the FVC. They will cover production, processing, trading and final consumption and include vulnerability to food insecurity and current coping strategies (month 9) **(IUW, ARI, SUA,** IFPRI, ZALF, DIE, all), and Ministry of Agricultur, Food and Cooperatives

D3.2.2 Report on the role of food safety standards in FVC in Tanzania and its impact on food security of households. (month 9) **(IUW, ARI, SUA,** IFPRI, ZALF, DIE, all), and Ministry of Agriculture, Food and Cooperatives

D3.3.1 Report on impact assessment of upgrading strategies on food (in)security and sustainable livelihoods of households within FVC by socio-economic household surveys, wave 2 (month 34, 55) **(IUW, ARI, SUA,** IFPRI, ZALF, DIE, all), and Ministry of Agriculture, Food and Cooperatives

Milestones:

M3.1 Local and regional FVC and their components identified (M8) and prioritization of upgrading strategies carried out (M12)

M3.2 Baseline household survey (wave 1) (M2,5), additional post-surveying if required (M8) and result presentation for input to other WPs (M12)

M3.3 Second wave of socio-economic panel survey and impact assessment of upgrading strategies (first cropping season) carried out (M24,28), additional post-surveying if required (M32) and delivery of results to WP8 (M42)

Work package 4	Natural Resources							
Participant number	1	**2**	3	4	5	6	7	8
Participant short name	ZALF	**UHOH**	IUW	HU	DIE	PIK	DITSL	IFPRI
Person-months per participant	25,0	58,7	4,8	0	0	30,7	0	4,3

Participant number	9	10	11	12	13	14			
Participant short name	ICRAF	SUA	ARI	TFC	ACT	MVIWATA			
Person-months per participant	3,0	24,5	14,1	0	0	0			

Objectives

Given the biophysical and socio-economic circumstances of Tanzania, all resources for agriculture and their determinants for food security and/or economic success are changing, particularly soil and water resources for rainfed and irrigated agriculture. (1) Improved soil resource management and conservation must be adapted to local soil and terrain features, climatic and social environments. (2) Erratic and declining precipitation in many African regions leads to water scarcity for rainfed crops and to competition for water resources between human consumption, livestock, and irrigated field cropping. Water erosion is among the most severe threats to agriculture, deteriorating the soil and landscape quality on a wide scale.

To cope with these declining resources, research and development need integrated planning tools, relying on a sound data basis of spatial and attribute data collected and standardised beforehand. Planning, sustainable management and conservation of soil and water resources must be adapted to local and regional biophysical and socio-economic environments and hence occur at different spatial and authority levels. Therefore, a database serving development objectives will be established with the following characteristics: 1) freely accessible to the Tanzanian researchers and authorities using it, 2) allowing for continuous updating and integration of new topics, 3) integrating different spatial scales, and 4) allowing for connection to analytical tools. Web-GIS applications include these four characteristics, are easy to handle, and can be used by national authorities and other institutions in both developed and developing countries. The Web-GIS will be linked to relevant planning tools such as evaluation and/or impact assessment schemes. WP4 will integrate the following aspects: 1) Web-GIS development according to the stakeholder needs, 2) data collection and standardisation, and 3) development and linking of exemplary evaluation and impact assessment tools according to the Trans-SEC requirements. Impacts of climate change on food production systems will be assessed with suitable bio-physical process models and upgrading strategies. These will be tested for robustness by applying climate change-induced resource proofing (model LPJmL (PIK)).

The objectives of WP4 are:

- To establish a harmonised multi-scale database with a main focus on the soil, water and climate resources but also on the socio-economic environments in Tanzania
- To establish an open access Web-GIS for collection and representation of spatial data
- To develop scale-dependent, factor-specific on-line evaluation tools linked to the Web-GIS

- To develop an integrated but easy to handle biophysical and socio-economic evaluation scheme with limited data need for ex-ante evaluation of technologies and innovations
- To develop simple indices describing the local production risk created by climate variability
- To assess the impacts of climate change on food production systems

Description of work:

WP4 is dedicated to collecting and evaluating spatial data resources. The basis will be an open Web-GIS tool which will be developed on a participatory basis and by national partners trained in its use and development. The Web-GIS will be filled with existing as well as new data on the biophysical and socio-economic environment. Three scales will be in the focus from the beginning: national, regional and local. For the three scales, we will develop evaluation schemes concerning sustainable land and water use, crops, technologies and innovations. The final aim is to establish an integrated online evaluation scheme linked to the Web-GIS for those technologies and innovations the Trans-SEC project has deemed promising.

Task 4.1: Establishing a web-based Geo-Information-System (GIS) with a multi-scale digital Food Security Atlas (FSA) of Tanzania
(**UHOH, SUA**, ARI, PIK, ICRAF, IFPRI)

In developing countries, data which allow for sound planning are often dispersed among different authorities. A long-term vision of development requires establishing a central digital database that is accessible to everybody rather than serving small research communities. Soil, water, climate as well as socio-economic data of Tanzania will be compiled from various sources, in particular from the Institute of Resource Assessment (IRA) of the University of Dar es Salaam, Ministry of Agriculture, Food and Cooperatives, TMA (Tanzania Meteorological Agency), and Selian Agricutural research institute (SARI). It will be jointly integrated for mutual benefit. The African Soil Information Services (AfSIS) project is conducting strong, on-going GIS work in relation to food security, land or environmental degradations. Numerous Tanzanian sample sites contribute expertise and data to this project. A complementary survey on water use along different water-dependent sectors in the Ngerengere River basin (development in past, present and future) will be carried out[6]. This case study will be based on literature research, stakeholder interviews, remote sensing and hydrological data analyses and modelling, and will integrate regional and local expert knowledge. Food securing soil and water conservation technologies will be screened, participatively assessed with WP2 actors and inventoried to the database. This will help define promising new options for crop production, integrating soil and water conservation and its management.

Web-GIS technology and associated databases will enable this data collection, spatial representation as well as open-access use and application. An open-access Web-GIS system will be jointly established with Tanzanian partners and stakeholders covering three spatial scales: national, regional (Trans-SEC focal regions Morogoro and Dodoma) and local (Trans-SEC case study sites). This Trans-SEC Web-GIS will be an open development tool available to the GA-RDInet and will promote food security research and development beyond project lifetime. Accordingly, participatory development is fundamental. Mirrored hosting will be necessary to guaranty sustainability. The Web-GIS content will include and illustrate a range of variables concerning agriculture (climate, soils, water, land use, crop species, infrastructure, population, institutions and

[6] Wami Ruvu Water Board Office will participate here as a subcontract-partner of SUA

markets). The Ministry of Agriculture, Food and Cooperatives, as an important stakeholder, will provide relevant food security-related data and expertise.

Task 4.2: Developing and applying tools to link-up crop, land evaluation, and water management to optimize planning of food security
(**UHOH, SUA,** ZALF, ARI, ICRAF, IFPRI)
The Web-GIS developed in task 4.1, once implemented, will not only be used to spatially present statistical and content data. Quantitative algorithms will be developed and implemented which support planning and decision making with respect to land evaluation and water management focussing on food security. These algorithms will be developed based on available data and participatory factor weighting. Activities include the development of indices for climate risk, soil erosion, land suitability and finally for food security. The climate risk index for crop production will be based on modelling biomass production and grain yield with recent historical weather data (last 20-30 years) by including the most sensitive stages for crop failure and yield reduction. The soil erosion index will include the site dependent degradation risk based on soil development depth. Both indices will be developed using the EPIC model (Erosion Productivity Impact Calculator). The Land evaluation procedure will be based on the Sys et al. (1991) procedure and realised via the program SLISYS (Soil and Landuse Information System) hosted at the UHOH. A user-friendly interface will be programmed. For local adaptation crop coefficients will be derived based on literature and WP5 experiments and soil and water conservation technologies screened. These single tools will finally be integrated into a food security index, which integrates climate, soil, water, and socio-economic factors. They will be jointly developed with WP2, 3, 7 and 8.

Task 4.3: Modelling climate risks for regional production systems and FVC (Climate impact models SWIM, LPJmL, IMPACT)
(**PIK, IFPRI**, IUW, SUA, ZALF)
Climate change poses a significant risk to current and improved production systems. It also impacts the availability and quality of natural resources. Such direct (climate) and indirect (resource availability) impacts of climate change on food production systems will be assessed with suitable bio-physical process models (LPJmL & SWIM, both hosted and developed at PIK). Because of the eminent uncertainty in climate change projections and also in the so-called "CO_2 fertilization", the analysis of possible climate change impacts will be complemented by a risk assessment and an analysis of new production options. For this, current and innovative production systems (WP5) will have to be described and parameterized in the process-based simulation models; this will have to take the full range of climate change scenarios for Tanzania and Africa into account. Climate risk assessments in bio-physical production systems will be extended to and complemented by an analysis of their economic relevance (IMPACT). The transferability of upgrading strategies in production systems to other target groups and Tanzanian regions will be analysed with respect to both bio-physical (LPJmL) as well as economic (IMPACT) feasibility.

Deliverables:

D4.1.1 Open-access Web-GIS (soft- and hardware) including 10 SUA, ARI, and ICRAF scientists trained in Web-GIS use and development (month 18) (**UHOH,** ARI, SUA)

D4.1.2 Online agronomic and food security atlas for Tanzania (months 32, 50) (**UHOH,** ARI, PIK, SUA, ICRAF, IFPRI)

D4.1.3 Case study on water use along different water-dependent sectors in the Ngerengere River basin (month 20) (**ZALF**, SUA)

D4.2.1 Database and online tool set for integrated (biophysical and socio-economic) Trans-SEC land evaluation and ex-ante impact assessment scheme for upgrading strategies (month 48)

(**UHOH,** SUA, ARI, ICRAF, IFPRI)

D4.3.1 Bio-physical climate change risk assessment for current and innovative production systems in Tanzania, including an analysis on the transferability of Tanzanian solutions to other regions (month 58) (**PIK, IFPRI**, IUW, SUA, ZALF)

D4.3.2 Economic climate change risk assessment for current and innovative food value chains in Tanzania, including an analysis on the transferability of Tanzanian solutions to other regions (month 58) (**IFPRI**, **PIK,** IUW, SUA, ZALF)

Milestones:

M4.1 Mirrored Web-GIS established in Tanzania and Germany: conceptualisation (M3), implementation (M10), prototype (M18), communication of functionalities and input (M32), support on use Web-GIS technology (M50)

M4.2 Database for crop and land evaluation established (M24), tested (M32), and support on functionality by using multimedia means (M36)

M4.3 Workshop on evaluation tools carried out and support of users (M40,46)

M4.4 Bio-physical and economic climate change risk assessment: scenario definition (M13), data base establishment (M24), result presentation (M36), WS on use of results (M44), and policy WS (M54)

Work package 5	Food production							
Participant number	1	**2**	3	4	5	6	7	8
Participant short name	ZALF	**UHOH**	IUW	HU	DIE	PIK	DITSL	IFPRI
Person-months per participant	25	58,7	4,8	0	0	0	4,4	0

Participant number	9	10	11	12	13	14			
Participant short name	ICRAF	SUA	ARI	TFC	ACT	MVIWATA			
Person-months per participant	3	49,1	56,4	18	18	20,4			

Objectives

Resource efficiency must be increased and crop and livestock production stabilised. This requires promising upgrading strategies and/or innovations to raise and secure the quantitative and qualitative food supply in the framework of growing population pressure, soil nutrient depletion and the increasingly poor predictability of precipitation. Regional farming system typologies provided by WP2 will not be changed, but can be further refined if necessary. This will enable quick and efficient testing and up-scaling of the upgrading strategies defined and prioritised.

Upgrading strategies that improve productivity, for instance through better soil management, nutrient and water use efficiency, will be considered along with other non-technological methods. This could include adapted sowing calendars or rotations to boost agricultural productivity and sustainability. Field trials will be carried out to verify the sustainability of the identified upgrading strategies and management practices. Options for organic food production versus conventional food production will be screened and assessed.

A special focus will also be laid on the nutritional and hygienic quality as well as environmental safety of agricultural and pastoral products grown in low-input farming systems. Complementary qualitative and quantitative analyses of different food and feed species will be conducted to enhance regional food security, contributing to the eradication of malnutrition. Hence, the main objectives of WP 5 are

- To improve current food production systems in such a manner that the production and nutritional quality of the product is increased
- To participatively test and assess the impact of promising resource- (soil & water) preserving upgrading strategies and/or innovations on-field
- To participatively test and assess promising upgrading strategies on-field that improve and sustain food productivity
- To investigate malnutrition due to low food quality and identify solutions to alleviate malnutrition

Description of work:

WP5 focuses on the inherently complex local food production systems. To pay tribute to this complexity, the tasks of this WP are covered by partners with expertise in soil, crop and animal science as well as additional expertise. This broad spectrum of expertise will be maintained throughout the process and follows the subsequent innovation development.

Task 5.1: Analysing the current situation regarding biophysical conditions and rainfed crop-, livestock- and agroforestry systems (baseline)
(**SUA, ARI, ICRAF, UHOH,** TFC, ACT, MVIWATA)

A baseline survey will be conducted on the farming systems that support the major FVC as identified and typologised in WP2. This will be done in both of the project's target areas (surveys, rapid appraisal, and literature research). The baseline survey will also include the types of crops commonly grown; the cropping calendar and yield measurements to determine the current production levels; water availability and sources; evidence of water-harvesting technologies or micro-irrigations and their capacities; availability, type and use of agricultural inputs; and agronomic and livestock management strategies. Beyond productivity-related data, the dynamics of nutrients and organic matter will be described in detail to the extent possible and knowledge gaps will be identified. Both literature research and household, semi-structured questionnaire surveys will be conducted to retrieve knowledge on how production and food quality (task 5.3) restrictions were overcome in the past. Methods of data collection will also include focused group discussions, key informants interviews, and the researcher's own observations. This comprehensive information will help identify current productivity bottlenecks, system vulnerabilities and corresponding areas of innovation potential for crop-, livestock- and agroforestry systems. Potentials for organic food production versus conventional food production will be analysed. The findings are to be expanded by the accumulated knowledge of the Trans-SEC partners along with other institutions, stakeholders and farmers on the ground.

Task 5.2: Participatory on-farm/station testing, monitoring and assessing impacts of a) natural resource conservation technologies and b) food production technologies
(**UHOH, ARI**, **SUA, ZALF,** TFC, ACT, ICRAF, DITSL, MVIWATA)

A strong participatory approach will be used with farmers and pastoralists as well as Trans-SEC partners. This will help design, test and refine promising upgrading strategies and/or innovations analysed in the baseline analysis of task 5.1 and jointly identified in task 3.1 (Figure 3). This enables farmers and pastoralists to address management and other problems from their perspective. By explaining the key findings in a comprehensive way to all involved people, this task will also promote capacity building, while at the same time giving all partners the option to study early dissemination challenges (see also WP8).
Upgrading strategies for a) soil and water conservation and b) food production will be participatively tested on-field (farmers' or community land under real life conditions) on at least two case study sites over 2-3 years. The focus on each will be 1-2 core upgrading strategies. For validation under controlled conditions they will also be tested with a few trials only on the ARI and/or SUA stations. Vector analysis techniques may be used for nutrient diagnosis and evaluating interactions in mixed cropping systems (Kimaro et al. 2009). This will provide a site-specific evaluation of crop nutritional status (deficiency or sufficiency) and crop yields in response to the selected upgrading strategies. Subsequently, they will be jointly evaluated with local stakeholders for their success, adaptability and adoption. Potential impacts on food production and other pre-defined criteria will be jointly assessed.
The other 3-4 promising food securing soil and water conservation and/or food production technologies identified in task 3.1 will not be tested. Nonetheless, ex-ante impact assessments will be conducted with stakeholder participation and based on the Framework for Participatory Impact Assessment (FoPIA) (Morris et al. 2011), adapted to developing countries. The ex-ante impact assessment will explore possible trade-offs among the agronomic, economic, social and environmental dimensions of sustainability. Identified knowledge and data gaps will be filled (partly with knowledge from other field experimentations). The assessment frame will be established as an

online version with linkage to the Web-GIS.

Task 5.3: Analysing and enhancing food quality and consumption practices; minimizing quality losses related to food processing
(UHOH, **IUW, SUA,** TFC, ACT, MVIWATA)

Adequacy of nutrition is often calculated on a quantitative basis. That approach, however, overlooks food quality with respect to essential micronutrients. As a consequence, low intake of certain micronutrients is not registered before real signs of deficiency occur. This hidden hunger, in particular related to vitamin A, zinc, iron and iodine, is largely responsible for morbidity and mortality of children under five and maternal mortality. Nonetheless, proving that a micronutrient deficiency exists within a population prior to it becoming a major health concern (when individuals may show observable symptoms) is difficult. This is because definitive early diagnosis requires using biomarkers, which are usually costly and difficult to administer. One way to address this problem is via an easy-to-complete and comprehensive dietary intake survey, which can be adapted to include typical food items in different national diets.

A survey on food consumption, malnutrition, food availability, food prices, access and household expenditure will be conducted for the case study site households (Figure 3). The household survey will be targeted to also identify quality losses related to food processing. A special questionnaire for the Trans-SEC case study sites will be designed. Results will be used to modify and adjust the CIMIP* program of UHOH to the Tanzanian regional conditions. (CIMIP: “calculator for identification of micronutrient inadequacy on population-level”; with only 12 questions allowing for rapid and sufficient calculation of the micronutrient supply within a specific, population-based diet). The program will help detect the gaps for different micronutrients. Based on the CIMIP results, the sets of promising technologies among the food value chains will be targeted towards improving food variety and quality. The micronutrient and amino acid composition of selected, different food types from the target area will be analysed to detect alternative food types with enhanced quality. The Ministry of Agriculture, Food and Cooperatives will be directly involved in this task, providing baseline data on malnutrition for certain Tanzanian regions.

*CIMIP was developed in cooperation with day-med-concept GmbH (Berlin) and the Department of Biological Chemistry and Nutrition of the University of Hohenheim for Indonesia and Ethiopia.

Deliverables:

D5.1.1 Baseline report on rainfed crop-, livestock- and agroforestry systems (month 12) **(SUA, ARI, ICRAF, UHOH,** TFC, ACT, MVIWATA)

D5.2.1 Report on on-farm field tests a) soil and water conservation and b) food production upgrading strategies (months 17, 29, 41) (**UHOH, ARI**, **SUA, ZALF,** TFC, ACT, ICRAF, DITSL, MVIWATA)

D5.2.2 Report on ex-post impact assessments of the on-farm field testing results for a) soil and water conservation and b) food production upgrading strategies and on ex-ante impact assessments of the other 3-4 upgrading strategies identified in task 3.1 but not tested (months 20, 32, 44) (**UHOH, ARI**, **SUA, ZALF,** TFC, ACT, ICRAF, DITSL, MVIWATA)

D5.3.1 Report on food quality, malnutrition and mitigation options (month 37) **(UHOH**, **IUW, SUA,** TFC, ACT, MVIWATA)

Milestones:

M5.1 Concept of the data base incl. statistics on agro-systems established (M2) and implemented (M10)

M5.2 Preparatory WS and participatory on-farm field testing carried (M10), testing on farm/station (M17,24,34,44) and evaluation (M28,38,50)

M5.3 Workshops on impact assessment of upgrading strategies carried out (months 10,15,38,50)

M5.4 Conceptualizing household survey on food quality and availability (M14), conducting HH survey (M19), evaluating HH survey (M24), focus group (M36), and recommendations (M42)

Work package 6	Post-harvest processing, Biomass and Waste Product Utilization							
Participant number	1	2	3	4	5	6	7	8
Participant short name	ZALF	UHOH	IUW	HU	DIE	PIK	DITSL	IFPRI
Person-months per participant	42,9	56,3	9,5	0	9,2	0	0	0

Participant number	9	10	**11**	12	13	14		
Participant short name	ICRAF	**SUA**	ARI	TFC	ACT	MVIWATA		
Person-months per participant	3,0	57,2	0	18	18	20,4		

Objectives

The aim of WP6 is to analyse and enhance post-harvest processes, biomass and waste product utilisation within the FVC. This will help stabilise the Tanzanian food systems and livelihoods of smallholders in the target regions and on the case study sites. Increased demand for food and diversification in food processing is resulting in the production of large amounts of agricultural wastes, both at farmer, municipality and city levels (Sabiit 2011). These by-products are not being widely used, recycled and/or traded to maximize incomes in the food systems. Therefore, new ways of utilizing the complete range of by-products in agri-food systems from organic fertiliser towards animal feed and biomass energy chains will be screened and investigated. Furthermore, disposal and handling of agri-food wastes poses environmental and health challenges in the rural and urban centres. Waste minimisation and environmental best-practice technologies within the food systems are often sorely lacking. Agricultural and food-processing wastes are widely available, renewable and virtually free, hence they can be an important resource. Using appropriate conversion technologies, animal, cropping and food-processing wastes can be turned into useful agronomic and/or economic resources. These can be also partly utilised for (decentralised) bioenergy production. Furthermore, the integration of biomass-producing and/or oil-bearing fruits/crops and fast-growing trees into the rural crop production systems, for instance through hedges after conversion to bioenergy, offers options for additional income and thus livelihood stabilisation. The specific objectives of WP 6 are

- To identify, analyse and evaluate promising upgrading strategies for enhancing post-harvest processes in food production
- To perform life cycle assessments for various food crops
- To identify, analyse and evaluate options and income potentials for agricultural waste management and utilization
- To identify, analyse and evaluate options for enhanced and optimized nutrient cycling in the FVC
- To analyse income potentials with additional biomass production integrated with current cropping systems for conversion to bioenergy

Description of work:

The tasks of WP6 will involve screening, baseline surveys, Participatory Action Research (PAR), and impact assessment to identify, analyse and assess optimised pathways related to post-harvest processes, biomass, waste product utilization, and bioenergy production. Major linkages will be with WP2, task 3.1, WP5 and WP7. The following tasks will be conducted.

Task 6.1: Analysing, testing and assessing impacts of improved regional and local post-harvest processes including biofuel/biogas options (Life Cycle Assessment (LCA))
(**UHOH**, **SUA, ZALF**, **MVIWATA**, TFC, ACT)

We will screen prevailing post-harvest processes such as threshing, drying, storage of grains and legumes (Dodoma, semi-arid) and sorting, packing and transporting of fruit and vegetables (Morogoro, semi-humid). The focus will be on product quality, losses, labour, energy requirements, and agro-environmental impacts (LCA) and baseline studies. The reasons for the missing implementation of improved regional and local post-harvest processes will be identified. Upgrading strategies for post-harvest processing of promising products in both target regions will be identified and prioritized (task 3.1) for different nodes of the FVC. This will involve a) more in-depth analysis (LCA) and/or b) testing in a participatory approach (Figure 3). This can be done, for instance, by utilising processing wastes such as husk, straw, fruit stones for nutrient recycling and/or energy provision via production of solid fuels and biogas. Identified best practices will be assessed with regard to requirements and potential impacts at different levels and scales of the FVC and on the farm-level, in municipalities and in city markets.

Prevailing energy provision systems for cooking, lighting and transport in both target regions will be screened together with task 6.2 and 6.3 in terms of quantitative and temporal availability, costs and environmental impacts (LCA). We will examine whether higher energy efficiency (pressing facilities, cooking stoves) can reduce competition between food and biomass production. Decentralized energy provision systems based on post-harvest processing wastes will be identified. A pilot demonstration plant for rural post-harvest processing and/or energy provision will be established and tested with local partners in the Dodoma and Morogoro regions. The Ministry of Agriculture, Food and Cooperatives will be directly involved in task 6.1, providing expertise and baseline data on biofuel/biogas options for Tanzanian regions. Activities and experience on upgrading strategies in marginalized communities will be gained from the TaTEDO Centre for sustainable, modern energy supply.

Task 6.2: Analysing options on waste management and nutrient cycling to assess efficiency potentials in rural agricultural systems
(**SUA**, **ZALF**, **IUW**, **UHOH**, TFC, ACT, MVIWATA)

Nutrient availability both in soil and as external input is considered the most critical bottleneck for secure food production, particularly in rural smallholder farming systems of Tanzania. Post-harvest processing wastes have a potential in enriching the dietary intake to livestock and improving livestock keeping practices. In addition, processing wastes, including animal and human wastes, can be used to enrich the often depleted soils around villages and cities. Enhanced nutrient cycling therefore is a predominant mitigation measure in the already overgrazed or continuously cropped areas. Apart from increasing agricultural productivity, such cycling can reduce movement of pastoralists, improve livestock-keeping practices, reduce costs for energy, and increase food

availability, which are essential in improving socio-economic wellbeing.

Options for using post-harvest processing waste as well as animal and human wastes (if socially accepted) will be participatively identified and analysed in depth to optimise (1) nutrient cycling among the different FVC components by organic waste management, and (2) sanitation management. Options for nutrient cycling will be screened and potential impacts at different levels and scales of the FVCs and on the farm-level, in municipalities and in city markets assessed.

Task 6.3: Assessing feasibility and developing income potentials of using complementary biomass production in crop production systems
(**ZALF**, **SUA**, **IUW**, **UHOH**, **ICRAF**, DIE, TFC, ACT, MVIWATA)

Bioenergy technologies for decentralized energy production or regional marketing open new opportunities for existing or new farm products. Participatory feasibility studies on biomass sources and their utilization for bioenergy will be conducted pursuing past village household surveys conducted by ZALF, IUW and ICRAF in 2009, 2010 and 2011. Analysis of farmers' opportunities will consider integrating oil-bearing fruits/crops and fast-growing trees into on-farm production systems possibly through boundary tree planting and woodlots technologies. Promising upgrading strategies such as rotational woodlot (ngitili) planting for land restoration, maize yield improvement, fodder and fuel wood supply as tested in semi-arid areas of Morogoro will be assessed for food security impact and transferability as well as for impact on soil nutrient cycling and nutrient balance (Kimaro et al. 2007). Aspects of time saving for searching fuel wood can be factored in to get a clear picture of the economic advantage of these technologies.

Higher requirements for capital and knowledge to run these new technologies and the competition in acreage with food, fodder and other cash crops will be investigated in requirement and cost-benefit analysis. Indicator sets of energy and food security will be derived together with task 3.1 to monitor and assess the impacts of different systems of energy production as well as their consumption. The potentials for plant biomass waste utilization for animal feed will be investigated. The Ministry of Agriculture, Food and Cooperatives will be directly involved in task 6.3, providing expertise and baseline data on biofuel/biogas options for Tanzanian regions. The task will integrate upgrading strategies that are also tested and assessed by the TaTEDO Centre for sustainable, modern energy supply.

Deliverables:

D6.1.1 Baseline reports on a) post-harvest processes and bioenergy production, b) waste product utilization, and c) additional biomass utilization (month 19) **(UHOH, SUA, ZALF**, **MVIWATA**, TFC, ACT)

D6.1.2 Report on the testing of post-harvest processing upgrading strategies (month 32) (**UHOH**, **SUA, ZALF**, **MVIWATA**, TFC, ACT)

D6.2.1 Final report on upgrading strategies for waste product utilization and optimized nutrient cycling (month 45) (**SUA**, **ZALF**, **IUW**, **UHOH**, ICRAF, TFC, ACT, MVIWATA)

D6.2.2 Report on impact assessments of tested and/or analysed upgrading strategies on a) post-harvest processes and bioenergy production, b) waste product utilization, and c) additional biomass utilization (months 32, 45) (**SUA**, **ZALF**, **IUW**, **UHOH**, ICRAF, TFC, ACT, MVIWATA)

D6.3.1 Final report on feasibility and income potentials of using complementary biomass production in agricultural crop production systems (month 36) (**ZALF, SUA, IUW, UHOH, ICRAF,** TFC, ACT, DIE, MVIWATA)

Milestones:

M6.1 Upgrading strategies of a) post-harvest processes and bioenergy production, b) waste product utilization, and c) additional biomass utilization: WS on conceptual approach (M10), testing (M29,40), analysis and evaluation (M48)

M6.2 Impact assessments carried out for task 6.1, 6.2 and 6.3 and provided to WP8 (M10,33,48)

Work package 7	Commercialisation, Trade, Policies and Institutions							
Participant number	1	2	3	4	5	6	7	**8**
Participant short name	ZALF	UHOH	IUW	HU	DIE	PIK	DITSL	**IFPRI**
Person-months per participant	50	0	50,2	6	35,5	0	0	18

Participant number	9	10	11	12	13	14			
Participant short name	ICRAF	SUA	ARI	TFC	ACT	MVIWATA			
Person-months per participant	4,2	57,2	5,6	16,2	16,2	20,4			

Objectives

WP7 will analyse efficiency potentials for commercializing and trading in the agri-food sector, connecting supply and demand centres. Although there are debates about the future viability of small farms, most research findings accord a central role to the intensification and commercialization of smallholder agriculture as a means of reducing poverty. Innovations in key food and livestock value chains will not be adopted at scale unless farmers perceive that markets can absorb increased agricultural production without price declines: innovation adoption, productivity and market development must go hand-in-hand. Currently, farmers in highly productive areas often do not produce (more) for the market because increased production leads to production gluts and price declines; in less favoured areas, farmers strive to increase production but often fail due to lack of adequate inputs. In both cases, purchasing power is often insufficient to buy food on the market; as a result of these parallel strands of economic development, food markets remain thin. The result is overall production below potential and consumption below the minimum required to lead productive and healthy lives for the poorest rural and urban dwellers. The result is also frequent and high market and price volatility. This is sometimes accompanied by unnecessary declarations of food shortages that further stifle market interactions as a result of government interventions.

What can be done to increase market size and access for small producers? The striving for a regional market in Eastern Africa is one possible avenue for ensuring that increased production of key agricultural commodities will take place in areas with the greatest comparative advantage. This could help ensure that commodities can move across local and regional borders to those areas that need this production most. Measures to strengthen markets will differ by the type of agricultural commodity (market support interventions would differ if a product is perishable or not, for example). Other factors governing these measures are the relative profit margins along the FVC; the relative gender roles throughout the food value chain of these commodities (when women control part of the food value chain and can obtain income, impacts on family health and nutrition are generally improved); and the respective policy environment (some commodities are highly politicized, making policies toward larger markets more difficult to change; an example is maize in Tanzania).

In addition to markets, several other policies and institutions strongly influence innovation adoption, notably the research and extension system, credit availability and conditions of credit, and societal values and norms. These external factors, together with the inherent characteristics of the innovations and of farm characteristics, are likely to determine the adoption curve and rates. The analysis of these external influences gives important hints as to how policies can support the adoption of innovations.

The main objectives of WP7 are:

- To analyse smallholder commercialization pathways
- To assess the hardware (infrastructure) and software (regulations/policies) related to the food value chains of key commodities
- To identify market constraints, including both input and output markets along the food value chains for key commodities in the two study regions
- To analyse and assess a series of alternative measures (trade, input and output support policies, infrastructure, among others) and their relative impacts on markets
- To propose measures to relieve market constraints for key agricultural commodities

Description of work:

WP7 will assess markets for key agricultural commodities along the FVC to determine options for deepening and widening these markets. This will promote agricultural productivity growth. The approach will be to review prices for inputs and the agricultural commodity as it moves along the food value chain across various places in the study areas (gendered trader survey); to conduct expert interviews with key actors/organisations in the FVC; to review existing policies and regulations as they relate to the commodity. Depending on whether the market is local, national, regional or international and on whether the production cycle of the commodity (in- or off-season), various market constraints would be removed, for example by using the IFPRI DREAM model. The task will identify needed changes in infrastructure and policies to support enhanced market development of identified key agricultural commodities.

Task 7.1: Assessing commercialization pathways for smallholders to enhance market integration and information to bring added value in agricultural food systems
(**SUA, IUW, DIE, IFPRI**, ARI, TFC, ACT, MVIWATA, ZALF, ICRAF)

We will identify the necessary conditions and encouragement from policy for commercialization pathways of small farms in the agri-food sector. We will also examine the most promising public economic services and institutional innovations (e.g. contracts, cooperatives, outgrowing schemes and certification) with regard to how small farmers commercialize successfully and equitably within the agri-food systems. This will generate an inventory of those upgrading strategies for commercialization and the potential benefits to smallholding households. In retrospective, ex-post analyses will document the evolvement of successful upgrading strategies of market access with special attention to small agrarian villages.

We will identify and assess the interrelations between types of commercialization as one important element of the FVC and the impact of these interrelations on food security in villages. Patterns between the types of commercialization and the positive effects on livelihoods for rural smallholders must also be examined. Risk analyses will be carried out and will include assessing shortcomings of some types of commercialization. Success factors behind a likely implementation of commercialization pathways at the village and regional level will be listed. Negative side effects such as environmental degradation will be in the frame of a sustainability impact analysis.

Task 7.2: Assessing national market and trade policies; scenarios of market expansion; and regional trader surveys to assess market chains on input-output prices

(**IFPRI, SUA, IUW, DIE**, ARI, TFC, ACT, MVIWATA, ZALF)

A trader survey (including national and international food commodity brokers) will be designed and implemented to assess who participates in the various markets of the FVC. The survey will include

conventional and organic products. Price margins and bottlenecks (high costs) along the food value chain will be identified. A market analysis combined with GIS-based infrastructure data will be carried out.

Government policies will be reviewed in Tanzania and the Eastern African region to assess which policies and regulations hinder and which support market development, including trade policies, input and output price subsidies, and other regulations. Experts will be interviewed to assess opportunities for market enhancement.

Upgrading strategies for market deepening and widening will be identified and their impacts on the food production potential determined (Figure 3). For example, if a commodity can move from being traded locally to regionally or nationally as a result of enhanced storage facilities or improved post-harvest technologies, then the impact on the supply and demand for this commodity can be assessed. Related policies and institutions to support market development will be identified. The Ministry of Agriculture, Food and Cooperatives and the Ministry of Industry, Trade and Marketing will be directly involved in this task, providing insight and expertise on Tanzanian trade policies.

Task 7.3: Analysing supportive and inhibitive policies and related regional and national institutions to recommend reforms in and beyond FVC and output markets
(**DIE, IFPRI, SUA, HU**, TFC, ACT, MVIWATA)

We will analyse the influence of policies and institutions (both formal ones established through policies and laws, as well as traditional ones shaped by culture and society) supporting or hindering the adoption of innovations beyond the value chains and markets. This applies in particular to those related to research and extension, local knowledge, attitudes and behaviour, technology and input markets as well as credit. Based on these analyses, Trans-SEC will develop recommendations for improvement. Key methods applied will be (1) the participation in innovation screening by systematic assessment of criteria employed by different stakeholders to evaluate and select innovations for the project (WP3-WP6), (2) structured interviews with key resource persons (in collaboration with task 7.2 concentrating on product markets and trade, but including experts on the sector policies, institutions and rural societies), (3) the participation in the trader surveys (task 7.2), (4) the participation in data collection on farm/households characteristics and on the policy and institutional environments linked to adoption or non-adoption of upgrading strategies (task 3.1-3.2), (5) a study of the texts that have established formal institutions and logical analysis of their (non)linkages and (in)compatibilities, and (6) a participatory observation of the project trials and their (participatory) assessment as well as structured interviews with involved actors (researchers and partners). Experts of the Ministry of Agriculture, Food and Cooperatives and of the Ministry of Industry, Trade and Marketing will participate in this task, providing insight on Tanzanian market policies and institutions.

Deliverables:

D7.1.1 Reports on smallholder commercialization pathways tailored to different commercialization stakeholders in the agri-food systems; (months 20, 45).

D7.2.1 Report on national market and trade policies; scenarios of market expansion; and regional trader surveys to assess market chains on input-output prices (month 27, 56).

D7.3.1 Report on supportive and inhibitive policies and related regional and national institutions (months 27, 56).

Milestones:

M7.1 Trader survey discussed (M10), designed (M15) and pathway analysis carried out (M40)

M7.2 Literature research on national, inter-regional trade flows carried out (M12), trader survey conducted (M24,35,46), and policy expert interviews carried out (M56)

M7.3 Literature research on policies (M12), expert interviews carried out (M21,32), WS on analysed policies (M40), relevant policy framework designed (M48), and policy dissemination workshop on policy and institutional constraints to market development (M58)

Work package 8	Integration and dissemination							
Participant number	**1**	2	3	4	5	6	7	8
Participant short name	**ZALF**	UHOH	IUW	HU	DIE	PIK	DITSL	IFPRI
Person-months per participant	**75**	28,2	14,3	21,9	10,6	14,9	4,4	2,9

Participant number	9	10	11	12	13	14			
Participant short name	ICRAF	SUA	ARI	TFC	ACT	MVIWATA			
Person-months per participant	5,9	57,2	28,2	18	18	30,6			

Objectives

The primary aim of WP8 is to act as an integrating platform for the whole project. It is designed to ensure the effectiveness and usability of the products developed among Trans-SEC partners and the stakeholders. WP8 seeks a maximum impact for enhancing the existing FVC, boosting food security and efficiently disseminating the results into ministerial food policy programs, extension services and farmers associations.

Upgrading strategies and/or innovations will be integrated towards a system approach and the overall research framework evaluated. The major challenge of this WP is to integrate all upgrading strategies from WP2-7 into a consistent frame. If possible, it should identify feasible new combinations among the FVC to use their positive effects under the constraints of natural resources, human capital and economic production factors. The key impact assessment results of WP2-7 (natural resource, food production, processing, economic and socio-cultural dimensions) will feed the overall integrated impact assessment FoPIA (Framework for Participatory Impact Assessment). This will generate knowledge to support (1) capacity building and (2) decision making at the community, regional and national levels and (3) other research networks active in Tanzania and East Africa. A selected set of promising upgrading strategies among the FVCs analysed and/or tested will be demonstrated as the central lesson learnt. Transferability and up-scaling of this system approach from one Tanzanian target region to the other and beyond will be tested, proved and demonstrated using a set of different present and future scenarios. Trade-offs of limiting resources, production factors and soft factors such as gender-relevant and/or cultural requirements will be identified, as will potential risks.

The system approach around the typologized FVCs will be developed in a demand-driven way and evaluated by involved stakeholders and partners. The findings will be disseminated (1) at the extension level using adequate communication channels of MVIWATA, TFC, ACT such as farmer schools, and (2) to regional and national policy programs (e.g. NAPA, NSGRP, ASDS, ASDP[7]. The main aims of WP8 will be:

- to synthesise the results generated in WP2-7 and to backstop as well as to feedback to the overall Trans-SEC analytical framework design.
- to find recommendations for enhancing the existing food security framework.
- to investigate the predictive power of ex-ante assessments complementing “action research”

[7] Tanzanian politic programmes targeting food security: Agricultural Sector Development Strategy (ASDS); Agricultural Sector Development Programme (ASDP); National Strategy for Growth and Reduction of Poverty (NSGRP).

field experiments.
- to analyse the adaptation prospects and feasibility of the project's upgrading strategies using scenarios of the future framework conditions.
- to disseminate the project findings externally using adequate strategies for efficient outreach among the networks of involved researchers and stakeholders
- to give direct feedback and possibly adapt the WP1 work plan and coordination of Trans-SEC.
- to ensure that the Trans-SEC settings fit into the Tanzanian food policy and research landscape.
- to develop (1) scientific publication strategies of Trans-SEC results (e.g. special issues) in peer-reviewed journals for dissemination at the research level and (2) policy-brief series on activities for informing the public institutions and BMBF, BMZ, PTJ as funding organisations.
-

Description of work:

WP8 requires the involvement of all project partners and various inputs from all WPs and vice versa. Throughout the project duration, the overall Trans-SEC research framework will be continuously adapted to include and target new and/or unforeseen developments in food security issues in Tanzania. This WP ensures efficient backstopping, reporting, documentation of work processes and problem-oriented capacity adaptation.

Task 8.1: Synthesising all conducted FVC assessments of upgrading strategies (ex-post and ex-ante impact assessment) and recommendations
(**ZALF**, **IFPRI**, **SUA, IUW,** PIK, ARI, UHOH, DITSL, MVIWATA, TFC, ACT, all WPs)

The upgrading strategies analysed/tested among the FVC components in WP2-WP7 will be discussed in a participative way and synthesized. Preceding impact assessment tasks (tasks 3.3, 5.2, WP6, WP7) will be joined under the modified FoPIA framework for joint (ex-post) impact assessment. The synthesis will include a critical risk assessment. We will derive conclusions and recommendations in the form of storylines of lessons learnt from possible new combinations of innovations. This synthesis aims at providing a forum for considering the Trans-SEC outcomes at multiple scales, across disciplines, and between policy makers and other stakeholders. It will improve the science needed for enhanced food security in a capacity-building, decision-making and research context. It will also be tested in the light of alternative futures and scenarios.

Synthesising and drawing conclusions from upgrading strategies and/or innovations involves assessing the feasibility in the face of uncertainty and biased results. Because this evaluation can have important economic, environmental and societal implications, the transparency and traceability of the process of generating results is crucial. Multi-criteria analyses are required, including deliberations by stakeholders. The remaining uncertainty and its potential impact on the accuracy of the Trans-SEC outcomes will be evaluated.

While in WP2-7 the upgrading strategies and/or innovations were analysed with regard to local characteristics, task 8.1 will investigate them using a comprehensive, interdisciplinary scenario framework. This will involve applying the three models SWIM, LPJmL and IMPACT and applying Delphi methods by involving expert options. Potential innovations and associated changes identified for Tanzanian food production will be contrasted with each other and then tested in future scenarios. The scenario framework in an early phase will be based on stakeholder inputs of WP2 - WP7 (food value chains, natural resources, food production, income generation, markets, society and culture) and on previous or other on-going regional scenario projections (for example ReACCT www.reacctanzania.com). In a second step, the scenario framework will be applied to the outcomes of WP2 - WP7, enabling ex-ante impact assessments.

The aim of this task is to check the usability of the Trans-SEC results given the uncertainties of future developments and to derive suggestions for the food security framework. Participative impact assessment tools of WP2 such as the ZALF-GIZ Tool ScalA (www.sustainet.org) and/or FoPIA will be used to assess innovations identified among FVCs. They will be framed by regional-scale decision-support tools for project implementation. Tools and/or models for transferring and up-scaling of Trans-SEC results to other target groups and/or regions will be developed. The results of these tasks will be transferred to the analytical framework design (WP1). Experts of the Ministry of Agriculture, Food and Cooperatives will participate in this task, providing Tanzanian policy scenarios.

Task 8.2: Synthesizing innovation feasibilities on the information flows and the network related to stakeholder activities for Tanzanian Trans-SEC partner organisations
(**HU**, **DIE**, ARI, SUA, ZALF, MVIWATA, TFC, ACT; WP3, WP4, WP5)

Trans-SEC will develop and suggest region-explicit upgrading strategies to the existing food production and food security frameworks. Regional characteristics will allow specific sets of good practices. For example, a production shift to high-value perishable crops is only feasible with near market access. Basic conditions for this are efficient information flows and a well-assembled network to ensure sustainable implementation of good practices. Therefore, based on an institutional analysis, the information flows between the Trans-SEC consortium and all stakeholders involved will be analysed with regard to effective measures and settings of communication channels targeting implementation of FVC good practices. This objective will be achieved by the following activities:

To ensure the feasibility of Trans-SEC products and/or upgrading strategies, the WPs will be monitored and supported from the beginning. For this, WP 8.2 will start with the development of a framework of institution-shaping innovations and upgrading strategies in FVCs. Both the Trans-SEC consortium partners and other involved organizations will be analysed from the institutional perspective. Interviews will document the learning during the course of the project. Workshops with stakeholders along the value chains in the case studies will make explicit and transferable those reflexions and lessons learnt about innovative institutions, facilitating food security innovations.

Against this background, we will synthesize FVC findings and their respective impact on the environment, society and the economics. The outcomes of the analyses and testing of upgrading strategies will be validated against the institutional requirements and recommendations for innovations in institutions. Furthermore, improved institutional settings will be identified for establishing effective national food security networks. Experts of the Ministry of Agriculture, Food and Cooperatives and other relevant ministries will participate in this task, providing insight on information flow in Tanzanian policy sectors.

Task 8.3: Disseminating Trans-SEC strategies, methods and results for public outreach at the level of policy, organisations and media
(ZALF, MVIWATA, TFC, ACT, SUA, ARI, ZALF, DIE, supported by all)

Dissemination strategies will be developed for (1) scientific, (2) extension, (3) policy levels as well as to the (4) funding organisations BMBF/PTJ and BMZ. The upgrading strategies identified, analysed and/or tested in Trans-SEC, including our final conclusions and recommendations, will be prepared for a synopsis reports for dissemination to both decision makers and stakeholders among the FVC and to the scientific world. To disseminate the knowledge generated, the appropriate means and communication channels will be determined.

(1) A strategy and timetable for publishing Trans-SEC results in peer-reviewed and preferably open-access journals will be developed. (2) At the extension level the involved partner NGOs will

disseminate results to farmer schools, governance groups and other associations. Workshops raising awareness (first phase) will be followed by workshops on implementing results (second phase) at e.g. farmer school level. This task will be relevant to stakeholders at multiple scales from local to regional up to national. Final recommendations will be prepared with all consortium partners and will need an agreement (consensus-building) process. This process and the decisions taken - by consensus or majority vote - will be documented since there are different interests of diverse groups within agricultural society. (3) These recommendations will be reported to policy makers and funding organisations.

From the beginning, Tran-SEC will collaborate with existing research networks in the area of food security to use synergies in sharing communication channels, exploring capacity efficiency potentials and merging thematic sub-groups for joint funding initiatives. Experts of the Ministry of Agriculture, Food and Cooperatives and Tanzanian media will participate in this task, creating avenues for outreach to other Tanzanian policy sectors and to test potential up-take into policy programmes

Deliverables:

D8.1.1 Reports of the synthesis of FVC assessments of upgrading strategies (ex-post and ex-ante impact assessments) and recommendations (months 36, 60) (**ZALF, IFPRI, SUA, IUW,** PIK, ARI, UHOH, DITSL, MVIWATA, TFC, ACT)

D8.1.2 Annual conferences for exchange of Trans-SEC outcomes at multiple scales, across disciplines and stakeholders (months 20, 32, 44, 56) (**ZALF**, **SUA**, all WPs)

D8.1.3 Report on the scenario framework (month 32) and up-date report on scenario implications on the outcomes of WP2–WP7 (month 50) (**PIK, ZALF**, **IFPRI**, **SUA, IUW,** UHOH, ARI, DITSL, MVIWATA, TFC, ACT)

D8.2.1 Report on innovation feasibility (month 36) and up-date of the report summarizing practical testing of selected upgrading strategies (month 48) (**HU**, **DIE**, ARI, SUA, ZALF, MVIWATA, TFC, ACT)

D8.3.1 Brief interim reports of the applied dissemination strategies and actions taken (months 12, 24, 36, 48) and an up-date of the report towards a synopsis report (month 60) (**ZALF**, supported by all)

Milestones:

M8.1 WS on upgrading strategies synthesis (M22), synthesis concept disseminated (M30), synthesis applied (M40), evaluation WS on synthesis (48) and review including plausibility checks (M58)

M8.2 Approach on innovation feasibility testing of institutional frameworks developed (M12), study of the Seminar for rural development (SLE) carried out (M24), additional interviews conducted (M40), and recommendations for ministries, NGOs and other institutions disseminated (M54)

M8.3 Press releases conceptualized and launched (M6), policy briefs disseminated (M12), additional media strategies set up (M16), documentary launched (M24), dissemination workshops for the public (M30,54), marketing strategy applied (e.g. Deutsche Welle TV) (M44), synthesis on media (M57)

3. Work plan description

3.1 Resource planning

The Trans-SEC project includes seven partners from Germany, five partners from Tanzania, and two international CGIAR centres (IFPRI and ICRAF). It thus represents a medium-size consortium covering all relevant topics of food systems in East Africa (Table 1, Figure 1). The systemic approach entails a large thematic coverage within the given budget. Among the partners there is core-group of six German and African institutions (ZALF, UHOH, IUW, HU, SOKOINE, ARI) with a higher budget responsible for a large scope of research topics, whereas the other consortium partners provide tailored expertise analogical to their budgets. Local infrastructure, research sites and field material required for some of the Trans-SEC tasks already exist at SOKOINE[8], ICRAF and the ARI, and will be provided as a self-contribution. Details of the resource planning can be found in the legends of the detailed budget planning (in Annex III).

3.2 Partners and work package involvement

An overview of the PM per WP illustrates the following Table 3. A total of 2011 PM will be needed to achieve the goals of Trans-SEC. ZALF, UHOH, SUA and ARI will be the core group having the biggest work load while the other institutes will contribute with more specific expertise and less PM. Among the WPs, the PMs are balanced with regard to the work load required to achieve the milestones and deliverables. All PMs are calculated on the base of full time equivalents by using average annual costs for PhDs, Postdocs and senior scientists. The number of involved persons per WP, classified into PhDs, Postdocs and senior scientists are indicated extra (Table 3). Details of the provisioned person-months (PM) are presented in the WP descriptions (chapter 2).

3.3 List of WP, tasks and milestones

In the following Table 4 the Gantt chart of tasks and milestones is presented. The Table 5 provides the detailed the timing and interlinkages of the milestones of the Trans-SEC tasks. The tasks and milestones strongly interlink. Further details of the WPs, their tasks, deliverables and milestones are presented in chapter 2.

3.4 Exit strategy

(1) At the end of the first project phase (three years), Trans-SEC will provide the core products, namely a functional German-African R&D&I network; a full inventory of the present Tanzanian food systems; identified and tested, successful upgrading strategies and/or innovations at different scales along the food value chain; and reports on the potential transferability of Trans-SEC results to other Tanzanian regions.

(2) In the second project phase (two years) the knowledge and applicability of successful site-specific upgrading strategies among food value chain components will be deepened and further tested for feasibility in test runs. This will include dissemination sections at farmer schools and regional societal governance, and testing the uptake of findings into national and regional policy programmes.

[8] The ReACCT project established three trial sites including material and infrastructure (75,000 € value)

Table 3: Summary of staff effort (person months)

Participant No. / short name	WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		Total person months
1/ ZALF	89,3	2 Ssc; 2 Caf	14,3	1 PD	35,7	1 Ssc; 1 PhD	25,0	1 PD	25,0	1 PD; 2 PhD	42,9	1 PD; 1 PhD	50,0	1 Ssc; 1 PhD	75,0	2 Ssc; 1 PD; 2 Caf	357,3
2/ UHOH	11,7	1 Ssc; 1 PD	4,7	2 PD	16,4	1 PD; 1 PhD	58,7	1 PD; 1 PhD	58,7	1 PD; 2 PhD	56,3	1 PD; 1 PhD	0,0		28,2	1 PD; 2 PhD	234,7
3/ IUW	4,8	1 PD	1,9	1 PD	40,0	1 PD; 1 PhD	4,8	1 PD	4,8	1 PD; 1 PhD	9,5	1 PD	15,2	1 PD; 1 PhD	14,3	1 PD	95,2
4/ HU	1,5	1 PD	0,6	1 PD	0,0		0,0		0,0		0,0		6,0	1 PD	21,9	1 PD	30,0
5/ DIE	3,5	1 PD	3,5	1 PD	8,5	1 PD; 1 PhD	0,0		0,0		9,2	1 PD; 1 PhD	35,5	1 PD; 1 PhD	10,6	1 PD; 1 PhD	70,9
6/ PIK	0,9	1 PD	0,0		0,0		30,7	1 PD	0,0		0,0		0,0		14,9	1 PD	46,5
7/ DITSL	2,2	1 PD	28,4	1 PD	4,4	1 PD	0,0		4,4	1 PD	0,0		0,0		4,4	1 PD	43,6
8/ IFPRI	0,6	1 Ssc	0,0		2,9	1 Ssc	4,3	1 Ssc	0,0		0,0		18,0	1 Ssc	2,9	1 Ssc	28,6
9/ ICRAF	7,4	1 Ssc	0,3	1 PD	3,0	1 PD	3,0	1 PD	3,0	1 PD	3,0	1 PD	4,2	1 Ssc; 1 PD	5,9	1 Ssc; 1 PD	29,7
10/ SUA	81,8	2 Ssc; 1 PD	40,9	1 Ssc; 1 PD; 1 PhD	40,9	1 PD; 1 PhD	24,5	1 PD; 1 PhD	49,1	2 PD; 2 PhD	57,2	1 PD; 1 PhD	57,2	1 Ssc; 1 PD; 1 PhD	57,2	1 Ssc; 2 PD; 1 PhD	408,9
11/ ARI	8,5	1 Ssc; 1 PD	141,0	2 PD; 2 PhD	28,2	1 PD; 1 PhD	14,1	1 PD; 1 PhD	56,4	1 PD; 2 PhD	0,0		5,6	1 PD	28,2	1 Ssc; 2 PD	282,0
12/ TFC	1,8	1 NGO	18,0	2 NGO	0,0		0,0		18,0	1 NGO	18,0	1 NGO	16,2	1 NGO	18,0	2 NGO	90,0
13/ ACT	1,8	1 NGO	18,0	2 NGO	0,0		0,0		18,0	1 NGO	18,0	1 NGO	16,2	1 NGO	18,0	2 NGO	90,0
14/ MVIWATA	10,2	2 NGO	81,6	4 NGO	20,4	2 NGO	0,0		20,4	2 NGO	20,4	2 NGO	20,4	2 NGO	30,6	3 NGO	204,0
Total	226,0		353,2		200,3		165,0		257,6		234,6		244,6		330,1		2011,4

Table 4: Gantt chart of tasks and milestones

WP	Tasks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
WP1	1.1 Setting-up and assuring the network, management and scientific coordination within Trans-SEC		1.1/1.2 Kick-off meeting/website/launch										1.1 Annual meeting, AM						1.2 Revision website						1.1/1.5 AM/strategy on network GA-RDInet												1.1 AM												1.1 AM												1.1 Final A
	1.2 Risk control of deliveries, supervision of processes and mediation for inter-cultural understanding for all Trans-SEC tasks						1.2 Measures risk control/supervision												1.2 Supervision/mediati						1.2 Risk control revision/Supervision/Mediation												1.2 Supervision/Mediation												1.2 Supervision/Mediation								1.2 Evaluation of measures				
	1.3 Academic capacity building (CB), knowledge transfer and sustainability of the Trans-SEC consortium							1.4 all PhD assigne					1.4/1.6 Visits/GA-RDInet strateg								1.4 Visits				1.4/1.6 Visits/GA-RDInet strategy										1.4 Visits				1.4 Visi		1.5 Summer school								1.4/1.6 Visits/GARDInet strategy										1.6 GARDInet strate		
WP2	2.1 Identifying stakeholder groups, developing organisation plans for stakeholder involvement incl. defining their roles and tasks		2.1 List of stakeholders																																																										
	2.2 Establishing stakeholder groups; planning and conducting all local and regional workshops, focus groups, rapid appraisals for all WPs			2.2 Framework/WS									2.2 WS						2.2 WS						2.2 WS						2.2 WS						2.2 WS		2.2 WS				2.2 WS						2.2 WS						2.2 WS				2.2 WS		
	2.3 Operational preparing, setting-up and conducting on-farm trials in case study sites and (few) on-station trials for validation						2.3 Framework/field tria						2.3 Field trials						2.3 Field trials						2.3 Field trials						2.3 Field trials						2.3 Field trials						2.3 Field trials						2.3 Field trials						2.3 Field trials						
	2.4 Analysing and considering gender and socio-cultural differences						2.4 Gender approach defined												2.4 Gender focus group, strategy																		2.4 Gender focus group, measures applied												2.4 Gender focus group						2.4 Gender measures disseminated						
WP3	3.1 Identifying, defining and typologising FVC components and upgrading strategies to establish a comprehensive Tanz. inventory								3.1 FVC listed				3.1 Prioritizing of FVC components and SQL data base																																																
	3.2 Analyzing the current situation (baseline) by socio-economic, natural resource-oriented household surveys in the four case study sites: wave 1		3.2 Survey			3.2 Surveys			3.2 post-survey				3.2 Presenation of baseline study																																																
	3.3 Assessing and analyzing the impact of upgrading strategies within FVC by socio-economic household surveys: wave 2																								3.3 Survey 1				3.3 Survey 2				3.3 Post-survey (optional)										3.3 Evaluation WS on results and input for WP 8																		
WP4	4.1 Establishing a web-based Geo-Information-System (GIS) with a multi-scale digital Food Security Atlas (FSA) of Tanzania			4.1 inernal WS on concept							4.1 Implementation								4.1 WS and Web-GIS (prototype)														4.2 Communication on Web-GIS functionality and input data																		4.1 WS and Support on use (via multedia)										
	4.2 Developing and applying tools to link-up crop, land evaluation, and water managem. to optimize planning of food security																								4.2 Internal WS on concept												4.2 Testing databa					4.3 Evaluation WS					4.3 Support on functionality (via multimedia)														
	4.3 Modelling climate risks for regional production systems and FVC (Climate impact models SWIM, LPJmL, IMPACT)													4.4 Internal WS on scenario definition											4.4 Data base established												4.4 WS on scenario results								4.4 WS on use of results (other WPs)										4.4 WS with policy decision makers						
WP5	5.1 Analysing the current situation on biophysical conditions, and rainfed crop-, livestock- and agroforestry systems (baseline)		5.1 Internal WS (via multimedia)								5.1 Data base on statistics established																																																		
	5.2 Participatory on-farm/station testing, monitoring and assessing impacts of a) natural resource conservation technologies and b) crop production technologies										5.3 Internal WS					5.3 WS		5.2 Start Test 1							5.2 Start Test 2				5.2/5.3 Evaluation WS						5.2 Start Test 3				5.3 Internal evaluation						5.2 Start Test 4						5.2/5.3 Overall Evaluation WS										
	5.3 Analysing and enhancing food quality and consumption practices; minimizing quality losses related to food processing														5.4 WS on concept					5.4 HH Survey					5.4 Evaluation WS												5.4 Focus group						5.4 Recommendation WS																		
WP6	6.1 Analysing, testing and assessing impacts of improved regional and local post-harvest processes including biofuel/biogas options (Life Cycle Assessment (LCA))										6.1 WS on all concepts								6.1 Regional WS, post-harvest-biofuel etc.											6.1 Start Test 1				6.1 Evaluation WS, all proce							6.1 Start Test 1 (adapted)																				
	6.2 Analysing options on waste management and nutrient cycling to assess efficiency potentials in rural agricultural systems										6.2 Impact assessment (IA) WS								6.1 Regional WS, waste-manag.-nutrient c.											6.1 Start Test 2				6.2 IA interim evaluation							6.1 Start Test 2 (adapted)								6.1/6.2 Overall IA-WS, synthesis												
	6.3 Assessing feasibility and developing income potentials of using complementary biomass production in crop production systems																		6.1 Regional WS, income potentials, bioma											6.1 Start Test 3											6.1 Start Test 3 (adapted)																				
WP7	7.1 Assessing commercialization pathways for smallholders to enhance market integration and information to bring added value in agricultural food systems										7.1 Skype-Con					7.1 Trader survey designed																									7.1 WS on pathways																				
	7.2 Assessing national market and trade policies; scenarios of market expansion; and regional trader surveys to assess market chains on input-output prices												7.2 Literature research												7.2 Survey (interviews, wave 1)											7.2 Survey (interviews, wave 2)											7.2 Survey (interviews, wave 2)										7.2 Expert interviews				
	7.3 Analysing supportive and inhibitive policies and related regional and national institutions to recommend reforms in and beyond FVC and output markets												7.3 Literature research on policies									7.3 Expert interviews (survey 1)											7.3 Expert interviews (survey 2)								7.3 WS on analysed policies								7.3 Policy framework defined										7.3 Policy WS		
WP8	8.1 Synthesizing all conducted FVC assessments of upgrading strategies (ex-post and ex-ante impact assessments) and recommendations																						8.1 WS on synthesis concept								8.1 Synthesis concept disseminated										8.1 Synthesis concept applied								8.1 WS Synthesis results								8.1 post-processing				
	8.2 Synthesizing innovation feasibilities on the information flows and the network related to stakeholder activities for Tanzanian Trans-SEC partner organizations												8.2 WS on institutional analysis												8.2 SLE Study (Seminar für Ländliche Entwicklung)																8.2 Additional expert interviews														8.2 WS on Recommendation WS						
	8.3 Disseminating Trans-SEC strategies, methods and results for public outreach at the level of policy, organisations and media						8.4 Press releases						8.4 Policy brief				8.4 Media marketing strategy								8.4 Documentary (video						8.4 WS for Tanzanian organizations (dissemination 1)														8.4 Marketing strategy applied (all means)													8.4 Synthesis (update)			

Table 5: Milestones per WP and intermediate steps to achieve the tasks and deliverables

M1.1 Analytical framework, consortium agreement on management, and annual meetings*(M2,12,24,36,48,60)
M1.2 Trans-SEC website design and concept (M2), implementation and launch (M4), and revision (M18)
M1.3 Risk control measures defined (M6), revised (M12) and supervision and optional conflict management (M12,24,36,48)
M1.4 Capacity building programme: Exchange visits with two months duration of African young scientists in German partner institutes (M12,20,24,34,36,48)
M1.5 Capacity building programme: Summer school (credit based master programme) for European and African young scientists in Morogoro "Food Security Africa: Linking Innovations along value chains in agricultural systems" (M40)
M1.6 Continuation of GA-RDInet: establishing a funding, public relations and institutional strategy including Trans-SEC, NGOs and involved ministries (M24,36,48,60)
M2.1 Stakeholder roles and tasks defined (M2)
M2.2 Framework for executing action research on upgrading strategies (M3); carrying out conceptual research workshops* (M6,12,18,24,30,36,42,48,54)
M2.3 Stakeholder workshops and focus groups on field trials and other upgrading strategies (e.g. markets, food processing) (M6,12,18,24,30,36,42,48,54)
M2.4 Gender focus groups and role playing games interacting with the other stakeholder workshops including dissemination of applied measures (M6,18,36,42,48,54)
M3.1 Local and regional FVC and their components identified (M8) and prioritization of upgrading strategies carried out (M12)
M3.2 Baseline household survey (wave 1) (M2,5), additional post-surveying if required (M8) and result presentation for input to other WPs (M12)
M3.3 Second wave of socio-economic panel survey and impact assessment of upgrading strategies (first cropping season) carried out (M24,28), additional post-surveying if required (M32) and delivery of results to WP8 (M42)
M4.1 Mirrored Web-GIS established in Tanzania and Germany: conceptualisation (M3), implementation (M10), prototype (M18), communication of functionalities and input (M32), support on use Web-GIS technology (M50)
M4.2 Database for crop and land evaluation established (M24), tested (M32), and support on functionality by using multimedia means (M36)
M4.3 Workshop on evaluation tools carried out and support of users (M40,46)
M4.4 Bio-physical and economic climate change risk assessment: scenario definition (M13), data base establishment (M24), result presentation (M36), WS on use of results (M44), and policy WS (M54)
M5.1 Concept of the data base incl. statistics on agro-systems established (M2) and implemented (M10)
M5.2 Preparatory WS and participatory on-farm field testing carried (M10), testing on farm/station (M17,24,34,44) and evaluation (M28,38,50)
M5.3 Workshops on impact assessment of upgrading strategies carried out (months 10,15,38,50)
M5.4 Conceptualizing household survey on food quality and availability (M14), conducting HH survey (M19), evaluating HH survey (M24), focus group (M36), and recommendations (M42)
M6.1 Upgrading strategies of a) post-harvest processes and bioenergy production, b) waste product utilization, and c) additional biomass utilization: WS on conceptual approach (M10), testing (M29,40), analysis and evaluation (M48)
M6.2 Impact assessments carried out for task 6.1, 6.2 and 6.3 and provided to WP8 (M10,33,48)
M7.1 Trader survey discussed (M10), designed (M15) and pathway analysis carried out (M40)
M7.2 Literature research on national, inter-regional trade flows carried out (M12), trader survey conducted (M24,35,46), and policy expert interviews carried out (M56)
M7.3 Literature research on policies (M12), expert interviews carried out (M21,32), WS on analysed policies (M40), relevant policy framework designed (M48), and policy dissemination workshop on policy and institutional constraints to market development (M58)
M8.1 WS on upgrading strategies synthesis (M22), synthesis concept disseminated (M30), synthesis applied (M40), evaluation WS on synthesis (48) and review including plausibility checks (M58)
M8.2 Approach on innovation feasibility testing of institutional frameworks developed (M12), study of the Seminar for rural development (SLE) carried out (M24), additional interviews conducted (M40), and recommendations for ministries, NGOs and other institutions disseminated (M54)
M8.3 Press releases conceptualized and launched (M6), policy briefs disseminated (M12), additional media strategies set up (M16), documentary launched (M24), dissemination workshops for the public (M30,54), marketing strategy applied (e.g. Deutsche Welle TV) (M44), synthesis on media (M57)

* Workshops (WS) and annual meetings if feasible and reasonable will be jointly carried out across different WPs, tasks and milestones to use synergies (saving costs, logistics and time)

4. Coordination

The coordinators have managed four projects in Tanzania over a period of 6 years[9] with a funding of three million Euros and up to 30 involved researchers. Beyond, the coordinators have gained over eight years of experience in six medium-large projects (Annex 7). The experience gained creates unique selling points on knowledge and experience (1) to create and maintain a sustainable GA-RDInet within the entire Tanzanian research landscape[10], (2) to efficiently manage large consortia and perpetuate communication flows, (3) to generate an intrinsic work atmosphere, (4) to accomplish operational feasibility of solving unforeseen problems by conflict management among the different cultural mentalities, (5) to ensure output-oriented research findings using a combination of central and subordinate organisation development, (6) to apply new innovative management, coordination and supervision/mediation tools to ensure success. Due to our comprehensive experience we will provide an "ideal model" in continuously enhancing food security research with highest possible efficiency/effectiveness to meet the Trans-SEC aims and impacts promised, (7) to apply exceptional means for dissemination and marketing (Deutsche Welle TV DW, film documentary, video interview clips) beyond the traditional ones.

4.1 Project management

The ZALF Project Management Team (PMT) consists of two experienced coordinators, who will integrate scientific questions related to the multi- and trans-disciplinary research setting, manage the internal coordination of the consortium as well as take care of all external representational duties and responsibilities. Therefore, the PMT will establish tools and structures that ensure

- Short-, mid- and long-term financial, administrative and scientific management: the daily management clarifies questions and guides partners. The mid-term perspective ensures milestone achievements and safeguards timely delivery of results and/or products. The long-term perspective defines the strategic goals.
- Efficient information flow and systems (e.g. central knowledge centre on webpage): Two-way communication processes with input/output flows and tailor-made communication channels will be established.
- Systematic responsibility assignments of processes and outputs as well as transparent measures of incentives, rewards and sanctions: The work package leader bears the sole responsibility for that particular package and is required to report problems to the coordination level, where solving actions will be initiated. Delays and non-communication will be sanctioned up to payment stop, while on time-delivery will be rewarded by incentives at the scientific level (e.g. invitation of co-authorship for publication).
- Continuous evaluation of the efficiency of work and communication processes by meta-analyses applying both internal analysis and external services though experts: An internal revision and analysis will be conducted and supported by external communication experts, who evaluate the organisation system. Coaching will available if necessary.

[9] ZALF coordinates in Tanzania two GIZ projects (www.reacctanzania.com, www.better-is.com) and is partner of a project managed by IFPRI. A fourth project on ecosystem functions in Kenya is managed in cooperation with ILRI.

[10] A comprehensive formal Memorandum of Understanding (MoU) between ZALF and the SUA to establish student exchange programs and operational support in research was finalized in spring 2012.

- Risk control by iterative, obligatory checklist surveys assessing the probability of on-time deliveries, which are binding: Critical pathways identified will be monitored and documented through in-depth interviews. Critical, agreed-upon deadlines will be made visible as binding agreements on the internal webpage (see chapter 1.3).
- Innovative supervision and mediation and reactive actions to ensure good human relations, high-quality communication and thus enable low transaction costs, in particular with regard to, inter-cultural conflicts that, in our international project experience, can highly disturb the cooperation: Supervision for coordinators and regional subordinate leaders will take place on an annual basis. A conflict management system will be established to enable conflict prevention and – if necessary – conflict resolution. In both cases, anonymous phone consultation (hot-line) and open conflict mediation on request by workshops in a face-to-face setting are envisaged (see chapter 1.3). The lessons learnt will be summarized in a final report to BMBF for further use in other projects.
- Dissemination of outreach strategies to tailor knowledge generated to target groups, institutions and the wider public: Reporting and marketing of Trans-SEC in the research landscape by policy briefs to Tanzanian institutions (e.g. involved farmers schools, capacity-building centres, ministries), and other existing networks gained through cooperation. Publication strategies will make use of progress-oriented open access journals (e.g. http://www.livingreviews.org/), other peer-reviewed journals, new media such as short video clips on interviews to be published on the webpage, documentaries by Deutsche Welle TV (ZALF experience with IKI programme Global 3000) (see example http://www.youtube.com/watch?v=f4uA6eRmKus), and newspaper articles (e.g. ZALF experience with Die ZEIT).
- Safeguard of sustainable durability of the GA-RDInet, financing and scientific expertise during and beyond project lifetime: We will apply a two-fold strategy by a) extracting research components to apply supplementary funds in smaller entities (topping-up) and b) developing an overall long-term funding strategy for the entire GA-RDInet.

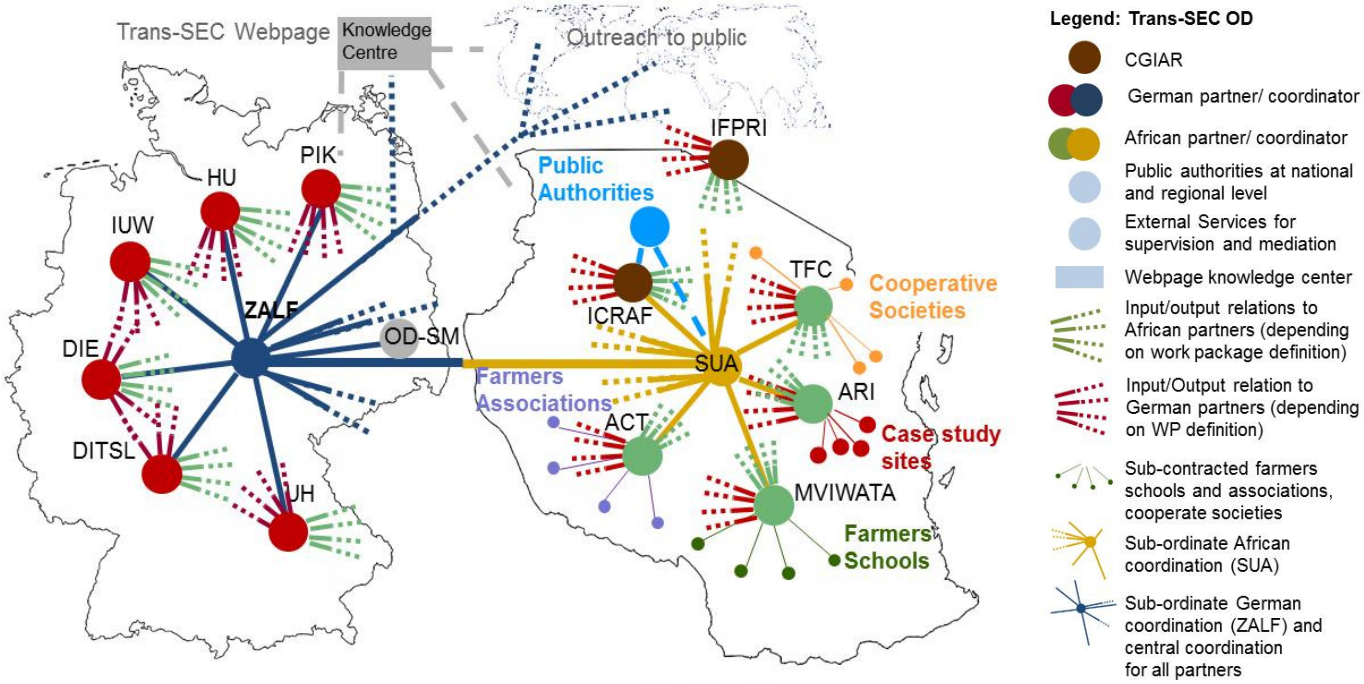

Figure 5: Mapping of the Trans-SEC Organisation Development

In summary, Trans-SEC will develop a system of intra- and inter-organisational development (OD) among hierarchies, regions and all stakeholders (see Figure 5). We aim to combine core information input/output flows among partners by a) a central coordination (ZALF) and b) a Tanzanian sub-coordination (SUA) for operational management and synthesis (Dietrich 2007). Standard information on administrative and risk management tasks such as checklist surveys will be managed using a "knowledge centre" on the internal webpage area. ZALF and SUA each coordinate their national partner cluster. SUA and ICRAF involve stakeholders at regional and national level of public authorities and ministries. The three NGOs TFC, MVIWATA and ACT will each disseminate Trans-SEC results to farmer associations and schools as well as cooperative societies. The WP leaders are responsible for on-time delivery of results. The two CGIARs operate on specific research tasks and will support the tasks with their excellent infrastructure. ZALF is responsible for further dissemination using additional communication channels of the CGIARs. External advisory board experts will analyse and support the Trans-SEC organisation and coordination. Progress and process control through supervision will ensure continuous improvement and maximise effectiveness and communication. Annual meetings and reporting to PTJ/BMBF/BMZ will be major means to ensure transparency and traceability of the project progress. They also provide a platform for commonly agreed goal settings, OD enhancements as well as communication of changes of processes and objectives.

A Project Steering Committee (PSC) will be established that includes the leaders (and potential co-leaders) of all WPs to ensure representation, in-depth scientific knowledge and managing details/background within the whole project. The PSC will be the leading group and the decision-making body of the project. It will work closely with the PMT on all strategic decisions regarding the work. The PSC will meet at 12-month intervals during the five years of the project.

4.2 Quality control

Trans-Sec will provide the following comprehensive quality control instruments: (1) high applicability through a people-centred approach in demand-pull design. Stakeholders have strong decision rights on topic selection and prioritising goals. The stakeholder representatives of TFC, MVIWATA, ACT and the agriculture ministry build a stakeholder advisory board (SAB); (2) the applied OD evaluated by external experts will continuously improve all processes and related instruments to streamline the communication and coordination towards efficiency (e.g. low transaction costs) and effectiveness; (3) the applicability of upgrading strategies and/or innovations will be proved by at least one comprehensive good practice approach implemented as action research; (4) a project advisory board (PAB) that will consist of two international experts[11] will advise the coordinators and partners. They will be present at the annual meetings and will meet the coordinators every six months for a counselling interview together with the PTJ; (5) sample templates (incl. instructions on formatting) provide a Trans-SEC design for corporate identity, and each delivery will be peer-reviewed by other partners and the coordinators before launching on the webpage; (6) scientific publication management of the processing and review (internal and/or external) of different kinds of publications to ensure a high scientific quality of the Trans-SEC publications; (6) feedback from PTJ/BMBF/BMZ will be requested on the progress and results documented; (7) in the event of quality failure the coordinators may ask for postponement to a given point in time.

[11] The PAB members will be a) Don Mitchell (former World Bank lead economist); b) The director of National Food Security, Mr. Karim Mtambo (Ministry of Agriculture, Food and Cooperatives)

4.3 Risk management and problem handling

In order to ensure the project outcome, we will establish four instruments to minimise and manage risks: (1) A risk diagnosis will comprise a critical path analysis including a control mechanism of delivery. This risk control will be achieved by iterative (every six months), obligatory electronic checklist-surveys designed to indicate the probability of on-time deliveries on the webpage (see chapter 1.1). Only the critical pathways identified will be followed up by in-depth interviews and documented on the webpage (see chapter 1.1). (2) A consortium agreement will enable secure management of the project, and clear rules will be drawn up on responsibility for processes and outputs. This will be accompanied by transparent measures of incentives, rewards and also strategies for dealing with non-delivery partners and partner withdrawal to facilitate and ensure on-time deliveries (see chapter 1.1). (3) Based on the new German mediation law[12], evident empiric efficiency losses due to conflicts averaged about 50 % (KPMG 2009). ZALF has experienced different intercultural perceptions and mentalities, always leading to efficiency losses[13]. Therefore, processes and communication will be regularly reflected using supervision and tailor-made mediation by external services. To handle potential problems, innovative instruments such as (1) supervision of processes (conflict prevention) and (2) shuttle, anonymous and open mediation within workshops (conflict resolution) will be applied.

Furthermore, each partner will have the possibility to report any foreseen risk. A mitigation plan will be set up describing this particular risk and what, when, by who and how something will be done to avoid it or minimize its consequences. Risk management of Trans-SEC further includes that delivery quality is ensured by partners with key responsibilities (WP leaders). Regular assessment and monitoring of progress will be made by the coordinator via monthly contacts with WP leaders. This should allow any problems to be identified at an early stage. This will be supplemented by in-between project meetings in the form of telephone or internet conferences if the need arises. Project meetings of all partners, the PSC, the PAB and the SAB will take place periodically every 12 months for 5 to 7 days depending the on level of conflicts and the need for adjustments among partners.

In the event of a negative evaluation by the PTJ/BMBF after three years, the project structure, work plan and products guarantee the provision of a complete inventory of analysed food value chains and successful upgrading strategies (chapter 3.3). This inventory's results in enhancing food security in Tanzania can be introduced at various dissemination levels and analysed for implementation feasibility.

[12] The mediation law was approved by the German Bundestag. The German Government fosters these procedures.

[13] Transaction costs through communication conflicts increase sick certificates and resignation from work as observed in the projects www.reacctanzania.com and www.better-is.com.

5. Partners involved

Trans-SEC encompasses a group of six large German and African research institutions (ZALF, UHOH, IUW, HU, SOKOINE, ARI) with a broad research agenda. The other consortium partners including the two CGIAR partners ICRAF and IFPRI will have narrower research tasks (Table 6 below). The Trans-SEC consortium during the five years planned will include around 15 Post-Doc scientists, 14 PhD scientists, 10 senior scientists, 8 stakeholder NGO staff, one financial coordination staff in Tanzania (52 scientists altogether), and many more field assistants, extension officers and drivers. Both German and Tanzanian consortium partners can build on previous intensive collaboration with national and international institutions during past agricultural research activities in these two regions. The African partner institutions for Tanzania encompass the Sokoine University of Agriculture (SUA), Agricultural Research Institutes of Tanzania (ARI), The Tanzania Federation of Cooperatives (TFC), the Agricultural Council of Tanzania (ACT), the National Network of Small-Scale Farmers' Groups in Tanzania (MVIWATA), and associated international centres ICRAF (World Agroforestry Center) and IFPRI (International Food Policy Research Institute). Involvement of this large number of local partners will help ensure that research remains demand-driven and highly relevant to local needs, and that local information is adequately understood and fed into research and development (Riisgaard et al. 2010). Existing connections and detailed insight into natural resources and the socio-economic environments relevant to the food systems will thus promote a rapid installation of the GA-RDInet and the start of the Trans-SEC research activities.

Table 6: Summary of partners with competencies, financed personnel capacities, principle scientists involved, and infrastructure (details in Annex II)

Partner	Core competence in Trans-SEC	Personnel capacities	Infrastructure	Principle scientists or staff involved	Research/ work experience: total / Africa (years)	No. of publications: total / peer-reviewed
1/ ZALF	• coordination, • economy, • farming systems, • bio-energy, • impact assessment, • hydrology	2 senior scientists, 4 Post-Doc, 3 PhD, 2 assistants	international centre logistics, training capacities, 1 project vehicle, equipment (75.000 € value)	Dr. Stefan Sieber; Dr. Frieder Graef, Dr. Götz Uckert, Dr. Ottfried Dietrich, Dr. cand. Hannes König PD Dr. K.-C. Kersebaum	14 / 7 19 / 6 13 / 4 26 / 3 4 / 3 30 / 6	62 / 19 80 / 25 22 / 2 75 / 18 15 / 9 132 / 30
2/ UHOH	• plant production, • natural resources, • post-harvest management, • human nutrition	1 senior scientist, 3 Post-Doc, 3 PhD	international university logistics, food security centre, laboratories	Prof. Dr. Folkart Asch, Dr. Jörn U. Germer, Prof. Dr. K. Stahr Dr. Ludger Herrmann, Prof. Dr. Joachim Müller Prof. Dr. H. K. Biesalski	20 / 20 17 / 9 >30 / > 30 20 / 20 27 / 20 30 / 20	184 / 92 11 / 10 >300 / > 100 120 / 23 250 / 90 392 / 215
3/ IUW	• economy and markets	1 senior scientist, 1 Post-Doc, 1 PhD	international university logistics	Prof. Dr. Ulrike Grote, Dr. cand. Anja Fasse	20 / 5 5 / 3	60 / 20 7 / 1
4 /HU	• communication, • transdisciplinary knowledge transfer	1 senior scientist	international university logistics, Centre for Rural Development (SLE)	Prof. Dr. W. Bokelmann, Dr. Bettina König	28 / 10 12 / 6	>100 / 24 20 / 8
5 /DIE	• institutional settings, • political landscape	1 Post-Doc, 1 PhD	international development centre logistics,	Dr. Michael.Bruentrup, Dr. cand. R. Herrmann	22 / 22 3 / 3	100 / 10 6 / 1
6 /PIK	• climate impact modelling	3 Post-Doc (partial)	climate data and modelling capacity, access to data services	Dr. Christoph Müller Dr. Fred Hattermann Dr. Stefan Liersch	9 / 5 14 / 6 8 / 4	45 / 25 55 / 42 14 / 8
7/ DITSL	• social issues and gender • communication	1 senior scientist, 1 Post-Doc, 1 PhD	international centre logistics, access to farming networks	PD Brigitte Kaufmann, Claudia Levy	19 / 19 6 / 3	30 / 11 5 / 1
8/ IFPRI	• food policy, • international markets	1 senior scientist	international centre logistics, regional sub-centres (offices) in Africa	Dr. Claudia Ringler, Ephraim Nkonja	16 / 8 12 / 12	120 / 80 56 / 36
10/	• agroforestry	1 senior scientist,	international centre	Dr. Anthony Kimaro	12 / 10	17 / 12

Partner	Core competence in Trans-SEC	Personnel capacities	Infrastructure	Principle scientists or staff involved	Research/ work experience: total / Africa (years)	No. of publications: total / peer-reviewed
ICRAF		1 Post-Doc,	logistics, transportation logistics			
11 /SUA	• food production, • natural resources • economy and markets • social issues and gender • nutrient cycling	2 senior scientists, 4 Post-Doc, 4 PhD	international university logistics, field testing sites, access to enumerator network, meeting facilities, laboratories, health care in emergency cases	Prof. Dr. Siza Tumbo, Dr. F. C. Kahimba, Dr. Khamaldin Mutabazi, Dr. Anna Sikira, Prof. Dr. Valerian Silayo Dr. Said H. Mbaga	12 / 12 10 / 6 9 / 9 8 / 8 17 / 17 19 / 19	60 / 20 32 / 9 27 / 15 18 / 5 50 / 17 25 / 10
12 /ARI	• food production, • farming systems • extension service • stakeholder involvement • dissemination	2 senior scientists, 1 Post-Doc, 4 PhD/field assistants	field testing sites, enumerator network, stakeholder meeting facilities, laboratories, extension services access to farmer schools and regional policy makers	Elirehema Swai, Bashir Makoko Dr Mkangwa Leon Mrosso	17 / 16 30 / 28 28 / 27 21 / 20	12 / 2 6 / 3 40 / 5 16 / 4
13 /TFC	• stakeholder involvement (higher level) • cooperatives • dissemination	2 staff members	cooperative network, food industry, public sector, education and training, workshop organisation	Willigis Mbogoro, Gloria Mazoko Ahadiel Mmbughu	24 12 3	- - -
14 /ACT	• stakeholder involvement (higher level) • dissemination	2 staff members	farmers' assoc. and cooperative network, food industry, public sector, workshop organisation	Janet Bitegeko, Renatus Mbamilo	38 3	- -
15 /MVIWATA	• stakeholder involvement (grassroot, medium and higher level) • dissemination	4 staff members	farmers' associations network on 3 levels, education and training, public sector, workshop organisation	Steven Ruvuga, Nickson Elly	20 10	- -

6. Exploitation plan

6.1 Perspective for sustainable continuation of established network

The sustainable continuation of the GA-RDInet will be a special focus and task from the beginning of Trans-SEC. Since the upgrading strategies and/or innovations, and products, will be developed jointly with smallholders, other involved stakeholders, NGOs (MVIWATA, TFC, ACT) engaged in securing food supply, and in close involvement with and participation of the national Food Security programme, we expect a high level of implementation and continuation. Furthermore, the Director of National Food Security Mr. Mtambo is advisory board member and the Tanzanian Ministry of Agriculture, Food and Cooperatives is actively involved with task 1.3 a number of other research tasks explicitly aiming to ensure the GA-RDInet durability (see LOI, Annex IV). The GA-RDInet will establish continuous structures such as the Trans-SEC homepage, other communication channels and cooperation with other existing research networks, as well as joint research activities, capacity building and exchange of scientific personnel. Within the project lifetime, joint future R&D projects will be developed to ensure the continuation of GA-RDInet. ZALF and the Sokoine University of Agriculture have a Memorandum of Understanding (MoU) for continuous and mutual support for present and future research activities.

Cooperations with other R&D networks will use synergies of capacities and create funding activities than guarantee the sustainable maintenance of the Trans-SEC network. The ZALF has explicitly created a cross-sector project “Food Security Africa (FSA): Linking Innovations along value chains in landscape systems”. This project is providing the necessary staff resources for continuous fund raising activities and focused research activities to continue after Trans-SEC ends. Hence, the continuation of the GA-RDInet, once established, will require little if any additional efforts and external follow-up funding.

6.2 Prospects for commercial success

Trans-SEC provides the scientific and technical groundwork for a speedy and cost-effective implementation of the upgrading strategies and/or innovations developed. Most WPs focus on their implementation options and commercial success, and special expertise is drawn upon with regard to associated economic issues among partners such as ZALF, IUW, SOKOINE and IFPRI. A two-year action research component will enable testing the potential success of these innovations and/or technologies. Permanent stakeholder involvement and external advice will frame most Trans-SEC activities and constitute another pillar for implementation and commercial success in food production and subsequent processing.

Based on this concept, directly 4000 households of the four selected villages in the target regions will directly benefit from the results of the identified and tested up-grading strategies. These results will be up-taken to farmer school programmes of the smallholder association MVIWATA and the other involved NGOs. Trans-SEC expects lower risks of yield losses and therefore an improved production planning for investments. Through new market access a producer price, which is at least three times higher than the traditional local market price is expected. This might add up to an annual income increase of 30 % per household, if at least 10 % of the total production is sold on markets. The livelihoods will thus be stabilized within the next ten years, once the upgrading strategies are implemented via extension services. Beyond this direct commercial success, indirect benefits will be achieved on larger regional scale through though trickle down effects and regional spill-overs. The

transfer and up-scaling to other Tanzanian regions will only take place, if Trans-SEC demonstrates a direct, visible commercial success in the four villages of Morogoro and Dodoma region. Extension services of other regions, the involved Tanzanian Ministry of Agriculture, Food and Cooperatives, and local governments will assist in gaining maximum outreach.

6.3 Prospects for scientific and/or technical success

Both scientific and/or technical success of Trans-SEC is assumed to be large. This is because the upgrading strategies and/or innovations, and products developed, will be supported by using several innovative tools and activities (e.g. action research; transferability testing and upscaling; participative approaches and tools) ensuring the scientific success. The overall research approach is holistic and innovative in a) analysing the entire food value chains across villages and regions and in b) identifying, testing and assessing upgrading strategies which have already been approved there or elsewhere. We will follow explicit publication strategies for scientific peer-reviewed papers and other communication pathways.

The scientific and technical quality management will be guaranteed by advisory boards of external research experts (PAB) and project stakeholders (SAB). The Trans-SEC coordinators and the steering committee have ample experience and high scientific expertise in food security research and will ensure the scientific success.

6.4 Scientific and/or commercial follow-up projects

Trans-SEC will promote sustainable food security in Tanzania. This will be supported by establishing the GA-RDInet, which aims at sustainable food production. The Trans-SEC settings are adapted to the Tanzanian policy and research landscape. A major aim of the GA-RDInet platform is to develop joint follow-up R&D projects within project lifetime. These will ensure both the continuation of the GA-RDInet and promote future German-Tanzanian cooperation in research and development.

ZALF has successfully coordinated R&D projects within Tanzania for the past six years in collaboration with various Trans-SEC partners and operates a cross-sector project “Food Security Africa (FSA): Linking Innovations along value chains in landscape systems” for continuous funding raising activities. ZALF, SUA, UHOH, IUW, PIK and other Trans-SEC partners are committed to continuing their research in this food-insecure region of Africa after the Trans-SEC project.

7. Presumed financial demands

The financial demands between German and African institutes are equivalent to country-specific cost levels (e.g. costs for personnel) and are targeted to achieve equal resources as possible. Thus, costs for personnel have a German-African ratio of 0,6 (3.856.940 € for German institutes to 2.296.282,5 € for African institutes), while ZALF will sub-contract the African partners (Table 7). Detailed cost explanations are provided in the Annex III.

Table 7: calculation of institutional resources (personnel, travels, technique, material, computers) per year and partners (allocation of costs are more detailed in Annex III)

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
1	**Costs for Personnel**	**no.**	**ZALF**	**+10%**	**no.**	**UHOH**	**+20%**	**no.**	**IUW**	**+20%**	**no.**	**HU**	**+20%**	**no.**	**DIE**	**+10%**	**no.**	**PIK**	**+10%**	**no.**	**DITSL**	**+10%**	**IFPRI**	**+17,5%**	**ICRAF**	**+17%**	**no.**	**SUA**	**0%**	**no.**	**ARI**	**0%**	**no.**	**TFC**	**0%**	**no.**	**ACT**	**0%**	**no.**	**MVIWATA**	**0%**
1.1	Year 1	11	264000	47680	5	113000	22600	2	59600	11920	1	33000	6600	2	40000	4000	1	33000	3300	2	30000	3000	52500	9188	46000	7820	11	106800		6	106000		2	30000		2	30000		5	60000	
1.2	Year 2	11	314000	60960	7	183000	36600	2	69600	13920	1	33000	6600	2	40000	4000	2	50000	5000	2	60000	6000	52500	9188	50000	8500	11	183600		6	112000		2	30000		2	30000		5	70000	
1.3	Year 3	10	294000	58960	7	183000	36600	2	69600	13920	1	33000	6600	2	40000	4000	2	50000	5000	2	60000	6000	52500	9188	50000	8500	11	183600		6	112000		2	30000		2	30000		5	70000	
1.4	Year 4	10	249000	54460	7	183000	36600	2	69600	13920	1	33000	6600	2	40000	4000	2	40000	4000	2	30000	3000					11	183600		6	112000		2	30000		2	30000		5	70000	
1.5	Year 5	9	249000	44980	6	133000	26600	2	59600	11920	1	33000	6600	2	40000	4000	2	40000	4000	2	20000	2000					11	106800		6	94000		2	30000		2	30000		5	70000	
Sum	**6153222,5**		**1370000**	**267040**		**795000**	**159000**		**328000**	**65600**		**165000**	**33000**		**200000**	**20000**		**213000**	**21300**		**200000**	**20000**	**157500**	**27563**	**146000**	**24820**		**764400**			**536000**			**150000**			**150000**			**340000**	
2	**Travel expenses**	**no.**	**ZALF**		**no.**	**UHOH**		**no.**	**IUW**		**no.**	**HU**		**no.**	**DIE**		**no.**	**PIK**		**no.**	**DITSL**		**IFPRI**		**ICRAF**		**no.**	**SUA**		**no.**	**ARI**		**no.**	**TFC**		**no.**	**ACT**		**no.**	**MVIWATA**	
2.1	Year 1	9	12	24888	5	10	21064	2	5	10720	1	3	6172	2	3	6396	2	2	4098	2	4	8896	4378		3567		11	21	18192	6	13	12896	2	8	5512	2	8	5512	5	10	6890
2.2	Year 2	9	13	30168	7	12	26679	2	4	9220	1	3	6172	2	3	6396	2	2	4098	2	3	7396	2378		3567		11	27	23116	6	17	15020	2	8	5512	2	8	5512	5	15	9390
2.3	Year 3	9	12	30088	7	11	26564	3	5	10720	1	3	6172	2	3	6396	2	2	4098	2	4	8896	4378		3567		11	27	23116	6	17	15020	2	8	5512	2	8	5512	5	15	9390
2.4	Year 4	9	12	28288	7	11	25364	3	5	10720	1	3	6172	2	3	6396	2	2	4098	2	3	7396					11	27	23116	6	17	15020	2	8	5512	2	8	5512	5	15	9390
2.5	Year 5	8	12	26888	5	11	24564	3	5	10720	1	3	6172	2	3	6396	2	2	4098	2	4	8896					11	22	18616	6	14	13520	2	8	5512	2	8	5512	5	15	9390
Sum	**740502**			**140320**			**124235**			**52100**			**30860**			**31980**			**20490**			**41480**	**11134**		**10701**				**106156**			**71476**			**27560**			**27560**			**44450**
3	**Costs for devices**		**ZALF***			**UHOH**			**IUW**			**HU**			**DIE**			**PIK**			**DITSL**		**IFPRI**		**ICRAF**			**SUA**			**ARI**			**TFC**			**ACT**			**MVIWATA**	
3.1	Year 1		5000			6500			1500			1500			1500			0			2500		0		0			112000			8000			1500			1500			1500	
3.2	Year 2		4250			5750			750			750			750			0			1750		0		0			17000			8000			0			0			750	
3.3	Year 3		4000			3500			500			500			500			0			1500		0		0			17000			6000			0			0			0	
3.4	Year 4		3500			3000			0			0			0			0			1000							15000			6000			0			0			0	
3.5	Year 5		3500			3000			0			0			0			0			500							15000			7000			0			0			0	
Sum	**273750**		**20250**			**21750**			**2750**			**2750**			**2750**			**0**			**7250**		**0**		**0**			**176000**			**35000**			**1500**			**1500**			**2250**	
4	**Consumables & Services**		**ZALF**			**UHOH**			**IUW**			**HU**			**DIE**			**PIK**			**DITSL**		**IFPRI**		**ICRAF**			**SUA**			**ARI**			**TFC**			**ACT**			**MVIWATA**	
4.1	Year 1		9300			10800			7000			500			3500			0			6500		500		4500			8000			5000			2000			2000			2000	
4.2	Year 2		13700			13000			12500			29000			5500			0			12500		500		4500			10000			3000			1000			1000			1000	
4.3	Year 3		13700			13000			10500			29000			5500			0			12500		0		4300			11000			3000			1000			1000			1000	
4.4	Year 4		14700			8500			11500			4500			4500			1000			13500							11000			4000			1000			1000			1500	
4.5	Year 5		8500			6500			6500			2500			2500			1000			3500							7000			4000			1000			1000			2000	
Sum	**397000**		**59900**			**51800**			**48000**			**65500**			**21500**			**2000**			**48500**		**1000**		**13300**			**47000**			**19000**			**6000**			**6000**			**7500**	
5	**Other costs**		**ZALF**			**UHOH**			**IUW**			**HU**			**DIE**			**PIK**			**DITSL**		**IFPRI**		**ICRAF**			**SUA**			**ARI**			**TFC**			**ACT**			**MVIWATA**	
5.1	Year 1		50200			1200			1200			600			600			600			1200		0		0			8600			23600			1600			1600			7600	
5.2	Year 2		35200			3600			1200			600			600			600			3600		0		0			8600			23600			1600			1600			7600	
5.3	Year 3		35200			1200			1200			600			600			600			3600		150		500			8600			23600			1600			1600			7600	
5.4	Year 4		35200			1200			1200			600			600			600			1200							8600			23600			1600			1600			7600	
5.5	Year 5		29200			1200			1200			600			600			600			1200							8600			23600			1600			1600			7600	
Sum	**434850**		**185000**			**8400**			**6000**			**3000**			**3000**			**3000**			**10800**		**150**		**500**			**43000**			**118000**			**8000**			**8000**			**38000**	
Total 7999324,5			**2042510**			**1160185**			**502450**			**300110**			**279230**			**259790**			**328030**		**197347**		**195321**			**1E+06**			**779476**			**193060**			**193060**			**432200**	

Legend: The columns indicate:

A: Costs for personnel: number of staff involved; note that these numbers illustrate the persons involved in Trans-SEC, but they do not represent full time equivalents.
Travel expenses: number of persons who will travel to Tanzania (for German institutes) and to the case study regions (for Tanzanian institutes).

B: Costs for personnel: total costs for personnel per institute.
Travel expenses: number of assessed trips to Tanzania for German institutes and to the case study regions for Tanzanian institutes.

C: Costs for personnel: overhead rate for personnel per institute. Note that ZALF will sub-contract all African partners and therefore coordination costs were added for administration and financial management.

F: Costs for personnel: Project allowances for universities are 20 %

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Annex I: Glossary

Case study site (CSS)	village with local market place and surrounding 2-3 villages
Impact assessment	A set of logical steps which helps assess the potential economic, social and environmental impact of specific inputs, options, and changes. It provides evidence to involved stakeholders on their advantages and disadvantages.
Food security	Defined according to WHO as existing “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life”. This includes both physical and economic access to food that meets people's dietary needs as well as their food preferences.
Food value chain (FVC)	Defined as consisting of the following main components: natural resources for food production, primary production, food processing, marketing, consumption
GA-RDInet	German-Tanzanian R&D&I network
Implementation feasibility	The ability of research components to be successfully implemented for sustainable use by small-scale farmers
Most vulnerable rural poor	Smallholders (small-scale famers) who do not exceed levels of self-sufficiency
Upgrading strategy	This term is used for a food securing success story and/or good practice example

Annex II: Detailed partner description

Partner 1 ZALF: Leibniz-Centre for Agricultural Landscape Research, DE

The Leibniz-Centre for Agricultural Landscape Research (ZALF) is a large national research facility with six institutes, about 250 scientists and a total of 500 employees. ZALF has extensive experience in coordinating international projects and scientific networks in the field of land and water management and sustainable agricultural development. The research focuses on integrated analysis of agricultural landscapes for sustainable management of land and water, conservation of natural and cultural resources, and sustainable development of rural areas including overseas regions, and particularly Africa. Activities are focused on developing methods to evaluate policy impacts and changes of land use systems on environmental, social and economic sustainability and to support decision making of land use management and policy.

Four ZALF-Institutes with long-standing African research experience participate in Trans-SEC: a) the Institute of Socio-economy, responsible for the project coordination, impact assessment and stakeholder analysis; b) the Institute of Land Use Systems, focusing on typologies of rural systems for upscaling local results, scenarios for land use development, and design of food and feed sustainability indicators; c) the Institute of Hydrology, for analysing regional water availability and balance; d) the Institute of Landscape Systems Analysis.

The project will benefit from the know-how and experiences gained in ZALF's long-time engagement in international agricultural research projects, some of them in Africa. Amongst others, current and recent important projects of ZALF include the coordination of the SENSOR project (www.sensor-ip.eu), MEA-Scope (www.mea-scope.org) and participation in PLUREL (www.plurel.net), LUPIS (www.lupis.eu), CLARIS-LPB (www.claris-eu.org). Until recently, ZALF has been particularly active in Tanzania, coordinating the project ReACCT (www.reacctanzania.com), which focussed on participative development of climate adaptation strategies and practices for small-scale agriculture and land use, and the project Better-iS (www.better-is.com), which aimed at identifying the potential for linking biofuel value chains to low-productivity farming and small and medium enterprises together with all stakeholders and mitigating food insecurity.

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Partner 2 UHOH: University of Hohenheim, DE

The University of Hohenheim (UHOH) comprises four faculties with a total scientific staff of 428. It maintains close international partnerships with universities and other research institutes in over 90 countries worldwide. Within the Faculty of Agricultural Sciences, 14 professors are dedicated to Agricultural Science in the Tropics and Subtropics, all of which are core members of the University's "Centre for Agriculture in the Tropics and Subtropics". The following institutes and working groups are considered in the Trans-SEC GlobE proposal:

1) The Department of Plant Production and Agroecology in the Tropics and Subtropics (380) has a long-standing record in research on food security, sustainable land-use systems, natural resource use, biodiversity, and ecology in tropical and subtropical agroecosystems. Prof. Dr. Folkard Asch holds the chair of "Crop water stress management in the Tropics and Subtropics" and is chairman of the board of the Council for Tropical and Subtropical Agricultural Research (ATSAF e.V.).

2) The Institute of Soil Science and Land Evaluation (310) (Prof. Dr. Karl Stahr, Dr. Ludger Herrmann) has for more than 20 years conducted research programmes dedicated to the sustainable land use and especially soil resources in tropical and subtropical countries, especially West-Africa and Vietnam. Special expertise relates to spatial data resources, soil mapping and fertility, and participatory approaches.

3) Prof. Dr. Joachim Müller holds the Chair of Agricultural Engineering in the Tropics and Subtropics (440e). He is conducting research on post-harvest processing, protecting water as a natural resource and on conserving energy. The combination of fundamental and applied research, frequently in cooperation with industry, enables the development of technology ready for market.

4) For many years the Institute of Biological Chemistry and Nutrition (140a) (Prof. Dr. Hans Konrad Biesalski) has been active in projects with developing countries dedicated to improve the nutritional status of vulnerable groups, for instance in Ethiopia, Uganda, South Africa and Guatemala.

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Partner 3 IUW: Leibniz University Hannover, DE

The Institute for Environmental Economics and World Trade (IUW) (Head: Prof. Dr. Ulrike Grote) belongs to the School of Economics and Management at the Leibniz University of Hannover (LUH). The overall objective of IUW is to contribute to a better understanding of the linkages between development, the environment and international trade. A major focus of the applied research is on questions about the use of environmental and social labelling and certification for agricultural products and for ecosystems, the competitiveness of countries, and the governance of value chains in agro-food sectors as well as on vulnerability to poverty. The small international team of about 13 researchers including PhD-students and post-docs at IUW comes from Africa, Asia, Latin America and European countries.

The main strength of IUW related to the GlobE project is its knowledge and experience in the field of value chains, certification and agricultural and poverty research. The project will benefit from the following ongoing research projects: DFG-financed project on “Impact of Shocks on the Vulnerability to Poverty: Consequences for Development of Emerging Southeast Asian Economies” (DFG FOR 756); BMBF-financed projects on “International Markets for Protected Area Certificates and their Socio-Economic Implications – the Example of Wetlands in Sub-Saharan Africa (including Tanzania)” (CERPA); “Assessing the direct and induced impacts of biofuel value chain activities at small-scale and village level for domestic and export biofuel value chains in Tanzania” (Better-iS), and “Assessment of Certification Systems at Farmer and Trade Levels for Horticultural Products in Thailand” (WEGA). The institute is well integrated in and connected to the development community in Germany, Europe and selected developing countries in Africa (Tanzania, Namibia, Ethiopia), among others.

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Grote, U., Warner, K. 2010. Environmental Change and Forced Migration: Evidence from Sub-Saharan Africa. The International Journal of Global Warming 2 (1):17-47.

Partner 4 HU: Humboldt-Universität zu Berlin, DE

Research at the Agricultural and Horticultural Faculty of the Humboldt-Universität zu Berlin (HUB) systematically deals with the management and maintenance of natural resources and with national and international dimensions of agricultural and horticultural production. The Department of Horticultural Economics (Head of Department Prof. Dr. Wolfgang Bokelmann) focuses on research and teaching activities on all aspects of food value chains, especially governance, sustainability and innovations. The emphasis is on agricultural management, agricultural marketing, environmental management and food value chain coordination. Among the activities of the department are international curriculum development projects with overeseas universities in Value Chain Analysis, Rural Development, Food Security and Problem-Based Learning as well as research projects in Innovations and Change Processes in rural areas.

Prof. Bokelmann is responsible for the EU/Edulink project ValueLEad: "Value Chains for poverty reduction in the agri-food sector – Problem-based learning in higher education" (2008-2011) with partner universities in Kenya and Ethiopia. He was also the project leader of the DoCuMap project

(2007-2010): Since 2011 he is project leader of EU-ALFA III Program, SERIDA Rural Society, Economy and Natural Resources – Integrating Competence in Rural Development.

Key references:

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Partner 5 DIE: Deutsches Institut für Entwicklungsforschung, DE

DIE is one of the leading Think Tanks for development policy world-wide. It is based in the UN City of Bonn. DIE works on the interplay between Research, Consulting and Training. Through this combination, it builds bridges between theory and practice and works within international research networks. The institute covers a wide array of topics, reflected and organized in its five research departments: Bi- and Multilateral Development Cooperation; Competitiveness and Social Development, Governance; Statehood; Security; Environmental Policy and Management of Natural Resources; and World Economy and Development Financing. At present, the Institute has a staff of 100, more than two-thirds of which are researchers.

The major contribution of DIE to the proposed research project is its theoretical and practical experience with political economy and politics of agricultural policies in Sub-Sahara Africa, development policy and policy advice. Apart from the general capacities in these fields, it profits specifically from the following recently concluded and ongoing projects: “Making agricultural policy work in Subsaharan Africa: Understanding and improving CAADP and APRM processes”, “Biofuel production in Namibia: Opportunities, threats and the institutional environment for rural development and food security”, “Biofuel production in Subsaharan Africa” as part of the BMBF-funded project “fairfuels?”, “Climate Change and Development in Africa and Latin America”, “Shaping value chains with a view to development needs”, “Innovations for ecologically sustainable development”.

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Partner 6 PIK: Potsdam Institut für Klimafolgenforschung, DE

The Potsdam Institute for Climate Impact Research (PIK) is a world-leading research institute addressing crucial scientific questions in the fields of global change, climate impacts and sustainable development. Through data analysis, computer simulations and models, PIK provides decision makers with sound information about climate change and novel concepts for sustainable development.

The PIK working group on global agriculture, climate and land use, encompassing 14 staff members, will be involved within GlobE. The group has an excellent publication record, but also a long-standing track record in stakeholder interaction and policy advice. Results have been quoted by IPCC SRREN 2011 and the World Bank World Development Report 2010 and have been used by important stakeholders (EU DG CLIMA and AGRI, European Parliament, CGIAR, ESSP, Munich Re Foundation, Bayer CropScience, Misereor and others). This project will benefit from the group's long-standing experience in conducting large-scale projects on climate impact assessment, crop and land use modelling as well as from ongoing research projects in Africa (3 projects in the BMZ call Adaptation of African Agriculture to Climate Change, 3 EU-funded projects ClimAfrica, AfroMaison, Dewfora) and contacts to African partners such as ASARECA, FANRPAN, ILRI and IER.

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Partner 7 DITSL: German Institute for Tropical and Subtropical Agriculture, DE

The German Institute for Tropical and Subtropical Agriculture (DITSL) is a non-profit limited liability company (GmbH) at the University of Kassel. As part of the university's international knowledge and technology development and transfer structure, it does capacity building at the academic and professional level and operates state-of-the-art training facilities. DITSL conducts research on regional management, resource and land use with a focus on agro-ecosystems, knowledge systems, food security, and food- and commodity chain development. Research projects also deal with production system analysis, efficiency in resource utilisation and knowledge systems, using a cybernetic analysis tool, participatory methods, farmer experimentation and participatory monitoring and evaluation.

DITSL (Assoc. Prof. Dr. Brigitte Kaufmann and Dr. Christian Hülsebusch) is currently partner in several collaborative research and network projects with relevance to the topic of the call: i) GrassNet "Cross-continental network for sustainable adaptation of grassland systems to climate change" (DAAD), ii) ICDD "International Centre for Development and Decent Work" (DAAD), iii) Adaptive Capacity: Increasing the adaptive capacity of agro-pastoralists in West and Southern Africa using a transdisciplinary approach" (BMZ), iv) Urban Food: "Nutrient Efficient Agriculture in West African Cities" (VolkswagenFoundation), v) ClimaLearn: Mutual learning of pastoral livestock keepers and scientists for adaptation to climate change (BMZ), vi) SuLaMa: Participatory research to support sustainable land management on the Mahafaly Plateau in southwestern Madagascar (BMBF). International collaboration is maintained with the CGIAR and NARS in Africa, Asia and Latin America.

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Partner 8 (CGIAR) IFPRI: International Food Policy Research Institute (USA)

IFPRI is an international agricultural research centre improving the understanding of national agricultural and food policies to promote the adoption of innovations in agricultural technology. IFPRI has offices in several developing countries, including Ethiopia, and has research staff working in many more countries around the world. Research topics include, for instance, low crop and animal productivity, environmental degradation, water management, property rights, sustainable intensification of agricultural production, climate change impact on poor farmers, food security, micronutrient malnutrition, microfinance programs, urban food security, and gender and development. IFPRI will carry out macro-level analysis of impacts on agricultural markets and food availability, as well as on the implied changes to land use that will result. The model used is the International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT), which was developed by IFPRI for projecting the global food supply, food demand and food security to the year 2020 and beyond.

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Partner 9 (CGIAR) ICRAF: The International Centre for Research in Agroforestry (KE)

The World Agroforestry Centre (ICRAF) is a member of the Consultative Group on International Agricultural Research (CGIAR). ICRAF conducts basic and applied research with the vision to bring rural transformation through increased use of trees in agricultural landscapes to improve food security, nutrition, income, health, energy resources and environmental sustainability. Its mission is to generate science-based knowledge about the diverse role trees play in agricultural landscapes and to use its research to advance policies and practices to benefit the poor and the environment. ICRAF works in over 25 developing countries through a strong network of national and regional partners. Recently, ICRAF and ZALF successfully completed joint projects: Resilient Agro-landscapes to Climate Change in Tanzania (ReACCT) and Biofuel Evaluation for Technological Efficiency using Renewables–integrated strategies (Better-iS). The network and experience developed from these two projects will be useful in implementing the proposed Trans-Sec project. Also, the existing projects such as the African Soil Information Services (Afsis) project (www.africasoils.net) and the leading scientists in biophysical and socio-economic research will contribute to the success of this project. Dr. Anthony A. Kimaro is the head of the Tanzanian ICRAF unit, with extensive experience in agroforestry research.

Key references:

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Isaac, M.E., Kimaro, A.A. 2011. Diagnosis of nutrient imbalances with vector analysis in agroforestry systems. Journal of Environmental Quality 40: 860-866.

Partner 10 SUA: Sokoine University of Agriculture, TZ

The Sokoine University of Agriculture (SUA) has four campuses and is located in Morogoro town 220 km from Dar es Salaam. SUA endeavours to answer the needs and solve the problems of Tanzania's agriculture and rural life, manage natural resources on a sustainable manner, and to contribute to improved production and therefore improved living standards of the people.

SUA is well endowed with 450 highly trained academic staff, more than 80 technicians/laboratory technologists/field officers. It also has agricultural/natural resources management officers in agricultural, natural resource and environment management sciences as well as in socio-economic and human studies. Other persons include a body of about 700 postgraduate students and about 3000 undergraduate students, as well as occasional research associates from other institutions across the world. The University enjoys collaboration with a number of other academic and research institutions across the world. Currently, the University holds Memoranda of Understanding and Collaboration Agreements with more than 50 institutions/agencies across the world. The University publishes a minimum of 70 papers in peer-reviewed scientific journal annually, amongst other outputs. The University currently is undertaking more than 130 research projects in various disciplines related to agricultural, natural resource and environment management sciences as well as in socio-economic and human studies. A number of ongoing research projects are connected to partners of Trans-SEC, for instance "Better-iS" and "React", both financed by BMZ.

SUA has played a key role in the development of the Agricultural Sector Development Programme (ASDP) of Tanzania. SUA is also expected to join hands with other actors in contributing to the Tanzania Government poverty reduction efforts. That is designed to contribute to the national level goal of reducing poverty for improved people's livelihoods within the framework of MKUKUTA, Vision 2025 and MDGs. SUA will participate with four departments, the Department of Agricultural Engineering and Land Planning, the Department of Agricultural Economics & Agribusiness, the Department of Animal Science and Production, and the Development Studies Institute.

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Silayo, V.C.K., Laswai, H.S., Ballegu, W.R.W., Mpagalile, J.J., Kulwa, K., Yuda, B. 2008. Adaption of the traditional coffee pulping machine to soybean dehulling. Tanzania Journal of Agricultural Sciences 9(1): 83-90.

Partner 11 ARI: Agricultural Research Institutes, TZ

The Agricultural Research Institutes (ARI) in Tanzania are coordinated under the Directorate of Research and Development (DRD), Ministry of Agriculture, Food and Cooperatives. The DRD is charged with responsibilities of developing appropriate agricultural technologies using participatory approaches. The core functions of ARI are to undertake research in farming systems, crops and environmentally friendly agricultural technologies, and to collect, document and disseminate agricultural research findings. Basically, the ARIs in Tanzania are coordinated at the Seven Research Zones, which have been characterized according to the agro-ecological zones (http://www.agriculture.go.tz/Organization%20structure/ARD/research%20zone.html). Each zone is composed of three major sections, namely Crop Research section, Farming Systems/Socio-Economic section and Special Programmes Research section. Some of the research activities include crop husbandry and agronomic practices, crop protection (disease, insect and weed control), post-harvest technologies, and conserving plant genetic resources for crop improvement (breeding). Other activities undertaken by ARI include documenting and disseminating crop research technologies to farmers through extension services and media, research on soil fertility, nutrition, soil and water conservation, research on conservation agriculture, soil, plant and water analysis research on tree species suitable for fuel wood, fodder and for improving soil fertility research on farm implements. The ARIs in Tanzania have experienced staff in different disciplines ranging from plant breeders, agronomists, natural resource management specialists, agricultural engineers to social economists. At present, ARI in Tanzania has a permanent staff categorized as PhD (57), MSc (139), BSc (113), and many more field officers and supporting staff members. The major contribution of the ARIs to the proposed research project is its long-time experience in conducting on-farm and on-station research and demonstration trials.

Key references:

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Mkangwa, C.Z., Semoka, J.M.R., Maliondo, S.M.S. 2004. Performance of Tephrosia vogelii grown on a P deficient Ferralsol amended with Minjingu phosphate rock. Proceedings of the 19th Conference of the Soil Science Society of East Africa, Moshi, Tanzania. In: Msaky, J.J.T., Msumali, G.P., Rwehumbiza, F.B.R. (Eds.) Moshi, Tanzania. 2-7 December, 2001: 124-140.

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Partner 12 TFC: Tanzania Federation of Cooperatives, TZ

The Tanzania Federation of Cooperatives LTD (TFC) http://www.ushirika.coop/ is the national Cooperative Umbrella Organisation that promotes, serves and coordinates the development and prosperity of all Cooperative societies in Tanzania Mainland. TFC is an autonomous, non-governmental and non-partisan body that is member owned and managed by internationally recognised co-operative principles and values. About 90% of the TFC members come from the agricultural and livestock sector. It strongly collaborates with various Tanzanian ministries, universities and NGOs.

The objectives of the TFC are a) to promote the prosperity of societies affiliated to it in accordance with co-operative principles and practices, b) to unite registered co-operative organizations; and c) to collect, analyze and disseminate information and statistics relating to or of particular relevance to co-operative societies' operations. The TFC initiates participatory education and training programs amongst its members and arranges for courses and seminars. It represents the member societies in national and international fora and gives publicity to all co-operative activities in Tanzania. The TFC conducts research and consultancy in the area of marketing, business development and financing, arranges for the audit and supervision of member societies, and coordinates nationally cooperative development plans for members. The TFC encompasses 22 professional staff members.

Partner 13 ACT: Agricultural Council of Tanzania, TZ

Agricultural Council of Tanzania (ACT) http://www.actanzania.org/ is the national apex organization of private operators in the agricultural sector of Tanzania, with a total of 16 employees. ACT has extensive experience in facilitating and coordinating projects and other activities in the agricultural area. It actively undertakes participative and consultative lobbying and advocacy roles on key private sector agricultural issues on behalf of members and stakeholders. The Council works to support and improve the policy, economic, legal, technical and institutional environment for private sector-led agricultural development. It is working to offer alternative ways of developing agriculture in Tanzania. While the Council works very closely with the public sector, its approach is grass-root-based and demand-driven and responds to the real needs of agriculture, rather than externally-driven perceptions of what would be useful. The Council draws its membership from a wide spectrum of stakeholders including: farmers' associations and cooperatives, companies and individuals involved in crop farming, animal production, fishing, crop and animal health, agro-processing industries, inputs supplying firms, agro-based academic research institutes, farmers' service centres and rural credit agencies.

ACT has increased participation in public-private partnerships by facilitating and coordinating PPP activities on behalf of partners, for example the Tanzania Agricultural Partnership (TAP) and Southern Agricultural Growth Corridor of Tanzania (SAGCOT). Also, ACT disseminates information to members through newsletters, fora and exhibitions, linking farmers through networking, representing these farmers locally and internationally, and linking farmers to financial institutions.

Key references

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Partner 14 MVIWATA: Mtandao wa Vikundi Vya Wakulima Tanzania (National Network of Small-Scale Farmers' Groups in Tanzania), TZ

MVIWATA http://www.mviwata.org/content/about-mviwata is the National Network of Small-Scale Farmers' Groups in Tanzania. It is a grassroots membership organization of small-scale farmers with over 4,000 groups, organised in over 1000 local networks and over 100,000 individual members in all regions of Tanzania. It unites small holder farmers in order to have a common voice with respect to economic, social, cultural and political issues in Tanzania. The MVIWATA organizational structure provides for three scale levels of networks, a) the national level composed of a board of directors and management team facilitate technical, financial, legal and similar support to middle-level networks; b) the middle-level networks are composed of farmers' networks at the regional and district level, with own leaderships securing technical and financial support and linking the national and grass root levels; c) local networks ("grass root level") are composed of farmers' groups and networks, and individual farmers at the village and ward level meet regularly to discuss issues of concern.

The main activities of MVIWATA are facilitating the organization of small-scale farmers into groups and networks; lobbying and advocacy for issues of interest to the small-scale farmers and ensuring representation of farmers' views in the policies affecting them; capacity building of small-scale farmers on group management, leadership, economic skills (marketing, saving and credits), lobbying and advocacy, gender, HIV/AIDS, and climate change; facilitating farmers' access to markets and finances; collecting and disseminating information, experience and knowledge of farmers through publications such as Pambazuko newsletter, weekly radio programme (Voice of MVIWATA), websites and other publications; developing participatory economic projects designed to economically empower farmers; organizing farmers' dialogues and forums such as workshop and meetings, exchange visits and farmers' participation in various agricultural shows. The total number of MVIWATA staff is 40, working in different regions of Tanzania.

Annex III: Detailed financial budgets – Costs for personnel

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
1	**Costs for Personnel**	**no.**	**ZALF**	**+10%**	**no.**	**UHOH**	**+20%**	**no.**	**IUW**	**+20%**	**no.**	**HU**	**+20%**	**no.**	**DIE**	**+10%**	**no.**	**PIK**	**+10%**	**no.**	**DITSL**	**+10%**	**IFPRI**	**+17,5%**	**ICRAF**	**+17%**	**no.**	**SUA**	**0%**	**no.**	**ARI**	**0%**	**no.**	**TFC**	**0%**	**no.**	**ACT**	**0%**	**no.**	**MVIWATA**	**0%**
1.1	**Year 1**	**11**	**264000**	**47680**	**5**	**113000**	**22600**	**2**	**59600**	**11920**	**1**	**33000**	**6600**	**2**	**40000**	**4000**	**1**	**33000**	**3300**	**2**	**30000**	**3000**	**52500**	**9188**	**46000**	**7820**	**11**	**106800**		**6**	**106000**		**2**	**30000**		**2**	**30000**		**5**	**60000**	
	Postdoc	4	60000	14280	2	40000	8000	1	39600	7920				1	10000	1000	1	33000	3300	1	30000	3000			26000	4420	4	36800		2	46000										
	PhD scientist	3	60000	12000	2	40000	8000	1	20000	4000				1	30000	3000											5	30000		3	30000										
	Senior scientist	2	99000	16900	1	33000	6600				1	33000	6600							1			52500	9188	20000	3400	2	40000		1	30000										
	Stakeholder NGO																															2	30000		2	30000		5	60000	
	Coordination admin and finance	2	45000	4500																																				
1.2	**Year 2**	**11**	**314000**	**60960**	**7**	**183000**	**36600**	**2**	**69600**	**13920**	**1**	**33000**	**6600**	**2**	**40000**	**4000**	**2**	**50000**	**5000**	**2**	**60000**	**6000**	**52500**	**9188**	**50000**	**8500**	**11**	**183600**		**6**	**112000**		**2**	**30000**		**2**	**30000**		**5**	**70000**	
	Postdoc	4	80000	19960	3	60000	12000	1	39600	7920				1	10000	1000	2	50000	5000	1	60000	6000			30000	5100	4	73600		2	46000										
	PhD scientist	3	90000	18600	3	90000	18000	1	30000	6000				1	30000	3000											5	60000		3	36000										
	Senior scientist	2	99000	17900	1	33000	6600				1	33000	6600							1			52500	9188	20000	3400	2	50000		1	30000										
	Stakeholder NGO																															2	30000		2	30000		5	70000	
	Coordination admin and finance	2	45000	4500																																				
1.3	**Year 3**	**10**	**294000**	**58960**	**7**	**183000**	**36600**	**2**	**69600**	**13920**	**1**	**33000**	**6600**	**2**	**40000**	**4000**	**2**	**50000**	**5000**	**2**	**60000**	**6000**	**52500**	**9188**	**50000**	**8500**	**11**	**183600**		**6**	**112000**		**2**	**30000**		**2**	**30000**		**5**	**70000**	
	Postdoc	4	60000	17960	3	60000	12000	1	39600	7920				1	10000	1000	2	50000	5000	1	60000	6000			30000	5100	4	73600		2	46000										
	PhD scientist	3	90000	18600	3	90000	18000	1	30000	6000				1	30000	3000											5	60000		3	36000										
	Senior scientist	2	99000	17900	1	33000	6600				1	33000	6600							1			52500	9188	20000	3400	2	50000		1	30000										
	Stakeholder NGO																															2	30000		2	30000		5	70000	
	Coordination admin and finance	1	45000	4500																																				
1.4	**Year 4**	**10**	**249000**	**54460**	**7**	**183000**	**36600**	**2**	**69600**	**13920**	**1**	**33000**	**6600**	**2**	**40000**	**4000**	**2**	**40000**	**4000**	**2**	**30000**	**3000**					**11**	**183600**		**6**	**112000**		**2**	**30000**		**2**	**30000**		**5**	**70000**	
	Postdoc	3	45000	16460	3	60000	12000	1	39600	7920				1	10000	1000	2	40000	4000	1	30000	3000					4	73600		2	46000										
	PhD scientist	3	60000	15600	3	90000	18000	1	30000	6000				1	30000	3000											5	60000		3	36000										
	Senior scientist	2	99000	17900	1	33000	6600				1	33000	6600							1							2	50000		1	30000										
	Stakeholder NGO																															2	30000		2	30000		5	70000	
	Coordination admin and finance	2	45000	4500																																				
1.5	**Year 5**	**9**	**249000**	**44980**	**6**	**133000**	**26600**	**2**	**59600**	**11920**	**1**	**33000**	**6600**	**2**	**40000**	**4000**	**2**	**40000**	**4000**	**2**	**20000**	**2000**					**11**	**106800**		**6**	**94000**		**2**	**30000**		**2**	**30000**		**5**	**70000**	
	Postdoc	3	45000	12780	2	40000	8000	1	39600	7920				1	10000	1000	2	40000	4000	1	20000	2000					4	36800		2	46000										
	PhD scientist	2	60000	10800	3	60000	12000	1	20000	4000				1	30000	3000											5	30000		3	18000										
	Senior scientist	2	99000	16900	1	33000	6600				1	33000	6600							1							2	40000		1	30000										
	Stakeholder NGO																															2	30000		2	30000		5	70000	
	Coordination admin and finance	2	45000	4500																																				
Sum	**6153222,5**		**1370000**	**267040**		**795000**	**159000**		**328000**	**65600**		**165000**	**33000**		**200000**	**20000**		**213000**	**21300**		**200000**	**20000**	**157500**	**27563**	**146000**	**24820**		**764400**			**536000**			**150000**			**150000**			**340000**	

In general there are slightly increasing assignments for costs for personnel because e.g. PhDs will not always be assigned from the first month onwards. ZALF will subcontract all African partners. Since the coordination efforts are very high, additional costs for "coordination admin and finance" were allocated to ZALF.

Legend of columns:

A: Number of staff involved; note that these numbers illustrate the persons involved in Trans-SEC, but they do not represent full time equivalents. Few senior costs are not financed, but these senior scientists will supervise the Postdocs (e.g. IUW, DITSL). For all German partners the cost equivalents are 66000 Euro per year for senior scientists, 30000 Euro per year for PhDs and 55000 Euro per year for Postdoc scientists.

B: Total costs per budget position per institute without overhead rate; e.g. ZALF: 4 Postdoc scientists are assigned 25 % each in full time equivalents for the first year.

C: Overhead rate per institute of personnel costs; note that ZALF`s overhead rate includes all costs for personnel for African partners. Therefore, the overheads of African partners are not indicated.

F: Project allowances for universities are 20 %.

AA: African partners have specific cost equivalents: One PhD costs 50000 Euro for 4 years; one senior scientist costs 50000 Euro for one year and a junior scientist costs 19000 Euro per year. These cost items apply to all partners, expect the involved associations are calculated in averages according to their level of involvement.

Budget. – Costs for travel

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
2	**Travel expenses**	no.	ZALF		no.	UHOH		no.	IUW		no.	HU		no.	DIE		no.	PIK		no.	DITSL		IFPRI		ICRAF		no.	SUA		no.	ARI		no.	TFC		no.	ACT		no.	MVIWATA	
2.1	**Year 1**	**9**	**12**	**24888**	**5**	**10**	**21064**	**2**	**5**	**10720**	**1**	**3**	**6172**	**2**	**3**	**6396**	**2**	**2**	**4098**	**2**	**4**	**8896**	**4378**		**3567**		**11**	**21**	**18192**	**6**	**13**	**12896**	**2**	**8**	**5512**	**2**	**8**	**5512**	**5**	**10**	**6890**
	International travel, Postdoc	4	2	3000	2	2	3000	1	1	1500	1	1	1500	1	1	1500	2	1	1500	1	1	1500					4	8		2	4									
	International travel, PhD	3	2	3000	2	1	1500	1	1	1500				1													5	12		3	8									
	International travel, Seniors	2	2	3000	1	1	1500													1	1	1500	2000				2			1											
	National travel, flat rate			2000			2000			1000			500			500			150			1000			3000			8000			6000	2	8	4000	2	8	4000	5	10	5000
	Exchange program (African PhD)																											1	1200		1	1200								
	Annual meeting, kick-off		6	9000		6	9000		3	4500		2	3000		2	3000		1	1500		2	3500	2000																	
	Scientific conferences			1000			1000			500			500			500			500			500																		
	Allowances PhD, 2 months			1200			600			600																		7200			4800									
	Allowances, others			2688			2464			1120			672			896			448			896	378		567			1792			896			1512			1512			1890
2.2	**Year 2**	**9**	**13**	**30168**	**7**	**12**	**26679**	**2**	**4**	**9220**	**1**	**3**	**6172**	**2**	**3**	**6396**	**2**	**2**	**4098**	**2**	**3**	**7396**	**2378**		**3567**		**11**	**27**	**23116**	**6**	**17**	**15020**	**2**	**8**	**5512**	**2**	**8**	**5512**	**5**	**15**	**9390**
	International travel, Postdoc	4	2	3000	3	2	3000	1	1	1500	1	1	1500	1	1	1500	2	1	1500	1	1	1500					4	8		2	4									
	International travel, PhD	3	3	4500	3	3	4500	1	1	1500				1													5	15		3	10									
	International travel, Seniors	2	2	3000	1	1	1500													1							2	1	1500	1	1	1500									
	National travel, flate rate			2000			2000			1000			500			500			150			1000			3000			7000			4000	2	8	4000	2	8	4000	5	15	7500
	Exchange program (African PhD)																											3	3600		2	2400								
	Annual meeting		6	9000		6	9000		2	3000		2	3000		2	3000		1	1500		2	3500	2000																	
	Scientific conferences			1000			1000			500			500			500			500			500						0			0			0						
	Sum allowances, PhD			5400			3600			600																		9000			6000									
	Sum allowances, others			2268			2079			1120			672			896			448			896	378		567			2016			1120			1512			1512			1890
2.3	**Year 3**	**9**	**12**	**30088**	**7**	**11**	**26564**	**3**	**5**	**10720**	**1**	**3**	**6172**	**2**	**3**	**6396**	**2**	**2**	**4098**	**2**	**4**	**8896**	**4378**		**3567**		**11**	**27**	**23116**	**6**	**17**	**15020**	**2**	**8**	**5512**	**2**	**8**	**5512**	**5**	**15**	**9390**
	International travel, Postdoc	4	2	3000	3	2	3000	1	1	1500	1	1	1500	1	1	1500	2	1	1500	1	1	1500					4	8		2	4									
	International travel, PhD	3	3	4500	3	2	3000	1	1	1500				1													5	15		3	10									
	International travel, Seniors	2	1	1500	1	1	1500	1	1	1500										1	1	1500	2000				2	1	1500	1	1	1500									
	National travel, flat rate			2000			2000			1000			500			500			150			1000			3000			7000			4000	2	8	4000	2	8	4000	5	15	7500
	Exchange program (African PhD)																											3	3600		2	2400								
	Annual meeting		6	9000		6	9000		2	3000		2	3000		2	3000		1	1500		2	3500	2000																	
	Scientific conferences			2000			2000			500			500			500			500			500						0			0			0						
	Sum allowances, PhD			5400			3600			600																		9000			6000									
	Sum allowances, others			2688			2464			1120			672			896			448			896	378		567			2016			1120			1512			1512			1890
2.4	**Year 4**	**9**	**12**	**28288**	**7**	**11**	**25364**	**3**	**5**	**10720**	**1**	**3**	**6172**	**2**	**3**	**6396**	**2**	**2**	**4098**	**2**	**3**	**7396**					**11**	**27**	**23116**	**6**	**17**	**15020**	**2**	**8**	**5512**	**2**	**8**	**5512**	**5**	**15**	**9390**
	International travel, Postdoc	4	2	3000	3	2	3000	1	1	1500	1	1	1500	1	1	1500	2	1	1500	1	1	1500					4	8		2	4									
	International travel, PhD	3	3	4500	3	2	3000	1	1	1500				1													5	15		3	10									
	International travel, Seniors	2	1	1500	1	1	1500	1	1	1500										1							2	1	1500	1	1	1500									
	National travel, flat rate			2000			2000			1000			500			500			150			1000						7000			4000	2	8	4000	2	8	4000	5	15	7500
	Exchange program (African PhD)																											3	3600		2	2400								
	Annual meeting		6	9000		6	9000		2	3000		2	3000		2	3000		1	1500		2	3500																			
	Scientific conferences			2000			2000			500			500			500			500			500						0			0			0						
	Sum allowances, PhD			3600			2400			600																		9000			6000									
	Sum allowances, others			2688			2464			1120			672			896			448			896						2016			1120			1512			1512			1890
2.5	**Year 5**	**8**	**12**	**26888**	**5**	**11**	**24564**	**3**	**5**	**10720**	**1**	**3**	**6172**	**2**	**3**	**6396**	**2**	**2**	**4098**	**2**	**4**	**8896**					**11**	**22**	**18616**	**6**	**14**	**13520**	**2**	**8**	**5512**	**2**	**8**	**5512**	**5**	**15**	**9390**
	International travel, Postdoc	4	2	3000	2	2	3000	1	1	1500	1	1	1500	1	1	1500	2	1	1500	1	1	1500					4	8		2	4									
	International travel, PhD	2	3	4500	2	2	3000	1	1	1500				1													5	12		3	10									
	International travel, Seniors	2	1	1500	1	1	1500	1	1	1500										1	1	1500					2			1											
	National travel, flat rate			2000			2000			1000			500			500			150			1000						7000			4000	2	8	4000	2	8	4000	5	15	7500
	Exchange program (African PhD)																											2	2400		2	2400								
	Annual meeting & Final meeting		6	9000		6	9000		2	3000		2	3000		2	3000		1	1500		2	3500																			
	Scientific conferences			3000			3000			500			500			500			500			500																			
	Sum allowances, PhD			1200			600			600																		7200			6000									
	Sum allowances, others			2688			2464			1120			672			896			448			896						2016			1120			1512			1512			1890
Sum	**740502**			**140320**			**124235**			**52100**			**30860**			**31980**			**20490**			**41480**	**11134**		**10701**				**106156**			**71476**			**27560**			**27560**			**44450**

Legend of columns: see next page

A: Number of staff involved; derived from the first table “costs for personnel”

B: Number of assumed trips to the case study sites and regions per year. The core team will attend the annual meetings.

C: - Average sum of flight costs and additional costs for staying in the region assuming one flight amounts to 1000 Euro and hotel costs etc. for one week amount to 500 Euro; e.g. two trips for PhDs amounts per year to 3000 Euro.
- PhDs receive a monthly allowance of 300 Euro per months and other scientist will receive a daily allowance of 32 Euro. The latter is represented in the cost item “allowances, others” which is an estimated average levelling out the differences in the length of research stays.
- For German partners a national travel flat rate represents all these cost items (e.g. unforeseeable events like “gasoline filling”, payments for hotels for drivers having to wait). Such costs always arise due to difficult local circumstances. For African partners the national travel flat rate is the budget to cover all costs for travelling, maintenance of pick-ups and mileage allowance.
- The exchange program applies to African PhDs only, who should visit German institutes for reasons of capacity building and supervision. Excluded are German scientists since costs for research stays in Tanzania are covered by the indicated allowances.
- A supplementary support for attending scientific conferences as an incentive for participation.

AB: The travel costs for African partners are indicated through a flat rate since the number of trips will be high and the costs per trip are relatively low. Lead scientists of African partners (SUA, ARI) will also travel several times to Germany in year 1, 2 and 3 for management meetings and strategic discussions.

Budget. – Cost for devices

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
3	**Costs for devices**		**ZALF***			**UHOH**			**IUW**			**HU**			**DIE**			**PIK**			**DITSL**		**IFPRI**		**ICRAF**		**no.**	**SUA**			**ARI**			**TFC**			**ACT**			**MVIWATA**	
3.1	**Year 1**		**5000**			**6500**			**1500**			**1500**			**1500**			**0**			**2500**		**0**		**0**			**112000**			**8000**			**1500**			**1500**			**1500**	
	Equipment (e.g on-farm trial sites)		1500			5000																						2000			4000										
	Equipment (e.g off-farm trial sites, other)		3500			1500			1500			1500			1500						2500							5000			4000			1500			1500			1500	
	3 Pick-ups for transport & maintenance																											100000													
	8 motor bikes f. remote areas (PhD)																											5000													
3.2	**Year 2**		**4250**			**5750**			**750**			**750**			**750**			**0**			**1750**		**0**		**0**			**17000**			**8000**			**0**			**0**			**750**	
	Equipment (e.g on-farm trial sites)		1500			5000																						2000			4000										
	Equipment (e.g off-farm trial sites, other)		2750			750			750			750			750						1750							5000			4000									750	
	3 pick-ups maintenance																											10000													
	0 motor bikes f. remote areas (PhD)																																								
3.3	**Year 3**		**4000**			**3500**			**500**			**500**			**500**			**0**			**1500**		**0**		**0**			**17000**			**6000**			**0**			**0**			**0**	
	Equipment (e.g on-farm trial sites)		1500			3000																						2000			4000										
	Equipment (e.g off-farm trial sites, other)		2500			500			500			500			500						1500							3000			2000										
	3 pick-ups maintenance																											10000													
	2 motor bikes f. remote areas (PhD)																											2000													
3.4	**Year 4**		**3500**			**3000**			**0**			**0**			**0**			**0**			**1000**							**15000**			**6000**			**0**			**0**			**0**	
	Equipment (e.g on-farm trial sites)		1500			3000																						2000			4000										
	Equipment (e.g off-farm trial sites, other)		2000																		1000							3000			2000										
	3 pick-ups maintenance																											10000													
	0 motor bikes f. remote areas (PhD)																																								
3.5	**Year 5**		**3500**			**3000**			**0**			**0**			**0**			**0**			**500**							**15000**			**7000**			**0**			**0**			**0**	
	Equipment (e.g on-farm trial sites)		1500			3000																						2000			5000										
	Equipment (e.g off-farm trial sites, other)		2000																		500							3000			2000										
	3 pick-ups maintenance																											10000													
	0 motor bikes f. remote areas (PhD)																																								
Sum	**273750**		**20250**			**21750**			**2750**			**2750**			**2750**			**0**			**7250**		**0**		**0**			**176000**			**35000**			**1500**			**1500**			**2250**	

Legend of columns:

- The costs for devices indicate the research focus of partners. ZALF, UHOH, SUA and in the ARIs will focus on on-farm testing of good practices in the regions.
- ZALF and other partners will collaborate with SUA and the ARIs to test good practices on research trial sites. These are average costs for all scientific instruments. In exceptional cases, laptops, mobiles etc. might be additionally needed in combination with scientific instruments (measuring data) and for exclusive use in Trans-SEC.
- Three project pick-ups will be bought due to several reasons: (1) The use of pick-ups for field work and transport is mandatory. Trans-SEC will have ca. 75 trips in the case study regions in the first year with progressing trend in the following years. Although synergies of sharing transport means will be achieved, additional hired transport means are necessary. The difficult circumstances in the remote areas justify this purchase (see scoping study in the Annex VI). (2) Based on our calculation this solution is more economic than hiring pick-ups from SUA or ICRAF, where immediate availability is additionally not guaranteed; e.g. only for the SUA team a pick up costs around 0.4 Euro per km (no fuel) 40 Euro every night one spends with a car. SUA will travel about 1000 km to and from Morogoro site and around 1500 km to and from Dodoma. The two trips will cost of about 2500 km x 0.4 = 1000 Euro. SUA has a minimum of 2 trips a month = 2000 €/month in 5 years = 5 x 12 x 2000 = 120.000 €. This plus the night charges (supposed each trip SUA stays with a car for a minimum of 10 nights every trip for 2 sites = 10 x 60 x 40 € = 24.000 €) totals 144.000 €. Dar es Salaam pick-ups of arriving scientists cost 400 km x 0.4 € = 160 + 50 = 210 €. At least one airport pick-up per month: 210 x 12 x 5yrs = 12.600 €. Overall total = 144.000 € + 12.600 € = approx. 156.600 €. This calculation is only for one car. The huge Trans-SEC team will need at least three cars: 500.000 € for 5 years. These costs are highly underestimated because these are based on only SUA travels. There will be at least two times higher costs due to the high use of the three pick-ups.
- Costs for maintenance refer only to spare parts and repairing. Breakdowns normally occur under intensive use in average twice per year for three pick-ups.
- The purchase of 8 motor bikes is inevitable due to the fact that PhDs will have to be mobile in the case study regions. The use of motorbikes will be only allowed in the case study regions, where public transport means are missing. Experiences at SUA show that this is the most efficient transport mean to ensure successful surveys.

Budget. – Cost for consumables

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
4	**Consumables & Services**	**no.**	**ZALF**		**no.**	**UHOH**		**no.**	**IUW**		**no.**	**HU**		**no.**	**DIE**		**no.**	**PIK**		**no.**	**DITSL**		**IFPRI**		**ICRAF**		**no.**	**SUA**		**no.**	**ARI**		**no.**	**TFC**		**no.**	**ACT**		**no.**	**MVIWATA**	
4.1	**Year 1**		**9300**			**10800**			**7000**			**500**			**3500**			**0**			**6500**		**500**		**4500**			**8000**			**5000**			**2000**			**2000**			**2000**	
	Software licences (5 y), various		800			800			500																			1000			1000										
	Field work, surveys (all cots)		6000			4000			6000						3000						6000				4000			3000			2000										
	Bags, labels, paper, scissors etc.		2000																									2000													
	Back up devices, data storage etc.		500			500			500			500			500						500		500		500			2000			2000			2000			2000			2000	
	Centre for Rural Development SLE																																								
	Subcontract GIS UHOH					5500																																			
4.2	**Year 2**		**13700**			**13000**			**12500**			**29000**			**5500**			**0**			**12500**		**500**		**4500**			**10000**			**3000**			**1000**			**1000**			**1000**	
	Field work, surveys (enumerators etc.)		10000			5000			10000			1500			3000						10000				4000			3000			2000										
	Bags, labels, paper, scissors etc.		1200																									2000													
	Back up devices, data storage etc.		500			500			500			500			500						500		500		500			1000			1000			1000			1000			1000	
	Centre for Rural Development SLE											25000																														
	Subcontract GIS UHOH					5500																																			
	Master thesis, all costs		2000			2000			2000			2000			2000						2000							4000													
4.3	**Year 3**		**13700**			**13000**			**10500**			**29000**			**5500**			**0**			**12500**		**0**		**4300**			**11000**			**3000**			**1000**			**1000**			**1000**	
	Field work, surveys (all cots)		10000			5000			8000			1500			3000						10000				4000			3000			2000										
	Bags, labels, paper, scissors etc.		1200																									2000													
	Back up devices, data storage etc.		500			500			500			500			500						500				300			1000			1000			1000			1000			1000	
	Centre for Rural Development SLE											25000																														
	Subcontract GIS UHOH					5500																																			
	Publication (proof reading, fees etc.)																																								
	Master thesis, all costs		2000			2000			2000			2000			2000						2000							5000													
4.4	**Year 4**		**14700**			**8500**			**11500**			**4500**			**4500**			**1000**			**13500**							**11000**			**4000**			**1000**			**1000**			**1500**	
	Field work, surveys (all cots)		10000			5000			8000			1000			1000						10000							3000			2000										
	Bags, labels, paper, scissors etc.		1200																									2000													
	Back up devices, data storage etc.		500			500			500			500			500						500							1000			1000			500			500			1000	
	Publication (proof reading, fees etc.)		1000			1000			1000			1000			1000			1000			1000							1000			1000			500			500			500	
	Master thesis, all costs		2000			2000			2000			2000			2000						2000							4000													
4.5	**Year 5**		**8500**			**6500**			**6500**			**2500**			**2500**			**1000**			**3500**							**7000**			**4000**			**1000**			**1000**			**2000**	
	Field work, surveys (all cots)		5000			5000			5000			1000			1000						2000							3000			2000										
	Bags, labels, paper, scissors etc.		2000																									2000													
	Back up devices, data storage etc.		500			500			500			500			500						500							1000			1000			500			500			1000	
	Publication (proof reading, fees etc.)		1000			1000			1000			1000			1000			1000			1000							1000			1000			500			500			1000	
Sum	**397000**		**59900**			**51800**			**48000**			**65500**			**21500**			**2000**			**48500**		**1000**		**13300**			**47000**			**19000**			**6000**			**6000**			**7500**	

In general the costs for consumables reflect the type of involvement of partners in specific research activities.

Legend for column B:

- Software licences are only needed for selected partners in the first year who either need management software or that work with specific programs (e.g. GIS).
- Field work causes a number of costs, which have been averaged. Generally, all costs related to field work like costs for enumerators, translators to the language Swahili, other services such as material and devices for field work, unforeseeable costs such as an overnight staying are included in this budget.
- Bags, labels etc. are needed to ensure a high level marketing of Trans-SEC for public relations.
- Backup devices and costs for data storage arise due to intensive data generation. Backups of raw data are evitable.
- The BMZ-financed Seminar for Rural Development (Seminar für Ländliche Entwicklung) SLE will be involved to ensure the institutional analysis within Trans-SEC. The innovation approach at institutional level is important to give recommendations for adequate institutional settings in food security programs of Tanzania.
- UHOH is responsible for the construction of the GIS based digital atlas and mapping. Programming expertise and maintenance is needed here.
- Costs for publications (e.g. costs for open access peer-reviewed journals, proof reading of English language, special issues) will amount at least 1000 Euro per year.
- Costs for master theses (MT) as capacity building is allocated directly to partners. In average 8 MT per year will be supported.

Budget. – Other costs

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
5	**Other costs**	**no.**	**ZALF**		**no.**	**UHOH**		**no.**	**IUW**		**no.**	**HU**		**no.**	**DIE**		**no.**	**PIK**		**no.**	**DITSL**		**IFPRI**		**ICRAF**		**no.**	**SUA**		**no.**	**ARI**		**no.**	**TFC**		**no.**	**ACT**		**no.**	**MVIWATA**	
5.1	**Year 1**		**50200**			**1200**			**1200**			**600**			**600**			**600**			**1200**		**0**		**0**			**8600**			**23600**			**1600**			**1600**			**7600**	
	Supervision, conflict management		20000																																						
	Local workshop, lump sum & other																														20000			1000			1000			4000	
	Annual meeting, lump sum & other																											5000													
	Advisory board, all costs		2000																																						
	Moderation meetings		2000																																						
	Public relations (Website, design etc.)		25000																																						
	Local transport, 0,3 Euro/km		1200	4000 km		1200	4000 km		1200	4000 km		600	2000 km		600	2000 km		600	2000 km		1200	4000 km						3600	12000 km		3600	12000 km		600	2000 km		600	2000 km		3600	12000
5.2	**Year 2**		**35200**			**3600**			**1200**			**600**			**600**			**600**			**3600**		**0**		**0**			**8600**			**23600**			**1600**			**1600**			**7600**	
	Supervision, conflict management		21000																																						
	Local workshop, lump sum &other																														20000			1000			1000			4000	
	Annual meeting, lump sum &other																											5000													
	Advisory board		2000																																						
	Moderation, meetings		2000																																						
	Public relations (Website, design etc.)		9000																																						
	Local transport, 0,3 Euro/km		1200	4000 km		3600	12000 km		1200	4000 km		600	2000 km		600	2000 km		600	2000 km		3600	12000 km						3600	12000 km		3600	12000 km		600	2000 km		600	2000 km		3600	12000
5.3	**Year 3**		**35200**			**1200**			**1200**			**600**			**600**			**600**			**3600**		**150**		**500**			**8600**			**23600**			**1600**			**1600**			**7600**	
	Supervision, conflict management		21000																																						
	Local workshop, lump sum &other																														20000			1000			1000			4000	
	Annual meeting, lump sum &other																											5000													
	Advisory board		2000																																						
	Moderation, meetings		2000																																						
	Public relations (Website, design etc.)		9000																																						
	Local transport, 0,3 Euro/km		1200	4000 km		1200	4000 km		1200	4000 km		600	2000 km		600	2000 km		600	2000 km		3600	12000 km						3600	12000 km		3600	12000 km		600	2000 km		600	2000 km		3600	12000
5.4	**Year 4**		**35200**			**1200**			**1200**			**600**			**600**			**600**			**1200**		**0**		**0**			**8600**			**23600**			**1600**			**1600**			**7600**	
	Supervision, conflict management		21000																																						
	Local workshop, lump sum &other																														20000			1000			1000			4000	
	Annual meeting, lump sum &other																											5000													
	Advisory board		2000																																						
	Moderation, meetings		2000																																						
	Public relations (Website, design etc.)		9000																																						
	Local transport, 0,3 Euro/km		1200	4000 km		1200	4000 km		1200	4000 km		600	2000 km		600	2000 km		600	2000 km		1200	4000 km						3600	12000 km		3600	12000 km		600	2000 km		600	2000 km		3600	12000
5.5	**Year 5**		**29200**			**1200**			**1200**			**600**			**600**			**600**			**1200**		**0**		**0**			**8600**			**23600**			**1600**			**1600**			**7600**	
	Supervision, conflict management		15000																																						
	Local workshop, lump sum &other																														20000			1000			1000			4000	
	Annual meeting, lump sum &other																											5000													
	Advisory board		2000																																						
	Moderation, meetings		2000																																						
	Public relations (Website, design etc.)		9000																																						
	Local transport, 0,3 Euro/km		1200	4000 km		1200	4000 km		1200	4000 km		600	2000 km		600	2000 km		600	2000 km		1200	4000 km						3600	12000 km		3600	12000 km		600	2000 km		600	2000 km		3600	12000
Sum	**434850**		**185000**			**8400**			**6000**			**3000**			**3000**			**3000**			**10800**		**150**		**500**			**43000**			**118000**			**8000**			**8000**			**38000**	

Legend: The other costs apply to the general operating costs of transport, which are assumed with 40 cents per km. The distances are currently slightly underestimated due to the fact that synergies among partners will be used. A tool for management (software) will support cost and transport sharing to the case study regions among partners. Explanations related to column B as follows:

- Supervision and conflict management services are inevitable. Non-communication due to conflicts can reach levels creating very low research outputs. To prevent this risk, supervised teambuilding, direct mediation and group discussions will be applied in workshops. Intercultural sensitizing and conflict solving will assure a most efficient collaboration (see management chapter).

- Local workshops will be mostly organized by the ARIs, which provide through their knowledge in the regions a functioning platform. All costs related to workshops, seminars and stakeholder events are included in this cost item and will be compensated through a conference fee (flat rate), once costs are transparent and detailed.
- The annual meeting will be organized by the SOKOINE University (SUA) and the costs for organization, equipment (e.g. flip chart) and room fees will total at least 5.000 Euro for a one-week event and be compensated by a flat rate, once the cost calculation is detailed.
- Costs for the advisory board applies to all costs related to transport and services involving high level advisors.
- Moderation of selected meeting is ensured via a subcontract including translation into Swahili.
- A central strategy for public relations and communication will be applied by means of multimedia (Trans-SEC website, documentaries/Videos, graphical design, Deutsche Welle TV) for the wider public and for the internal management of Trans-SEC (up load of deliverables on webpage, announcements, risk prevention, online surveys for Trans-SEC scientists). All costs related to the multimedia means are subsumed under this costs item.

Annex IV: Letters of intent (LOI)

zalf Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.

Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.
Eberswalder Straße 84, 15374 Müncheberg

Der Direktor
Prof. Dr. Hubert Wiggering

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E wiggering@zalf.de

Eberswalder Straße 84
15374 Müncheberg
www.zalf.de

Ihr Zeichen	Ihr Schreiben vom	Unser Zeichen	Datum
			12.06.2012

Letter of intent Trans-SEC, ZALF

Trans-SEC

The Leibniz-Centre for Agricultural Landscape Research ZALF e.V. initiated as coordinator of the research proposal Trans-SEC the building of an outstanding research consortium within the BMBF program „Securing the Global Food Supply - GlobE". The preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May in order to define precisely the partners` tasks and collaboration.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. In particular, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. More than 60 African and German scientists will be involved in Trans-SEC, of which 20 PhD will be assigned.

Since 2006 ZALF focuses on Sub-Saharan Africa in now more than 10 projects. In this regard ZALF is confident having prepared an excellent research program for the next five years and will especially support the Trans-SEC project with its available resources and infrastructure at the Leibniz-Centre

Bankverbindung
Volksbank Fürstenwalde
BLZ: 170 924 04
Konto: 77 00 00

zalf Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.

itself. Moreover, substantial investments for infrastructure and equipment for field trial sites at the SOKOINE University of Tanzania will be involved in Trans-SEC. Hence, and due to the wide range of projects in Sub-Sahara Africa, ZALF has an interdisciplinary team of highly skilled scientists.

The heads of involved institutes and the executive management support this initiative in particular. They are convinced to be able to substantially invest time and resources as well as emphasis Trans-SEC as one major research focus within the ZALF research program.

Please do not hesitate to contact me in case of further questions.

Yours sincerely,

Hubert Wiggering

Acting Director
Institute for Plant Production and Agroecology
in the Tropics and Subtropics,
University of Hohenheim,
70593 Stuttgart, Germany
E-Mail: fa@uni-hohenheim.de
Phone: +4971145922764

Stuttgart, 5 / 8 / 2012

Letter of Intent

The University of Hohenheim (UHOH) was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The Institute for Plant Production and Agroecology in the Tropics and Subtropics as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation
Yours sincerely

Prof. Dr. Folkard Asch

Prof. Dr. H.K. Biesalski
Head of Department
University Hohenheim
Department for Biological Chemistry and Nutrition
Garbenstr. 30, 70599 Stuttgart
Germany
E-Mail: biesal@uni-hohenheim.de
Phone: +49 (0)711 459 24112

Stuttgart, 5/8/2012

Letter of Intent

The University Hohenheim was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The University Hohenheim as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation
Yours sincerely

Prof. Dr. H. K. Biesalski

Manager
Department of Agricultural Engineering in the
Tropics and Subtropics (440e)
University of Hohenheim
Garbenstr. 9
70559 Stuttgart

Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.
Eberswalder Straße 84, 15374 Müncheberg

May 16, 2012

Letter of Intent

The University of Hohenheim was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The University of Hohenheim as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation
Yours sincerely

Prof. Dr. Joachim Müller

UNIVERSITÄT HOHENHEIM
INSTITUT FÜR BODENKUNDE
UND STANDORTSLEHRE (310)
Fachgebiet Allg. Bodenkunde und Gesteinskunde
Prof. Dr. Karl Stahr

Universität Hohenheim (310) · D70593 Stuttgart

Dr. Frieder Graef
ZALF e.V.
Eberswalder Str. 84
15374 Müncheberg

70593 Stuttgart
Emil-Wolff-Straße 27
Germany

Telefon: 0711 / 459 - 22324
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www.uni-hohenheim.de/bodenkunde
www.agrarstudium.de
Unsere Zeichen:

Betr: LOI für das Trans-SEC proposal

Sehr geehrter Dr. Frieder Graef,

den Aktivitäten der Vorbereitungsphase folgend, unterstützt das Institut für Bodenkunde und Standortslehre der Universität Hohenheim das Trans-SEC Proposal in vollem Umfang. Aufbauend auf den jahrzehntelangen Erfahrungen in Westafrika, sehen wir in den Projektinhalten einen erfolgreichen Weg Forschung und Entwicklung mit sinnvollen Inhalten und angepaßten Methoden zu beschreiten. Wir sehen den Antrag beim ZALF als koordinierende Stelle in guten Händen und werden uns bei dem Projekt voll einbringen. Insbesondere die Komponente, die sich mit den natürlichen Ressourcen beschäftigt, liegt in unserem Kernkompetenzbereich und wir hoffen mit dem geplanten Web-GIS sowohl Forschung als auch Anwendung auf tanzanischer wie auch deutscher Seite zu befördern.

Mit herzlichem Dank für die bisher sehr gute Kooperation verbleibe ich mit herzlichen Grüßen

Prof. Dr. K. Stahr

President
Leibniz Universität Hannover (LUH)
Welfengarten 1
30167 Hannover

Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.
Eberswalder Straße 84, 15374 Müncheberg

Hannover, 10 May 2012

Letter of Intent

The Institute for Environmental Economics and World Trade (IUW) of the Leibniz Universität Hannover (LUH) was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact on four communities with over 4000 households and an indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The IUW of the LUH as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to contribute to the success of the proposal.

Yours sincerely

M. Barke (i.V.)

Prof. Dr. Barke, President

HUMBOLDT-UNIVERSITÄT ZU BERLIN

HU | Der Vizepräsident für Forschung | 10099 Berlin

Der Vizepräsident für Forschung

Prof. Dr. Peter A. Frensch

Datum:
05.06.2012

Letter of Intent

The Humboldt University of Berlin was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The Humboldt University of Berlin as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation
Yours sincerely

Peter A. Frensch

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Telefax +49 [30] 2093-2934

vpf@hu-berlin.de

d·i·e

Deutsches Institut für Entwicklungspolitik

German Development Institute

Leibniz-Centre for Agricultural Landscape Research (ZALF) e.V.
To the attention of Co-ordinators:
Stefan Sieber and Frieder Graef
Eberswalder Str. 84
15374 Müncheberg
Germany

direct dial +49 (0)228 94927-111
imme.scholz@die-gdi.de

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Telefax +49 (0)228 94927-130

www.die-gdi.de

Letter of Intent

The German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE) was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

The Trans-SEC consortium aims at implementing and innovative interdisciplinary research project to improve food security in Tanzania. A major objective will be to enhance key staple food value chains to be implemented at regional and national level. Food and agricultural policy makers in Tanzania, as well as other governmental and non-governmental institutions involved in the value chains (including agricultural research and extension institutes and farmer and trader representatives) will be among the main beneficiaries. Moreover, it will ensure German-Tanzanian knowledge exchange by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The German Development Institute as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation

Yours sincerely

Dr. Imme Scholz
(Deputy Director)

P I K

Potsdam Institute for Climate Impact Research · P.O. Box 60 12 03 · D-14412 Potsdam

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Institute of the Leibniz Association

Prof. H. J. Schellnhuber CBE
Director
Phone +49 331 288 2502
director@pik-potsdam.de

Potsdam, 10. Mai 2012

Letter of Intent

The Potsdam Institute for Climate impact Research was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May 2012.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

FSC

The Potsdam Institute for Climate Impact Research as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation

Yours sincerely

Professor Hans Joachim Schellnhuber CBE

DITSL
where science meets people

Deutsches Institut für tropische und subtropische Landwirtschaft GmbH

DITSL GmbH – P.O. Box 1652 – 37206 Witzenhausen

Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.)
Attn.: Dr. Stefan Sieber, Dr. Frieder Graef
Eberswalder Straße 84
15374 Müncheberg

Phone: (49-5542) 607 0
(49-5542) 607 29
Fax: (49-5542) 607 39
E-mail: c.huelsebusch@ditsl.org
Web: www.ditsl.org

Witzenhausen, 09.05.2012

Letter of Intent - GlobE Proposal Trans-SEC

Dear Madam / Sir,

in the context of proposal submissions in response to the BMBF call „Securing the Global Food Supply – GlobE", we, the German Institute for Tropical and Subtropical Agriculture - DITSL GmbH Witzenhausen - confirm that we are part of the consortium submitting the proposal:

Trans-SEC - Innovating pro-poor strategies to safeguard food security using technology and knowledge transfer: a people-centred approach

Trans-SEC aims at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4,000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from Trans-SEC's findings. Moreover, Trans-SEC will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

We declare that:

- we are a non-profit limited liability company associated to the University of Kassel, with the mission to initiate, conduct and foster research and training on tropical / subtropical agriculture;
- we are part of this proposal as member of the consortium led by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.), with partners from Germany, Tanzania and the CGIAR System;
- we have participated with the scientists listed for our entity in the development of the proposal, and a DITSL representative took part in the preparation workshop with Tanzanian, German and CGIAR institutions in Moro-goro, Tanzania, from May 1st - 5th, 2012.;
- we strongly support the research proposal and commit our institute to carry out the tasks assigned to us in the proposal with the scientists listed for our entity, and will provide full support to the partner institutions within the scope of this project, in case our proposal is approved.

Please do not hesitate to contact us in case you should require any further information.

Yours sincerely

C. Hülsebusch

DITSL GmbH Witzenhausen is a non-profit limited liability company linked to the faculty of organic agricultural sciences at the University of Kassel

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Steinstrasse 19
37213 Witzenhausen

Tax No.: 025 250 70058
Tax / Revenue Office Kassel I

Company seat
Witzenhausen / Werra

Register of companies Eschwege
Registration No.: HRB 2005

Chair of supervisory board
Prof. Dr. Rolf-Dieter Postlep

Managing Director
Dr. Christian Hülsebusch

Bank
Sparkasse Werra-Meissner
Acc. No.: 50 003 763
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SWIFT-Code: HELADEFF

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
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L-039-EPTD-12

June 19, 2012

Dr. Frieder Graef
Leibniz Centre for Agricultural
Landscape Research (ZALF)
Institute of Land Use Systems
Eberswalder Str. 84
D-15374 Muencheberg
Germany

Letter of Intent

Dear Dr. Graef:

The International Food Policy Research Institute (IFPRI) was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program "Securing the Global Food Supply – GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro, Tanzania on May 1-5, 2012.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

IFPRI as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation

Yours sincerely

Mark W. Rosegrant
Director
Environment and Production Technology Division
Email: m.rosegrant@cgiar.org

World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES

22nd June 2012

Dr. Stefan Sieber, Dr. Frieder Graef
Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.)
Eberswalder Str. 84; D-15374 Müncheberg,
Germany,
Email: stefan.sieber@zalf.de;

Letter of intent for collaboration in a proposed project for submission to BMBF

The World Agroforestry Center (ICRAF) was intensively involved in the preparation process of the proposal for the research project "**Innovating Strategies to safeguard Food Security using Technology and Knowledge Transfer: A people-centred Approach - Trans-SEC"** coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program "Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May 2012.

The Trans-SEC project aims at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact on four communities with over 4,000 households and indirect impact on many more communities benefiting from capacity building of involved extension staff. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

ICRAF as an active partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties. With more than 30 years of research experience in developing countries, ICRAF will share experience and/or knowledge on regional soil and vegetation maps from the on-going African Soil

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Fax: +254 20 7224001 or 1 650 833 6646| Email: icraf@cgiar.org | http.www.worldagroforestry.org

Information Services (Afsis) project (www.africasoils.net) and provide scientific support to agroforestry interventions to be tested using the proposed value chain approach.

We are happy to collaborate with the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) and look forward to further and future collaboration in research activities.

Yours sincerely,

Tony Simons
Director General

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TELEX: 55308 UNIVMOG TZ E-Mail: drpgs@sua.ac.tz

Our Ref:	**DRPGS/R.**	**Our Date**	**14th May, 2012**
Your Ref:		**Your Date**	

Director,
Leibniz Centre of Agricultural Landscape Research (ZALF e.V)
Eberswalder Straβe 84, 15374, Mücheberg, Germany

Dear Sir/Madam

RE: Letter of Intent

The Sokoine University of Agriculture (SUA) was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program "Securing the Global Food Supply - GlobE". A preparation workshop with Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro, Tanzania, from 1st to 5th of May.

The Trans-SEC project aims at high quality research outputs to improve the Food Security in Tanzania. A major objective is to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge sharing on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The Sokoine University of Agriculture as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation
Yours sincerely

Prof. V.R.M. Muhikambele
DIRECTOR, DIRECTORATE OF RESEARCH AND POSTGRADUATE STUDIES

UNITED REPUBLIC OF TANZANIA
MINISTRY OF AGRICULTURE FOOD SECURITY AND COOPERATIVES

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E-Mail:arihombolo@yahoo.com
In Reply please quote:

Ref. No: ARI/H/05/22/002

Officer In-charge,
Agricultural Research Institute
Hombolo,
P.O Box 299,
Dodoma, Tanzania
11/05/2012

Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.
Eberswalder Straße 84, 15374 Müncheberg

RE: LETTER OF INTENT

The Agricultural Research Institute Hombolo (ARI Hombolo) participated fully in the preparation of research proposal titled **"Innovating pro-poor Strategies to safeguard Food security using Technology and Knowledge Transfer/BMBF GLOBE** "being abbreviated as "Trans-SEC" and it is coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". ARI Hombolo was adequately consulted and was involved in proposal preparation workshop held in Morogoro, Tanzania from 1st to 5th of May 2012. The proposed Trans-SEC project primarily aims at achieving high quality research outputs as a sound strategy aiming at improving Food Security and Nutrition of poor limited resource farmers in Tanzania.

The overall objective of the proposed project is to develop improved food value chains targeting major food crops both at regional and national level. Trans-SEC will benefit directly four communities situated at different agro-ecological zones with over 4000 households. On the other hand, more communities will also benefit indirectly through capacity building of extension service and farmers. The project findings on food value chain envisioned to improve Tanzanian food policies, institutional settings and agricultural education programs. It is therefore our expectation that proposed project will foster German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building.

The ARI Hombolo as an institute confirms its commitment and will participate in the delivery of research services during the entire period of project implementation.

Looking forward for successful approval of our proposal.

Elias Abel Letayo
Officer Incharge

OFFICER IN CHARGE
HOMBOLO RESEARCH STATION
P.O. Box 299 DODOMA

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF AGRICULTURE, FOOD SECURITY AND COOPERATIVES

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AGRICULTURAL RESEARCH INSTITUTE ILONGA
P.O. Box 33
KILOSA

In reply please quote Ref. No. ZRT/E/01. 18/05/2012.

RE: Full proposal endorsement: Innovating pro-poor Strategies to safeguard Food security using Technology and Knowledge Transfer/BMBF GLOBE

I have gone through the full proposal "Trans-SEC" that our research officer, Mr Bashir Makoko, has participated in developing, collaborating with other scientists from Tanzania, German and CGIAR institutions coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program "Securing the Global Food Supply - GlobE". I have been impressed by the high level of commitment and team work that the proposing team has demonstrated over the last few months, and I am confident that this team will set very high standards in implementing the project.

The proposed Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. The framework that is described in this proposal has potential to make a real difference to thousands of farming households. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building.

ARI-ILONGA as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal. It has been an honour for our institute to be part of a team that was invited to develop full proposals. With great anticipation, we look forward to a favourable review outcome to our full proposal.

We thank you very much for your co-operation
Yours sincerely

Dr. C.Z. Mkangwa
Zonal Director, Research and Development, Eastern Zone

ZONAL DIRECTOR
RESEARCH AND DEVELOPMENT
ILONGA AGRICULTURAL RESEARCH INSTITUTE
PRIVATE BAG
KILOSA

TANZANIA FEDERATION OF CO-OPERATIVES LTD. (TFC)

Ref. No: FED/INO/VOL.IV/77 **Date:** 25TH May, 2012

Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.
Eberswalder Straße 84, 15374 Müncheberg

Letter of Intent

The Tanzania Federation of Cooperatives ltd (TFC) was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The Tanzania Federation of Cooperatives as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.
We thank you very much for your co-operation.

Yours sincerely,

Willigis O. Mbogoro
EXECUTIVE SECRETARY

All correspondence should be addressed to the Executive Secretary - TFC P. O. Box 2567 Dar es Salaam
Tel: +255 22 2184081/2/4 Fax: +255 22 2184081 E-mail: ushirika@ushirika.co.tz website: www.ushirika.coop

ACT
Agricultural Council of Tanzania

P. O. Box 14130 Dar es Salaam;
Tel: 255 22-2124851 Fax: 255 22 2128032
Email: act@actanzania.org; Web:www.actanzania.org

Ref. No. ACT/GEN/11/66 16th May, 2011

Leibniz –Centre for Agriculture Landscape Research (ZALF e.V.),
Eberswalder Str. 84;
D-15374 Muncheberg,
Germany.

Dear Graef and Stefan

LETTER OF INTENT

The Agricultural Council of Tanzania (ACT) was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research(ZALF e.V.) within the BMBF program„Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

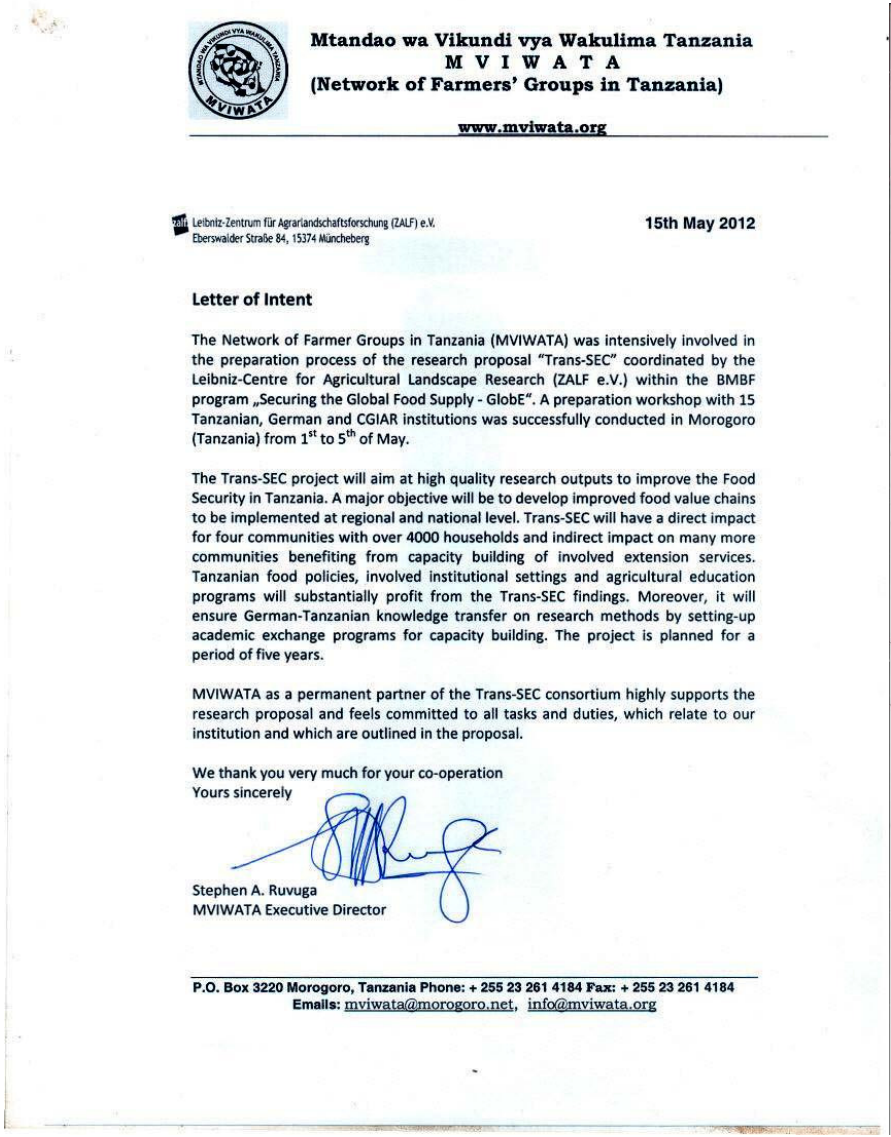
The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programswill substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

The Agricultural Council of Tanzania as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation

Yours sincerely

Renatus Mbamilo.
For: Executive Director



Mtandao wa Vikundi vya Wakulima Tanzania
M V I W A T A
(Network of Farmers' Groups in Tanzania)

www.mviwata.org

Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.
Eberswalder Straße 84, 15374 Müncheberg

15th May 2012

Letter of Intent

The Network of Farmer Groups in Tanzania (MVIWATA) was intensively involved in the preparation process of the research proposal "Trans-SEC" coordinated by the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) within the BMBF program „Securing the Global Food Supply - GlobE". A preparation workshop with 15 Tanzanian, German and CGIAR institutions was successfully conducted in Morogoro (Tanzania) from 1st to 5th of May.

The Trans-SEC project will aim at high quality research outputs to improve the Food Security in Tanzania. A major objective will be to develop improved food value chains to be implemented at regional and national level. Trans-SEC will have a direct impact for four communities with over 4000 households and indirect impact on many more communities benefiting from capacity building of involved extension services. Tanzanian food policies, involved institutional settings and agricultural education programs will substantially profit from the Trans-SEC findings. Moreover, it will ensure German-Tanzanian knowledge transfer on research methods by setting-up academic exchange programs for capacity building. The project is planned for a period of five years.

MVIWATA as a permanent partner of the Trans-SEC consortium highly supports the research proposal and feels committed to all tasks and duties, which relate to our institution and which are outlined in the proposal.

We thank you very much for your co-operation
Yours sincerely

Stephen A. Ruvuga
MVIWATA Executive Director

P.O. Box 3220 Morogoro, Tanzania Phone: + 255 23 261 4184 Fax: + 255 23 261 4184
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National Food Security Div.,
P.O. Box 9192
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In reply please quote:

Ref.No.216/310/01

27/06/2012

Director Prof. Hubert Wiggering
Leibniz-Centre for Agricultural Landscape Research e.V.
Eberswalder Straße 840
15374 Müncheberg Germany

REF: LETTER OF INTENT AND NOMINATION TO THE ADVISORY BOARD

Kindly refer to your letters of 3rd March 2012 that were sent to us on 23rd June 2012.

In accordance to your request of cooperation with the Ministry of Agriculture and thus a letter of intent to this cooperation, the Ministry of Agriculture, Food Security and Cooperatives (MAFC) has no objection, proposed Trans-SEC Project within the BMBF program.

The Ministry of Agriculture, Food Security and Cooperatives is therefore, committed to seek for linking the Trans-SEC results with the current policy programs related to Food Security in Tanzania and supports the research proposal. MAFC is highly interested with the knowledge that will be generated from Trans-SEC geared towards to improving policy programs related to food security.

Furthermore, MAFC will be actively involved in the Board of Trans-SEC-advisor as per your request. It will be a pleasure for us to give advices and guidance from the perspective of Tanzanian food security related policy programs.

Karim Mtambo
For: THE PERMANENT SECRETARY

Annex V: Pictures of preparation workshop in Tanzania

Picture 1: The Trans-SEC consortium

Picture 2: The ice-breaker introduction

Picture 3: The Trans-SEC workshop

Picture 4: The Trans-SEC workshop

Picture 5: The Memorandum of Understanding

Annex VI: Scoping study for the Trans-SEC project in Tanzania

Khamaldin Mutabazi, Sokoine University of Agriculture

1. Introduction

The Trans-SEC project commissioned a mini-scoping study to a local expert with the main aim of characterizing the project sites to inform a comprehensive spatial design. Guiding criteria for the site selection were specified in the terms of reference as follows:

1. **Spatial Design:** Conducting a literature research on relevant characteristic a considering the spatial design:
   - two focal regions in Tanzania (Morogoro, Dodoma),
   - each region with two case study sites (CSS) consisting of at least one local marketplace and surrounding 2-3 villages,
   - the two CSS among the target regions are selected to differ in factors such as market and capital access for investments, remoteness, population density, land availability, soil types, infrastructure, facilities, and others,
   - create sufficiently diverse environmental and socio-economic conditions for investigating food securing technologies along FVC and allowing for testing the transfer of results to other Tanzanian regions.
2. **Criteria:** Major criteria for selecting the case study sites
   - Main selection criteria for regions: two climates types:
     - semi-arid Dodoma (350-500mm),
     - semi-humid Morogoro region (600-800mm)
     - clear distinction between the regions.
   - other criteria within the regions:
     - rather similar climate (must) +-80mm,
     - weak and good market access (must) (=market and capital access for investments),
     - rainfed crop–livestock systems oriented, not too strongly paddy rice oriented (< 20% rice) (must),
     - village size: approx. 800-1500 households (must)
     - Others: MVIWATA villages (if possible), not other large projects intervening,
     - stunting cases, logistics and infrastructure, different wards, land availability,
     - facilities, capital, soil types, and population density etc.

2. Tanzania's food systems: an overview

2.1 Food security

Tanzania, as many other poor countries in the sub-Saharan Africa, takes food security as a central agenda in its development and poverty reduction efforts. Tanzania has not smoothly excelled in its efforts to deliver the MDGs particularly with respect to the food poverty. MKUKUTA, the National Strategy for Growth and Poverty Reduction, is not on track to meet the Millennium Development Goals (MDGs) for reducing the percentage of people below the

food poverty line and halving the number of people below the income poverty line. The 2007 Household Budget Survey (HBS) established that the number of people living below the poverty line increased by one million between 2001 and 2007. Tanzania performs moderately better in food self-sufficiency compared with other countries in the region, but malnutrition is rampant among under-five year old children (38% stunted and 22% underweight), and the country remains vulnerable to food price fluctuations (FtF, 2010).

National policies and strategies on agriculture address the need to increase food production to enhance self-sufficiency in staple food production, including rice. The Tanzanian government has recently drawn a Tanzania Agriculture and Food Security Investment Plan (TAFSIP) under the CAADP framework. It aims to contribute to national economic growth, household income and food security in line with national and sector development aspirations outlined in Vision 2025 and Agricultural Sector Development Strategy (ASDS), and National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA). The objective of TAFSIP is to rationalize allocation of resources to achieve an annual 6% agricultural GDP growth (URT, 2009).

The energy based foods (entailing cereals, beans and pulses), and roots and tubers are central in the Tanzanian food industry. Cereals and legumes constitute the major sub-sectors in the food industry. This is characteristic for most of African food systems. The performance of the Tanzanian food industry is dependent on the performance of the agricultural sector, and the crop subsector in particular. Smallholder agricultural sector provides 95% of the national food requirements.

The performance of the food crop sub-sector is mixed. Between 1985 and 2009, the six main food crops (maize, rice, sorghum, millets, wheat and legumes) have grown at 3.5% per year marginally exceeding the population growth rate of about 3%. However, the levels of food crop productivity have not been encouraging (URT, 2009).

The future demand for food is expected to grow exorbitantly with Tanzanian population urbanizing at the rate of 5% per year (URT, 2006). This rapid growth has been caused mainly by rural-urban migration, more than by any other factor. Urbanization is likely to raise the food demand that will stretch the rural based food systems to supply the food required. Most of the urbanites are predominantly net buyers of food. Breakthroughs in R&D in the rural based food systems would foster a vibrant food sector that rewards producers and marketing business firms while delivering affordable food to poor urban consumers.

2.2 Poverty and malnutrition

The prevalence and depth of poverty and malnutrition are still the features of the Tanzania's human development picture. This situation indicates the slow path that Tanzania is striding towards delivery of the MDG I (Table 1). Since the agricultural sector is central in the battle against income poverty and hunger (URT, 2005), the poor performance of the sector, particularly its food systems, is the main hurdle. Tanzania experiences high regional and seasonal variability in poverty levels and food availability. Poverty is highest in the drier central zone regions including Dodoma.

Table 1: Tanzania roadmap to MDG I on halving the % of the poor and those suffering from hunger by 2015

Indicator	1990 Baseline	2000 Results	2007 Results	2015 Target
Percentage of people living below income poverty line	39	36	33.6	19.5
Percentage of people living below food poverty line	22	19	16.6	11
Percentage of under-weight under-5 children	28.8	29.5	22	14.4
Percentage of under-height under -5 children (stunted)	46. 6	44. 0	38	23. 3

Source: URT (2007)

Achieving the MDG Goal 1 is considered very unlikely for Tanzania as well, in spite of the country's high GDP growth of over 5% during the recent years (URT, 2009; Atkison and Lugo, 2010). Based on the economic data between 2000 and 2007, Tanzania ranks 151 on the list of global countries ranked by the UNDP's Human Development Index. The rank improves to 93 with respect to Human Poverty Index (HPI). The GDP per capita in 2007 was at US$ 1,208. During the period between 2000 and 2007, the percentage of Tanzanians below the global poverty lines of US$ 1.25 and US$ 2 per day were 89 and 97%, respectively. During the same period, 36% of the population was below the national poverty line (UNDP, 2009). Poverty remains highest in rural areas, where 37 percent of the population falls below the basic needs poverty line (Rweyemamu, 2009).

The relatively high growth rate that was enjoyed over the last ten years was mainly due to economic and financial reforms and prudent monetary and fiscal policies; all of which promoted domestic and foreign investment. This impressive growth did not, however, have a significant impact on poverty reduction. For example, poverty, measured by the Headcount Index, declined only marginally from 35.7 in 2001 to 33.6 in 2007, even though GDP growth averaged 7.1 percent over this period. This situation shows that growth has not been broad-based and pro-poor (URT, 2010b; URT, 2011b).

In 2009, the GDP grew by 6.0 percent, which compared poorly with 7.4 percent growth in 2008. The slowdown in growth for 2009 was attributed to the impact of the global financial crisis as well as the drought in 2008-2009, which affected agricultural production, hydro power generation, and industrial production. They all contribute significantly to total GDP. However, the rate of growth in per capita has been just modest given an increase in the population. The 2009 GDP at current prices is Tshs. 28,212,646 million, which is equivalent to Tshs. 15,721,301 million at 2001 constant prices. With an estimated population on the Tanzania mainland of 40.7 million in 2009, the per capita income is Tshs. 693,185 at current prices, compared with Tshs 628,259 in 2008, indicating an increase of 10.3 percent (URT, 2011a).

Tanzania is very far from delivering the indicators of MDG 1 on halving the population in abject income poverty, food poverty and stunted under five year old children. By embarking on upgrading the performance of the Tanzania food systems, Trans-SEC project will be enhancing the capacity of the country to deliver MDG 1 (URT, 2007).

2.3 Economic and livelihood significance of agriculture

Tanzania has a mixed economy. Agriculture, comprising crop growing, animal husbandry, forestry, fishery, and hunting, played a key role in past years. In the current economy, activities in the service industry account for 42 percent of the gross domestic product (GDP). In 2009, the agricultural sector grew by 3.2 percent compared with growth of 4.6 percent in 2008 (URT, 2009).

Low productivity has hampered Tanzania's growth in the agricultural sector. Most staple crops have yields of less than one ton/ha. The 2002-2003 agricultural census shows that Tanzania's average yields for major cereals such as maize and rice are very low. The census estimates the national maize yield average to be 0.75 tons/ha which is far less than the African average of 1.3 tons/ha. Low productivity of cereals in Tanzania is attributed to dependency on rain-fed agriculture and low usage of fertilizer, improved seeds and pesticides (FtF, 2010). The pathway of improving agricultural productivity is not only vested in irrigation, but also in efficient and sustainable management of agricultural water through soil and water conservation measures and rainwater harvesting (Hatibu et al. 2006).

During the same period, the growth rate of crops decreased from 5.1 percent to 3.4 percent and that of livestock decreased from 2.6 percent in 2008 to 2.3 percent in 2009. Drought during the 2008-2009 planting season caused these decreases in growth, particularly in the northern part of Tanzania, where there was inadequate pasture and water for livestock (URT, 2011a).

Currently, agriculture contributes about 25.3 percent of the GDP, but absorbs 74 percent of the labour force. From 2002 to 2010, annual agricultural growth averaged 4.2 percent, which is below the national average of about 6.7 percent over the same period. For any growth to be inclusive and pro-poor, it must involve substantial growth of agricultural productivity and allow most of the rural population to benefit from such growth through selling the increased production on domestic and export markets (URT, 2011b).

Participation of farmers in markets is necessary for structural transformation from subsistence agriculture to an economy based on specialization, exchange and technological innovation (Msuya and Isinika, 2011). For Tanzania to be a net exporter of food, its aggregate self-sufficiency ratio has to exceed 120% consistently over time, which has not been achieved since 1995. Moreover, per capita production of food has been declining (Msuya and Isinika, 2011).

The agricultural sector has performed less well, averaging 4.4% growth since 2000, well below MKUKUTA's target of 10% by 2010. The sector's contribution to GDP has declined to 24% in 2008 (URT, 2009). Tanzania's agricultural sector is extremely diverse. Crop production accounts for 55% of agricultural GDP, livestock for 30%, and natural resources for 15% (Darksen-Schrock et al. 2011).

Transformation of agriculture for food self-sufficiency and export is one of the five core priorities that are targeted under the Tanzania 5-year development plan (2011/12 - 2015/16) signed by the President in June 2011 which aimed at unleashing Tanzania's latent growth potentials (URT, 2011b).

Arguably, the efforts to modernize agriculture cannot by-pass the upgrading of the rainfed agriculture. Rainfed agriculture accounts for 95% of Tanzania's food production. Rainfed

production is vulnerable to adverse weather conditions, and it is facing other daunting limits including food crop loss (both pre- and post-harvest), minimal value addition and product differentiation, and inadequate food storage and preservation that result in significant commodity price fluctuation. Limited access to markets is a further hurdle that smallholders have to overcome. This problem is multi-faceted: Producers are commonly faced with poor infrastructure to reach markets, barriers in penetrating markets due to limited resources, lack of information, few support mechanisms and restrictive policies (URT, 2009).

2.4 Tanzania's food system

Food systems in Sub-Saharan Africa have been rapidly changing during the recent decades. Transformations in production, distribution, and consumption of food have been brought about with globalization and political regime shifts, modernization of societies, population growth, land use and land tenure arrangements, as well as cultural and environmental change in larger scales (Haapanen, 2011).

Despite the advocacy for agricultural modernization during the last five decades, the pace of "green revolution" in Sub-Saharan Africa has been slow and the expected increase in productivity has not taken place (Haapanen, 2011). Since the 1960s, yields of cereals per hectare in the region have remained at low levels, while the yields have grown by manifold in other parts of the world (WB, 2007).

Food security status is considered as the primary outcome of a food system and the basic indicator of how well the system functions (Ericksen et al. 2009). Despite the progress towards achieving the UN Millennium Development Goals, Sub-Saharan Africa is lagging behind particularly in regard to the targets for reducing poverty and malnutrition (UN, 2011).

With regard to the marginal spaces of the world economy such as the rural villages in Tanzania, there is still lack of knowledge on how these subsistence-based communities and food systems, from which these depend on, are transforming and integrating into the modern markets (Haapanen, 2011). Evolution of Tanzanian food system has followed major policy and institutional regimes that have prevailed at least since independence. During the 1970s and the '80s until 1986 the markets of agricultural products were divided into the official government controlled markets and the unofficial grey economy market. During this period the food system was governed by the State organizations such as National Agricultural Products Board (NAPB), National Milling Corporation (NMC) and the National Strategic Grain Reserve (SGR). Following market liberalization, towards the end of 1980s to 1990s and later on, the private sector came into play in the food trade.

Food systems can be described as comprising four sets of activities: (i) producing food; (ii) processing food; (iii) packaging and distributing food; and (iv) retailing and consuming food (Ericksen et al. 2009). The ultra-poor dominating the SSA poverty landscape are mostly employed in agriculture. Their productivity is so low that they typically do not produce enough to feed their families, forcing them to depend on non-farm earnings to supplement farming to pay for their net purchases of food (Barret, 2008).

By the end of the last millennium (1990s), food production in Tanzania, especially on a per capita basis, was stagnant or declining. The market reforms did not induce smallholder farmers to specialize or to use improved technologies as envisaged (Msuya and Isinika, 2011).

The entry point within food systems for helping unlock the ultra-poverty/hunger/ill/health trap in which so much of rural SSA finds itself includes among others: enhancing food productivity

gains mainly through adoption of improved agricultural production technologies and the stock of productive assets (soil quality, livestock, etc.) under farmers' control, and improving access to supporting services (Barret, 2008).

Improved and pro-poor food systems actually set a transformation path from agriculture to improved nutrition and health. The efficient food supply chain linking food production with food consumption and human nutrition is at the centre-stage of the agriculture-nutrition synergy (WB, 2007).

The Tanzanian food system demonstrates many features which are common to the food systems in other countries in Sub-Saharan Africa. Thus some more general insights that apply at wider scale in the SSA can also be gained from the Trans-SEC research.

2.5 Nutrition

The 2010 TDHS measured three anthropometric indicators of nutritional status in children: height-for-age, weight-for-height, and weight-for-age. At the national level, 42% of children under 5 had low height-for-age or were stunted, 5% had low weight-for-height or were wasted, and 16% had low weight-for-age, which reflects both chronic and acute undernutrition. The severely stunted comprised 17% of 42% of generally stunted underfives. These results reflect a mix in progress in nutritional status from the 2004-05 TDHS when these indicators were measured at 38, 3, and 22 percent, respectively. The children in the Central (including Dodoma) and Southern Highlands zones are particularly disadvantaged—at least half are stunted, which reflects long-term undernutrition in these areas (URT, 2011).

Another dimension of undernutrition is anaemia. Anaemia contributes to several serious health problems for women and children. The 2010 TDHS tested the haemoglobin level of children age 6-59 months and women age 15-49 years. The data showed that there has been a decline in the prevalence of any anaemia among children (72 percent in 2004-05 down to 59 percent in 2010). 27 percent of children have mild anaemia, 29 percent have moderate anaemia, and 2 percent have severe anaemia (URT, 2011). However, such positive achievements have not addressed the anaemia problem.

2.6 Demographic trends

The high population growth rate in Tanzania has been brought about by high fertility and declining mortality levels. According to the 2002 census, the life expectancy at birth is 51 years (Table 2). The population of Tanzania has continued to be predominantly rural despite the increase in proportion of urban residents over time, from 6 percent in 1967 to 23 percent in 2002.

Table 2: Demographic indicators

	Census year			
Indicator	**1967**	**1978**	**1988**	**2002**
Population (millions)	12.3	17.5	23.1	34.4
Intercensal growth rate (%)	2.6	3.2	2.8	2.9
Crude birth rate (CBR)	47	49	46	43
Total fertility rate (TFR)	6.6	6.9	6.5	6.3
Crude death rates (CDR)	24	19	15	14
Infant mortality rates (IMR)	155	137	115	95
Percent urban	6.4	13.8	18.3	23.1
Density (pop./km2)	14	20	26	39
Life expectance	42	44	50	51

Source: URT (2011)

3. Aspects of the food systems in the case study regions

After covering aspects of poverty, agriculture and various strands at the national scale, this section gives an overview on the two case study regions. Where possible the regional status is compared to the national situation.

Morogoro is better-off compared to Dodoma in terms of literacy (Table 3). It also fares well above the national literacy level. Literacy is critical in the human progress as it enables efficient transformations of other capitals into positive livelihood outcomes.

Table 3: Education

Region	**No education**		**Completed primary education**		**Beyond primary education**		**Median years completed**		**Literacy: ability to read**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Morogoro	17.9	24.2	34.6	32.8	11.2	8.6	4.9	3.9	85.1	73.3
Dodoma	33.2	39.6	24.2	22.3	4.9	5.3	2.3	1.4	72.8	62.0
Tanzania	18.4	26.5	30.9	29.5	12.4	8.9	4.6	3.6	81.8	71.9

Source: URT (2011)

In terms of the assets based wealth index, Morogoro fares well above Dodoma and ranks close to the national average in relation the lowest and highest wealth quintiles (Table 4). This wealth index was computed in the 2010 TDHS from collected information on household ownership of a number of consumer items, ranging from a television to a bicycle or car, as well as information on dwelling characteristics, such as source of drinking water, type of sanitation facilities, and type of materials used in dwelling construction (URT, 2011). The assets based wealth index tends to correlate with the income and expenditure based poverty measures. Moreover, the distribution of assets based poverty was not of much difference among the case study regions.

Table 4: Distribution of asset based wealth index in the selected case study regions

Region	Quintiles					Gini Coefficient
	Lowest	Second	Middle	Fourth	Highest	
Morogoro	17.9	15.9	23.4	27.2	16.6	43.0
Dodoma	37.7	25.7	21.0	12.4	3.2	44.4
Tanzania	19.4	21.8	22.2	19.4	17.2	50.2

Source: URT (2011)

However, the recent information on child nutrition status (2010 Tanzania Demographic and Health Survey - THDS) indicates that the level of stunting has increased (Figure 1). Dodoma is leading in terms of the percentages of stunted underfives compared to other regions (about 80%). This stunting level combines both moderate and severely stunting. The level of child stunting in Morogoro is marginally above the national average of around 60%. The percentage of severely stunted underfives comprises 18.8 and 28.4% of stunted underfives in Morogoro and Dodoma regions, respectively. In 2004-05 THDS shows that the percentage of stunted underfives were 46% and 61% for Morogoro and Dodoma, respectively. This implies that over the period of six years the level of stunting has increased by 14% and 20% in respective case study regions. This is a huge increase in the prevalence of child undernutrition problem.

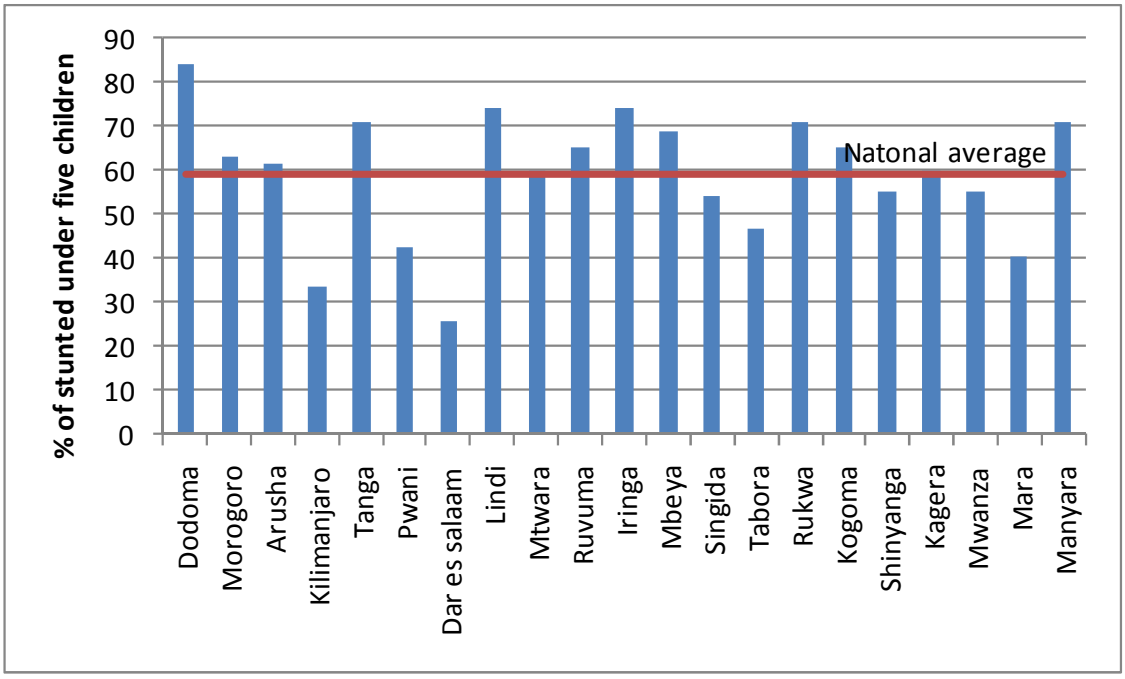

Figure 1: Percentage distribution of stunted children under 5 years of age by region
Source of data used in the graph: URT (2011)

The population growth rate is higher in Morogoro compared to Dodoma (Table 5). The magnitude of respective populations did not vary much for the past two censuses (Table 5), and even for 2025 projections (Table 6). Both regions are relatively under-populated with the population density less than 50 persons per square kilometer. According to URT (2006) Dodoma is characterized with higher level of outmigration compared to Morogoro. Inter-

regional migrations tend towards the agro-ecologically high potential areas. The highly populated districts are Kilosa and Kondoa in Morogoro and Dodoma, respectively. These are potential districts in terms of agriculture in respective regions.

Table 5: Population and growth rates between 1988 and 2002

	Land area sq. km	1988	2002	Average annual growth rate	Population density 2002
Morogoro	70,799	1,220,564	1,753,362	2.6	25
Dodoma	41,311	1,235,327	1,692,025	2.2	41
Tanzania (mainland)	883,749	23,095,882	34,443,603	2.9	39

Source of data: URT (2006)

Table 6: Projected population trends for the case study regions and their districts

Region/district	2003	2012	2025
Morogoro	1,794,815	2,209,072	2,818,784
Morogoro urban	236,158	226,406	481,385
Kilombero	330,151	407,755	522,874
Kilosa	501,772	612,072	771,656
Ulanga	199,343	238,415	291,644
Mvomero	263,713	314,718	383,684
Morogoro rural	263,678	308,882	367,541
Dodoma	1,739,456	2,214,657	2,748,056
Dodoma urban	342,984	529,635	588,014
Kongwa	255,031	313,486	364,992
Mpwapwa	261,510	323,947	382,929
Kondoa	430,116	516,730	583,074
Dodoma rural*	229,816	530,870	588,014

* In 2007 has been split into Chamwino and Bahi
Source of data: URT (2006)

The rural non-farm sector is increasingly complementing the rural farm income. In Morogoro, about 35% of the rural households are engaged in non-farm agriculture (Table 7). In Dodoma, a relatively lower proportion of rural households (21%) are involved in the non-farm sector. The agro-value chains of rural food systems offer non-farm opportunities that enhance incomes of rural households. For example, wastes in the agri-food systems can be utilized to generate tradable energies and organic fertilizers while minimizing environmental and public health problems.

Table 7: Rural households involved in agriculture

Region	Rural agricultural households	Total rural households	% of agricultural households
Morogoro	298,421	303,737	65
Dodoma	358,969	363,788	79
Tanzania	5,838,523	5,986,069	67

Source: (URT, 2010a)

In 2007/08 main season maize harvests amounted to 238,435 and 350,979 tons for Morogoro and Dodoma regions, respectively. During the same period the national production amounted to 5,438,778 tons. Maize yields levelled to around 1 ton/ha for the two regions which compared similarly to the national average of 1.3 ton/ha (URT, 2010a). In terms of tillage technology, Dodoma used more animal power involving 14% of the households compared to 3% in Morogoro. However, Morogoro did relatively better in terms of tractor use with 2.3% using this technology compared to 0.4% for Dodoma. The proportion of farmers using improved seeds in Dodoma exceeded those doing the same in Morogoro by a difference of 6 percent, i.e. 22 versus 16%. However, farming households that embarked on soil erosion control in Dodoma exceeded those who did the same in Morogoro by fourfold, i.e. 16 versus 4% (URT, 2010a).

Livestock and cattle in particular is an important activity to most of the farming households in Dodoma compared to Morogoro. In 2008 about 21% of the agricultural households in Dodoma reared cattle compared to 6% in Morogoro. Distribution of cattle by breed in the two regions are summarized in Table 8.

Table 8: Number of households and type of cattle reared in 2008

Region	Indigenous		Beef		Dairy		Total	
	No. hhds	No. cattle	No. hhds	No. cattle	No. hhds	No. cattle	No. hhds	No. cattle
Morogoro	15,818	628,475	417	1,874	2,297	9,414	18,532	639,763
Dodoma	75,878	1,166,715	749	2,916	1,617	3,473	78,244	1,173,104
Tanzania	1,482,252	20,522,607	25,673	66,631	216,201	511,939	1,724,126	21,101,177

Source: URT (2010a)

4. Selection and description of case study districts and villages

4.1 Selection and description of the study districts

The major criteria that guided the selection of districts in the first place differed slightly for the two regions. For Morogoro, the selection condition of showing a sharp contrast in the level of rainfall reliability with the district in Dodoma was critical. Through discussion with an agro-climate scientist at Sokoine University (Prof. Siza Tumbo), Kilosa was selected in Morogoro. Morogoro (rural) which seems to have higher level of child stunting (see Figure 2), which was thought to be the main guiding principle among others, is faced with unreliable rainfall. This would limit the agronomic testing of best-bet technologies that Trans-SEC project expects to undertake. Kilombero and Mvomero were also opted out because of the predominance of irrigated rice, given the interest of Trans-SEC in rainfed systems.

For Dodoma, the selection was much easier. IFPRI (2006) estimated higher level of stunted underfives in Dodoma (rural) (Figure 2) which later in 2007 was split into two districts - Chamwino and Bahi. This was the main basis of selecting this area. Chamwino was selected because of its easy accessibility. Bahi which was opted out has high intensities of lowland rice production activities. Chamwino district meets also other criteria set in the first place.

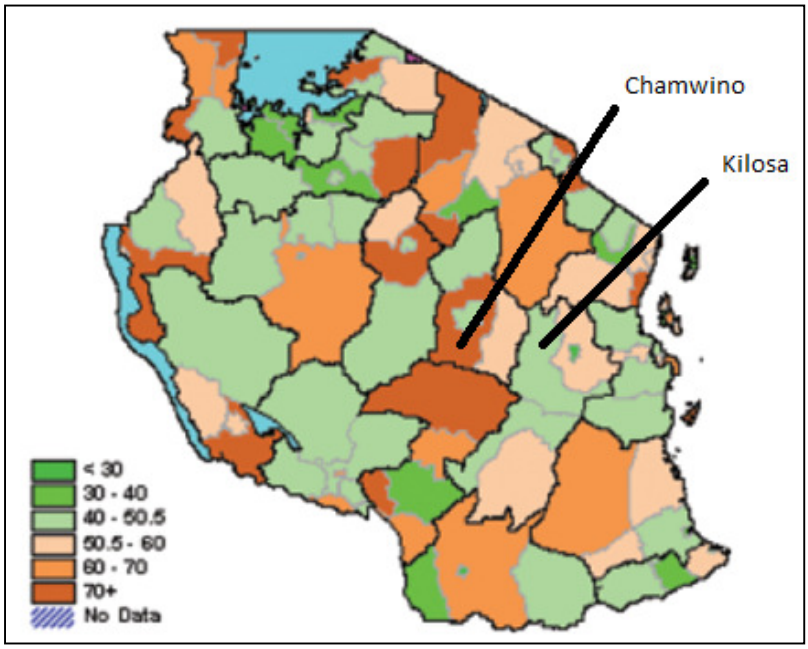

Figure 2: Child stunting levels by districts (Source: IFPRI 2006)

4.2 Districts' profiles

The district profiles were obtained from the DALDO's office at the district headquarters. They were minimally edited, and are mostly presented as they are described in the documents. The two documents should be cited as: Chamwino Socio-economic Profile, (2012) and Kilosa Socio-economic Profile, (2010).

Chamwino district

Location: Chamwino district is among the six districts of Dodoma region. The district is located in the central plateau of Tanzania which extends between Latitude 40º and 80º south and between longitude 35ºand 37º east. The district has five divisions, 28 wards, and 77 villages.

Administration: According to 2002 National population census and with the projection of 1.6 percent population increase per annum, projections show that Chamwino district council has about 289,959 people, of which 153,161 and 136,798 are females and males respectively. The district has a total of 57,992 households; with 50,293 being directly involved in crop and livestock production activities.

Climate: The district has a dry Savannah type climate, which is characterized by a long dry season starting late April to early December, and a short single wet season starting December to mid April. The average rainfall is 500mm annually, and about 85% of this falls in the four months between December and March. The rainfall in the district is relatively low and unpredictable in frequency, amount and distribution, particularly in January when most of the crops are generally sown.

Agro-ecological Zones: As part of Dodoma Region, the district is dry and flat low lands hence their agro-ecological zone differs in climatic conditions. For production purposes, the district is subdivided into two agro-economic zones based on soil and climatic conditions. The descriptions of the zone are presented in Table 9. The selected case study division and related wards and villages are in the first zone.

Table 9: Agro-ecological zones summary

Zones	Features of Zones	Rainfall	Soil	Economic activities
1	Very dry flat undulating plain with a low population. Almost entirely used for grazing except in west where there is tsetse fly; rainfall very unreliable	400mm	Reddish-brown loamy sands. Grey clay in depressions. Dark grayish brown loams in hills to east	Crops grown include sorghum, simsim, groundnuts and sunflower
2	Flat undulating hills in south, most densely populated because of Dodoma town, rainfall low and unreliable	550-650mm	Reddish-brown or dark loamy sands	Mostly covers Itiso and Chilonwa divisions where rainfall is slightly higher. Crops grown include maize, sunflower, groundnuts, simsim and vines for cash.

Agriculture land: Chamwino district has a total area of 805,600 hectares. The proportion of suitable land for crop production in the district is about 70% of total arable land. The district has 563,920 hectares suitable for agricultural production and about 246,821 hectares are used for crop production.

Vegetation: The district has six forest reserves which cover an area of 107,720 ha. Chenene forest reserve has 29,839 ha, Chinyami 43,330 ha, Sasajila 1,145 ha, Goima 6,959 and

Chamhene forest reserve, 3,785 ha. The forest and woodland areas in the district have been greatly dilapidated due to deforestation as a result of shifting cultivation, uncontrolled bush fires, overgrazing and catering for energy use.

Energy: Apart from the hydro-electricity from Mtera Dam, there is also energy from diesel, petrol and kerosene, which are sources of energy for both small industries and domestic use. However more than 95% of the population depend on firewood and charcoal as their sources of energy with exceptional to areas like Chamwino, Buigiri, Chinangali II, Chalinze, Mvumi Mission and Mvumi Makulu where they are served by the national grid of the Tanzania Electric Supply Company (TANESCO). Excessive use of charcoal and firewood leads to the destruction of eco-systems, forest depletion and serious environmental degradation. Environmentally friendly sources of energy like electricity, solar and biogas have been strongly advocated in the district for domestic use. A number of biogas plants have been installed in collaboration between the community and NGOs.

Agriculture Potentials: The district has 563,920 hectares suitable for agricultural production and about 246,821 hectares are used for crop production. The district has the potential and possibilities for agricultural expansion since the acreage utilized for crop production is around 44 % of the arable land. This implies that more land could still be brought under crop production.

Agriculture and Livestock sector constitutes the mainstay of the economy of Chamwino district and its population in providing income, employment and ensuring adequate food supplies. Only a small number of the population is engaged in commercial and industrial sectors. The latter sector is still limited to small scale enterprises which include maize and oil mills, carpentry, and tailoring mainly found at Chamwino and Mvumi Mission and trading centres of Haneti, Chalinze, Mpwayungu and Mlowa Barabarani.

Chamwino district produces a substantial percentage of the total regional production of sorghum, maize, and cassava. Other crops grown include grapes, sunflower, simsim, groundnuts, bulrush millet and paddy. Livestock keeping is ranked second as a vital economic activity in the district, though its actual contribution to the district economy in terms of provisions of income, employment and contribution to GDP and Per Capita income is yet to be accurately assessed.

Importance of Agriculture Sector in the District: Agricultural sector is the major employer of the district's labour force, employing about 90% of the active working population. With the population estimated at 289,959 a very small percentage of the labour force earns a salary. Whereas during the rainy seasons almost the entire labour force in the district could be said to be engaged in agricultural activities, in the dry season a good percentage becomes unemployed. Thus in order to alleviate poverty in the district, employment creation through irrigation schemes ought to be accorded high priority.

Crop Production: The district produces a variety of both food and cash crops. The district's strategy for increasing agricultural production includes: Expansion of land under cultivation, increasing yield per unit area by promoting the use of motorised power tillers, expansion of area under improved irrigation technologies such as drip irrigation in grape production and promoting access to and use of modern farm implements and use of draught animals.

Food Crops: The production trend of food crops and hectares under cultivation between 2009/2010 and 2010/2011 farming season are shown in Table 10. In general the figures do not show any significant increase of production of food crops in the district during the period.

This situation is mainly caused by frequent drought in the district which has adversely affected the level of food adequacy in the district.

Table 10: Food Crops Production 2008/09 to 2010/11

Crops	Quantity	2008/09	2009/10	2010/2011
Maize	ha	18,354	15,849	20,841
	Mt	14,659	12,679	15,209
Sorghum	ha	22,060	31,621	29,774
	Mt	20,227	23,716	28,004
Millet	ha	15,549	26,104	12,497
	Mt	9,565	7,831	4,560
Cassava	ha	6,030	2,103	8,700
	Mt	4,818	1,863	3,880
Cowpeas	ha	3,217	249	630
	Mt	836	75	194

Source: DALDO (2012).

Farm Implements: Table 11 shows the number of farm implements in the district. The district has a total of 5,285 oxen ploughs, 110 Magoye rippers, 1,302 ox cart, 37 tractors and 40 power tillers distributed in the district as shown in table number 4. Despite the existence of various farm implements in the district, the majority of the farmers still depend on hand hoes for cultivation. The implication of this situation is the inability of the district to increase agricultural production so as to increase per capita income significantly and meet food demand for the fast growing district population.

Table 11: Farm Implements

Division	Power tillers	Tractors	Ox-plough	Ox-carts	Magoye ripper
Chilonwa	7	3	2253	498	51
Itiso	10	25	376	107	51
Mpwayungu	7	2	492	156	2
Mvumi	**7**	**4**	**859**	**196**	**6**
Makang'wa	9	3	1305	345	0
Total	40	37	5285	1302	110

Source: DALDO (2012)

Improved Seeds: Improved seeds commonly used in Chamwino district comprise different sorghum varieties. The commonly used type of sorghum seeds in the district is Macia whose demand has been relatively stable between 2007/08 and 2010/2011. Chamwino district council has been distributing improved seeds of sorghum every year to enable farmers realize the benefits of using improved seeds. In 2007/2008 cropping year the district distributed 30 tones of Macia, while in 2008/2009, 2009/2010 and 2010/2011 the district distributed 25, 40 and 126 tons of sorghum, respectively.

Despite a huge institutional framework for seed production both in the public and private sector, availability of good quality seeds continues to be a problem for the farmers in Chamwino district. In view of that, the district has decided to establish a 200 acre farm for production of certified sorghum seeds in 2010/2011 growing season. The farm produced 120

tones of Quality Declared Seed (QDS) that was distributed in 65 villages in the sorghum growing zone before onset of rains. It is expected that in 2011/2012 growing season farmers will increase their yields and subsequently, nutrition and food security at household level.

Storage Facilities: The district has a total of 12 storage banks with a total capacity of 1,600 tones (Table 12). The utilization capacity is about 61 percent of the total capacity. These grain banks are used for various purposes ranging from storage of crops such as sorghum and maize as well as storage of farm inputs. More than 80% of these grain storage banks which are owned by villages and farmers' groups are hired by private traders for storage of grains. Table 12 shows the distribution of these grain storage banks by division. In the selected division of Mvumi no storage facility was found.

Table 12: Storage Facilities in the District by Division

Division	Number	Capacity (tones)	Utilized capacity	Usage %
Chilonwa	9	1100	550	50
Makang'wa	1	100	25	25
Itiso	2	400	400	100
Total	12	1600	975	61

Source: DALDO (2012)

Ward Agricultural Resource Centres: Ward agricultural resource centres (WARCs) are part and parcel of timely, responsive and effective extension services delivery to farmers. Being aware of the role played by these centres, the district has constructed 3 and rehabilitated 16 ward resource centres in 19 wards. The selected division of Mvumi has 2 WARCs. Currently 19 wards (59%) render services to farmers (Chamwino Socio-economic Profile, 2012). These would serve as knowledge and technology transfer platforms for the Trans-SEC project.

Livestock: In 2012 the district had an estimate of 299,166 indigenous cattle, 51,435 goats and 12,709 sheep based on 2002 livestock census projection, where number of cattle was 185,659 ,goats 41,384 and sheep 9,007 (Table 13). Cattle population accounts for about 20% of the regional cattle herd and it ranks second to Kondoa district in terms of livestock numbers. There has been a significant increase in the number of livestock in the district, partly due to immigration of nomadic pastoralists with their livestock into the area. Currently, livestock are concentrated in Makang'wa, Chilonwa, Itiso and Mpwayungu divisions. The case study division of Mvumi has the least population of livestock.

Table 13: Number of Livestock in Chamwino district by division

Livestock	Year	Itiso	Chilonwa	Mvumi	Makang'wa	Mpwayungu	TOTAL
Cattle	2010	65,792	77,079	1,496	86,017	54,365	284,749
	2011	67,437	79,006	1,534	88,167	55,724	291,868
	2012	69,123	80,981	1,573	90,372	57,117	299,166
Goats	2010	13,271	1,285	79	14,005	828	29,468
	2011	14,425	13,235	81	13,669	8,528	49,938
	2012	40,801	13,633	84	14,858	878	70,254
Sheep	2010	3,391	3,192	19	3,799	1,639	12,040
	2011	1,042	3,272	10	3,893	168	8,385
	2012	358	337	19	401	173	1,288
Pigs	2010	258	440	156	961	214	2,029
	2011	266	453	1,607	990	220	3,536
	2012	274	467	1,655	1,020	227	3,643
Chicken	2010	65,012	60,702	64,722	60,896	67,123	318,455
	2011	68,263	63,737	67,958	63,941	70,479	334,378
	2012	71,676	66,924	71,356	67,138	74,003	351,097

Source: DALDO (2012)

Livestock and Livestock Products Marketing: The district has 14 primary livestock markets which are also used as markets for other commodities (Table 14). These are livestock markets where livestock keepers/farmers meet traders monthly.

Table 14: Primary livestock markets in the district by division

Division	Number of livestock markets
Mpwayungu	3
Makang'wa	3
Itiso	3
Chilonwa	4
Mvumi	1
Total	14

Source: DALDO (2012).

Kilosa district

Location: Kilosa District Council is one of six districts that comprise Morogoro Region. It is located in East central Tanzania 300 km west of Dar es Salaam and is bounded by latitude 5°55' and 7°53' South and longitudes 36°30' and 37°30 East. Kilosa borders Mvomero district to the East, Kilombero and Kilolo districts to the South, Kiteto (Manyara region) and Kilindi (Tanga region) to the North; and Mpwapwa district (Dodoma Region) to the West.

Area: The District covers a total area of 14,245 square kilometres, of which:

- 536,590 ha are suitable for agriculture
- 483,390 ha are under natural pasture
- 323,000 ha are Mikumi National Park
- 80,150 ha are under forestry cover
- 14,420 ha are Urban areas, water and swamps.

Agro-climatic zones: The climatic condition of the district varies depending on the agro-ecological zones (Table 15). The highest parts of the district are found in the Ukaguru, Rubeho, and Vidunda Mountains, which are 2200m above sea level, with annual rainfall between 1000 mm – 1600mm. This area is characterized with moderately fertile well drained soil, comprising sandy (clay) loam soil. The central and southern parts experience an average rainfall of 800mm – 1400mm with poorly drained black clay and loamy soils which are suitable for maize, paddy, sisal, sugarcane, onion cultivation. Normally short rains starts in October to December and long term rain fall start in February continuing into May. The annual temperature is typically between 25℃ -30℃. The case study divisions of Masanze and Ulaya are in the medium to high agro-ecological zone.

Table 15: Crops grown within the agro-ecological zones

Zone	Area	Crops: Subsistence	Crops: Cash
1. Highlands	Ukaguru and Nguru mountains. Chonwe, Udung'hu and Vidunda areas	Maize, Beans, Banana, round potatoes	Coffee, Wheat, Vegetables Fruit
2. Medium to High	Magole, Masanze, Ulaya,Mikumi and Gairo Division	Maize, Rice, cassava, Sorghum and Banana	Cotton, Coconut, Cashew nut Sisal, Sugar cane, Vegetables
3. The Plains	Mkata Plains in Masanze, Kimamba, Mikum i& Magole Division	Maize, Banana, Rice, cassava, Sweet Potatoes	Cotton, sunflower, Sugar Cane, Coconuts, Fruit

Source: Agricultural & Livestock Dept. August 2010

Population: As per 2002 Population and Housing Census the District recorded 488,191 people with 243,329 males and 244,862 females, with an average of 4.6 people per family (Table 16). The growth rate is 2.5% which makes a 2010 Population Projection of 587, 967 people (293,675 males and 294,292 females). The sex ratio is 99:100. The district population density is 34 persons per square km.

Table 16: Population Distribution by Division

Division	No.wards	No village	Population 2002			Av. Size of household	
			Male	Female	Total		
Mikumi	8	23	50119	46682	96,801	19,635	4.2
Gairo	7	30	46880	50384	97,264	16,747	4.1
Ulaya	2	9	10984	10849	21,833	5,642	5.4
Masanze	4	16	16866	16534	33,400	8,421	5
Kimamba	6	15	21574	22145	43,719	15135	4.3
Nongwe	4	13	13499	13881	27,380	4719	6
Kidete	2	13	10067	9890	19,957	9325	4.4
Magole	9	41	60724	61053	121,777	17736	4.4
Kilosa	4	1	12616	13444	26,060	8275	4.1
TOTAL	46	164	243329	244862	488,191	105635	4.6

Source: DPLO's Office 2010

The district economy: More than 80% of the district population is employed in agricultural activities. According to the 2002 population and housing census, 2.8% were employed in office work, livestock keeping 0.93%, fishing 0.08, elementary occupation 7.45%, plant operations 0.49% and others 8.25%.

Agricultural Activities: Agriculture is the main economic activity and most of the people engage in farming of both subsistence and cash crops where the major food crops are paddy, maize, beans, cassava and bananas and major cash crops are sisal, sugar cane, cotton, simsim and sunflower. However, crops like rice, maize and beans can fall into both categories. The district has 536,590 hectares suitable for agriculture in cultivation of cash and food crops. Approximately 93% of land used for farming is under subsistence crop production, while 7% is used for cash crop production.

Cash crops: Simsim and sunflower are newly introduced cash crops adopted by smallholder farmers (Table 17). These crops have not yet been popular because of insufficient value adding infrastructures (oil milling machines) especially after the so called SIDO industries had collapsed. Other cash crops include onions and cotton. Sugarcane is grown by smallholders through an outgrower scheme arrangement.

Table 17: Cash crops production in tons from 2007/8 up to 2009/2010

Crop	2007/2008	2008/2009	2009/2010
Cotton	2,350	22,738	474.15
Onion	8,162	9,262	13,277.4
Sugar cane	450,780	450,780	573,294.4
Groundnut	778	778	1,763.28
Coconut	2,612	2,460	4,549.4
Simsim	480	916	75
Total	481,447	505,748	593,358.63

Source: Agricultural & Livestock Dept. August 2010

Food crops: As shown in Table 18, the main food crops grown in Kilosa District include maize, paddy, sweet potatoes, cassava, beans, and bananas. Maize is the main food crop in the district.

Table 18: Food crops production in tons from 2007/2008 up to 2009/2010

Crop	2007/2008	2008/2009	2009/2010
Maize	128,801	116,960	153,938.58
Rice	42,465	47,213	43,059.72
Sorghum	3,820	6,567	4,613.75
Cassava	60,690	116,949	55,543.18
Sweet potato	34,450	30,000	14,799.3
Banana	18,500	14,680	27,705
Wheat	78	328	0
Round potato	200	347	27,705
Beans	8,998	12,800	13,332.05
Cowpeas	924	924	958.65
Pigeon pea	1,313	1.313	3,386.8
Garden pea	405	425	107.5
Total	301,124	348,420	505,748

Livestock keeping: The livestock keeping is another economic activity undertaken in the district, it includes keeping cattle, goats, sheep, pig, poetry and dairy. This activity is mostly performed by Masai and Sukuma tribes who immigrate from other regions. Grazing is the major type of livestock keeping used by livestock keepers which in turn create social and environmental consequences. The area suitable for grazing is 290,688 ha out of which 193,792 ha have been affected by tsetse flies as a result of pastoralist grazing in this area.

4.3 Selection and description of the case study sites within the districts

The selection of the case study sites within respective districts was done systematically following a range of criteria. The list of criteria given in the terms of reference were expanded and modified to render them more relevant to the local conditions. The district officials helped in the selection process. The selection panel at the district involved key officials that have been involved in extension delivery in the villages for a long time (>20 years most of them). These include the crop and livestock subject matter specialists, officers in charge of marketing and cooperatives and the nutritionists (see Appendix 1). Administratively, below the district are divisions, wards are constituents of divisions and villages fall within wards. The iterative systematic process started with subjecting all divisions to a range of criteria (Table 19).

Table 19: Selection criteria for CSS

Selection criteria	Ranking
Market access	0---5---10
Capital market	0---5---10
Physical accessibility	0---5---10
Access to extension services (public): WEO/VEO	0---5---10
Land availability	0---5---10
Farmer-pastoral land disputes	0---5---10
Food security: availability	0---5---10
Child & maternal nutrition/health	0---5---10
Value addition: agro-processing, milk collection etc	0---5---10
Orientation to crop	0---5---10
Orientation to livestock	0---5---10
Agricultural water management	
rainfed	0---5---10
SWC	0---5---10
RWH	0---5---10
Irrigation	0---5---10
Environment degradation	0---5---10
Energy sources & trade	
Firewood	0---5---10
Charcoal use	0---5---10
Charcoal trade	0---5---10
Electricity	YES/No
Decentralized & renewables (e.g. solar, generators etc)	Exist/Not
MVIWATA	YES/No
Concentration of other big projects	None/Low/High
Village size (800-1500)	Met/Not met

Ranking was done on the scale of 0 -5-10 towards a positive direction. A zero rank means the non-existence of the situation specified by the criterion, 5 is at a moderate rating and marginally beyond towards 10 is the highest side of the ranking. A few criteria were subjected to a qualitative binary ranking. The ranks were cautiously added while observing for the overriding criteria envisaging the rainfall range of 350-500mm, lesser importance of irrigation and non-existence or low concentration of big projects. Food availability was the

isolation criterion in case the summed scores tended to tally. At least one division that met most of the criteria was chosen. All the wards under the selected division were listed and again screened across the same criteria. Then, villages in each of the two qualifying wards were listed. The aim was to select at least one village from each of the qualified wards. For village selection the criteria were reduced to about three – the village must be large enough with more than 600 households, it has to have food security problems and it must be accessible. The two villages in the two wards had to contrast each other in terms of market access and child/maternal nutrition status.

In Kilosa, the above process culminated in selecting Mazanze and Ulaya divisions. Under Masanze division Masanze ward was selected and from Ulaya division Ulaya ward was selected. In Masanze ward, Changarawe village was selected and in Ulaya ward Ilakala village was chosen. The two villages were visited for ground-truthing and coordinates were taken to enable physical location on the maps (Figure 3). Changarawe has relatively good market access and is relatively better off in terms of food availability while Changarawe has relatively poor market access and has exceedingly problems of food security. Not much variation exists in terms of rainfall.

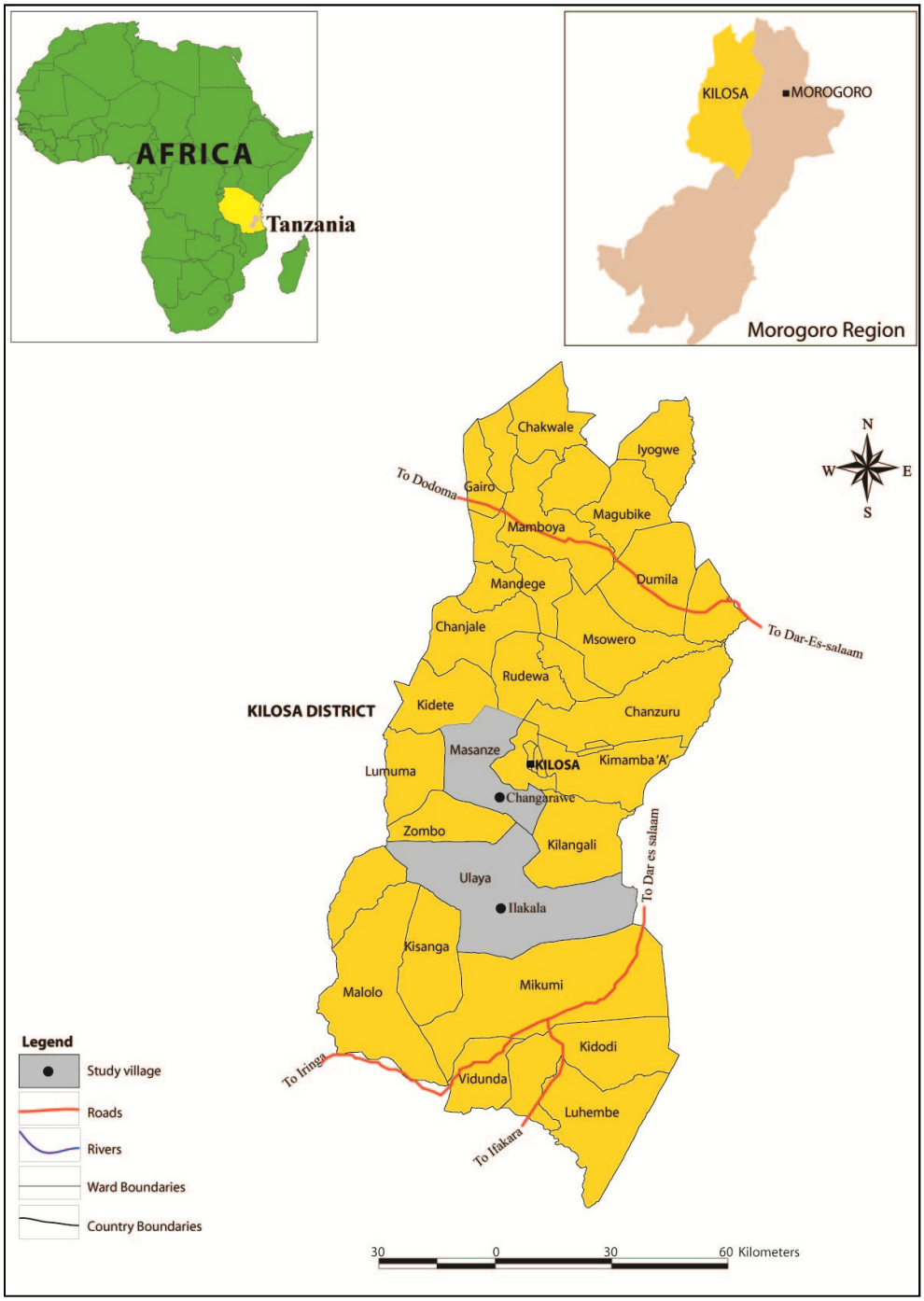

Figure 3: Maps showing the CSS in Kilosa District

In Chamwino, Mvumi division was chosen with its Muungano and Idifu wards. Under Muungano ward Ilolo village was selected and under Idifu ward Idifu village was selected. Ilolo is relatively better positioned in terms of market access compared to Idifu. The villages were visited and coordinates taken to determined their geographical locations (Figure 4).

As the villages were visited without notice most the offices were closed, hence detailed village level data were not made available. However, the researcher talked to ward and village extension officers in confirming the required features. He also took some photos that not only tell some interesting stories but set overarching research questions (Appendix 2).

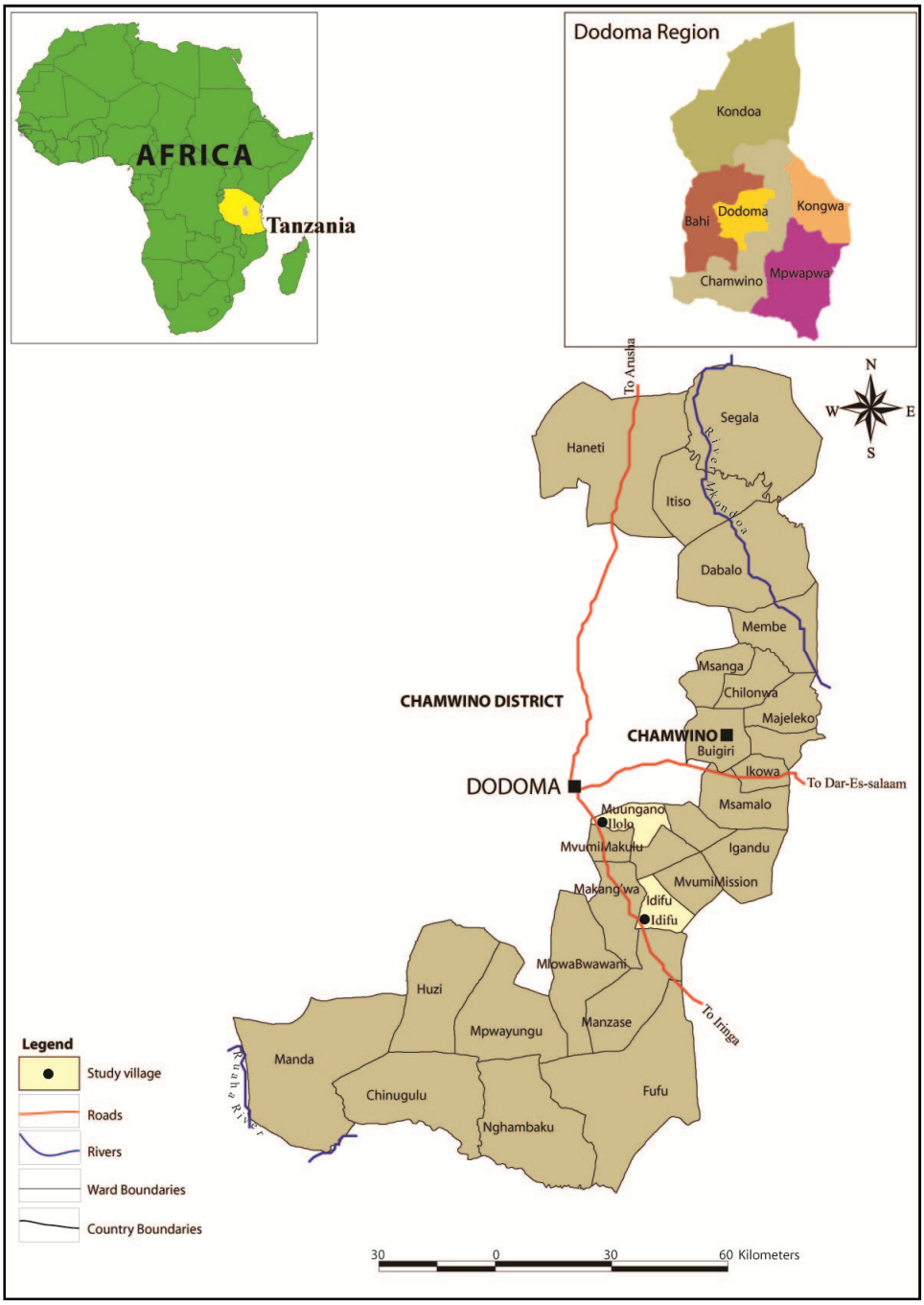

Figure 4: Maps showing the CSS in Chamwino District

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Appendix 1: List of consulted stakeholders

Kilosa District: Morogoro

SN	Name	Title	Location	Telephone	E-mail
1	Mr. Mchome A.A.	Subject matter specialist: crops	District headquarters	+255787127313	mchomeabel@hotmail.com
2	Mr. Kiango K.M.	Cooperative officer	District headquarters	+255655841929	-
3	Ms. Alice Pesha	Nutritionist	District headquarters	+255784731701	-
4	Mr. Thabit M. Waziri	Agro-mechanization officer	District headquarters	+255784828090/+255655828090	wthabit@yahoo.com
5	Mr. Geofrey Muya	Ward Extension Officer (WEO)	Changarawe Village	+255767471809	-
6	Mr. Festo Moses	WEO	Ulaya ward	+255768212068	-
7	Mr. Kasimu Ramadhan	WEO	Ilakala village	+255767340446	-

Chamwino District: Dodoma

SN	Name	Title	Location	Telephone	E-mail
1	Mr. Abbas Bakula	Cooperative officer	District headquarters	+255755042366	
2	Mr. Jonnie V. Semwaiko	Subject matter specialist: crops	District headquarters	+255762898868	daldochamwino@yahoo.com
3	Mr. Augustino C. Kibaya	Livestock officer	District headquarters	+255755654656/+255715654656	kibayaaugustino@yahoo.com
4	Mr. Richard Mwangalimi	Village Executive Officer (VEO)	Idifu village	+255787894292	-

Appendix 2: Research questions from the field: storylines on photos

Photo 1: Charcoal selling by the roadside at Mkata in Kilosa

Photo 2: Rural town centre: transforming rural Africa – Youth fixing a satellite dish at Changarawe village in Kilosa

Photo 3: Oranges and banana at the village market centre in Ilakala village, Kilosa. Orange farming used to be common in the past but nowadays it is a neglected enterprise.

Photo 4: Maize – bulrush millet mixed farming with infestation of Striga (witch weed) – a notorious parasitic weed which cripples food production in most of African countries. Those are not flowers – but the killer weeds! The weed parasitizes major cereals and legumes. There are promising technologies in striga management available but the adoption rate has been very slow. Approximately 21 million hectares for cereal production in Africa are infested by striga. Maize is the most affected crop compared to other cereals such as sorghum. About 2.5 million hectares of African maize production suffer grain loses of 30-80% from striga infestation. For only Kenya, for example, about US$ 29 million per annum worth of maize is lost due to striga (Mignouna et al. 201114). Combating such problem would be a research action area for the Trans-SEC project through technology transfer pathways.

[14]D.B. Mignouna, K.D.S. Mutabazi, E.M. Senkondo and V.M. Manyong. 2011. Imazapyr-Resistant Maize Technology Adoption for Witch Weed Control in Western Kenya. African Crop Science Journal, 19(3): 187-196.

Photo 5: Use of draught power for rural transportation: in Mvimi division, Dodoma. On the right panel the cart is loaded with harvested bulrush millet and sorghum.

Photo 5: The donor funded project can make a difference in supporting rural governance and knowledge transfer. The photo on the left – a modern information board in a village where development reports, plans and financial reports on village development investments are displayed for public access. On the right – a small rural information centre servicing as a community library where farmers can access reading material of relevance to their daily life including farming extension. The projects were supported by OXFAM. The photos were taken in different villages in Mvumi division, Dodoma. Such innovations are not widely scaled-up, for example, none exists in Kilosa.

Photo 6: Through history indigenous knowledge has enabled man to survive in challenging climates. A youth (in yellow shirt) in Mvumi division is growing off-season cowpeas and other crops in the ephemeral sand river in deeper planting holes. The residual moisture in the sand river beds takes the crops through to maturity. Such innovations can be enhanced through better agronomic practices – have a look – the young man is not making any effort to supply his precious crops with nutrients! Can Trans-SEC project help in enhancing such indigenous innovations? Yes it can!

Photo 7: Another on farm innovation in the semi-arid Dodoma. The pictures tell an interesting story but also set some research questions. The man without shirt is digging out trenches – for what? To capture the rainwater and runoff needed to supply the plants with needed water. The cropping pattern is a mixed one – tomatoes, maize and grapes. The runoff enters the trenches and is retained to provide for crop water requirement. Excessive runoff is allowed to collect in the nearby pond (next in Photo 8). Initially, the researcher thought the man owned the plot – he praised the man for being innovative on his farm. But latter it was realized that the man was actually a labourer and the farm belonged to the young lady's family. What this means – rural labour market supports farming innovations also as family farms commercialize there is an increasing tendency to hire labour bringing economic multipliers into the rural economy. The visit by the researcher at the farm rewarded the lady's family – the bucket was exchanged for Tsh 5,000. This price is not much – the same bucket buys 4 times in Dodoma town – 35 km from that farm. Can such innovating rural farmers get out of poverty traps – NO, unless the markets work for the rural poor.

Photo 8: Rural farmers are not in the same innovation boat. The photos are from Ilolo village – one of our case study villages. Some farmers can afford water saving technologies like use of mechanical treadle pumps. This farm is next to the digging trenches to capture the runoff. Though in proximity they are innovating differently – why and what conditions under their varied innovations? The two children running the pump are doing this for money – they are not family members of the farm owner – is this not child labour? May be not may be yes – it is not a drudgery for the two children. They were dancing and enjoying on the pump while pushing water from the pond to the field for payment. We did not ask how much they were paid for that job. This is another research question regarding farm innovations and social differentiation. When we were leaving the man on the water harvesting trench requested us to bring a donor project that will make them afford a treadle pump technology as the one of their neighbour. For them during the critical dry spell they wet their field using a bucket. Worthiness of technological innovation choices require smart economics – what are the costs and benefits associated with alternatives?

Photo 9: At Ilolo village in Dodoma. Rural energy solutions through renewables – here solar power. The youth is commercially running a small rural energy centre. He charges mobile phones, sells solar panels and its parts, and he repairs the solar units. There is an overarching research question regarding the future of rural youth in agriculture including the agri-food systems? Where these young men and women will position in the future agricultures and rural economies at large? The photos, this and the preceding ones, suggest some possible pathways of youth in the rural settings. They can manage their own farms – a young man struggling to grow crops in the sand river bed in photo 6; they can decide to work on family farms and possibly supervise the hired labour – the lady in photo 7; they can sell labour to the farm-sector – the children treadling for cash in photo 8; or take a path out of agriculture – a young man running a commercial solar energy shop.

Annex VII: ZALF scientific expertise in Sub-Saharan Africa

Expertise for Agricultural Research in Sub-Saharan Africa on Climate Change and Food Security at ZALF e.V. since 2006

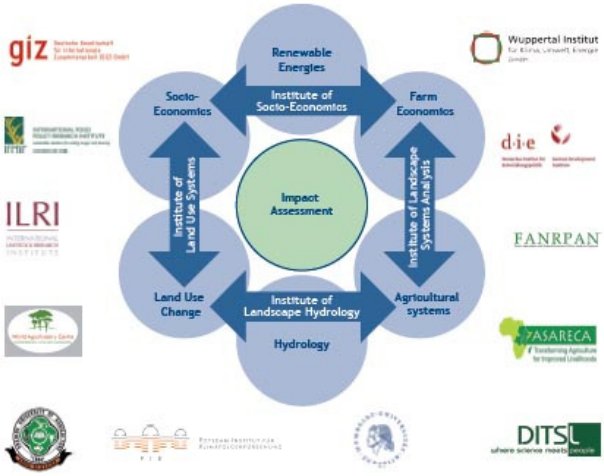
Partners

Projects

Trans-SEC:	Innovating pro-poor Strategies to safeguard Food Security using Technology and Knowledge Transfer: A people-centred Approach (BMBF)
PES-Africa:	Payments for Ecosystem Services (German Embassy, Kenya)
ReACCT:	Climate Change Impact Assessment and adaptation options in vulnerable agro-landscapes in East Africa (GIZ, BEAF)
Sub-Sahara:	Strategies for Adapting to Climate Change in Rural Sub-Saharan Africa: Targeting the Most Vulnerable (GIZ, BEAF)
Better-iS:	Bioenergy - Strategies to use biomass value chain potential for sub-Saharan Africa to better respond to global change (GIZ, BEAF)
LUPIS:	Land use policies and sustainable development in developing countries (EU Frame Program FP6)
CA2Africa:	Conservation Agriculture in AFRICA: Analyzing and Foreseeing its Impact - Comprehending its Adoption (EU Frame Program FP7)
Globe:	Sustainable Agriculture as an approach to achieve pro-poor growth in developing countries (BMVEL, BLE)

Institutes for Agricultural Research in Sub-Saharan Africa on Climate Change and Food Security at ZALF e.V. since 2006

Partners



Institutes

The **Institute of Socio-Economics** addresses issues and problems concerning multi-functional landscape use, integrated landscape management and the sustainable development of rural areas. In our research, we primarily pursue an interdisciplinary and transdisciplinary approach. One key topic is the understanding and support of decision-making processes and implementation of the decisions taken at farm, regional and political level. The research objective is how to derive and provide politically relevant information on multi-functional landscape use in the context of the sustainable development of rural areas.

At the **Institute of Land Use Systems**, scientists are involved in cultivating crop plants and in exploring productive livestock, species and habitats within the agricultural landscape. Not only do we examine the design principles of agricultural land use, the influencing factors that lead to each land use system and how can these processes be generalized. We also define interactions between species that live in the wild, or their habitats, and agricultural land use. In these two key research areas, we also investigate new potential solutions and concepts with regard to production and land use.

The **Institute of Landscape Systems Analysis** primarily deals with issues related to the analysis and modeling of complex interactions between land-use change induced by human activities and climate change and their impact on ecological functions and services of agricultural and forest landscapes. To this end, innovative methods and models are devised to better analyze, understand and assess landscape changes and potentials and the the spatio-temporal consequences of land-use and climate change on ecosystem functions as a basis for deriving management strategies for sustainable landscape development.

The **Institute of Landscape Hydrology** investigates the physical, chemical and biological processes that occur in the soil water, groundwater and surface water of rural areas. We focus on the following issues: What is the impact of deliberate or unintentional human intervention on the water balance? What role do spatial structures and processes play? Which are the effects of changing landscape structures on these processes? How can river basin management be optimized?

Annex VIII: German summary

Die globale Ernährungssicherung ist eines der dringlichsten Ziele der Menschheit und eine Herausforderung an die Forschung. Das BMBF fördert im Rahmen von „GlobE“ die Entwicklung von Forschungsnetzwerken mit dem Ziel, die Probleme von Ernährungssystemen in Ländern Afrikas zu lösen und adaptierte Forschungslösungen zu entwickeln. Ein wichtiger Ansatzpunkt ist hier die Entwicklung eines integrierten Systemansatzes, der die gesamte Wertschöpfungskette von ressourcenabhängiger Produktion, Verarbeitung, Vermarktung bis zum Konsum nach Effizienzpotenzialen analysiert und durch Einführung von Innovationen nachhaltig verbessert.

Trans-SEC ist ein internationales und interdisziplinäres Konsortium, das aus 14 Partnern besteht und insgesamt eine Konsortiumgröße von 53 Wissenschaftlern sowie zahlreichen weiteren Akteuren wie Masterstudenten, SLE (Seminar für Ländliche Entwicklung), Unternehmern, Kleinbauern und Nicht-Regierungsorganisationen erreicht. Das Forschungskonzept zielt ab auf die Sicherung des Ernährungssystems für die kleinbäuerliche Landwirtschaft in zwei Regionen Tansanias und es umfasst folgende Schwerpunkte: a) Die Etablierung eines nachhaltigen Deutsch-Afrikanischen Netzwerks für Forschung, Entwicklung und Innovationen im Tansanischen Ernährungssystem, b) die Analyse und Identifizierung derzeitiger Probleme in der Nahrungmittel-Versorgung, und c) die partizipative Entwicklung von lokal und regional angepassten nachhaltigen Lösungen zur Stabilisierung der Nahrungsmittel-Wertschöpfungskette und ihre Prüfung auf Anwendbarkeit.

Trans-SEC hat zum Ziel, innovative Strategien (neue, erfolgreiche gute Praxis) entlang der Nahrungsmittel-Wertschöpfungsketten im Bereich des kleinbäuerlichen Regenfeldbaus in Tansania zu identifizieren, übertragen und regionsspezifisch an die Standortbedingungen anzupassen und zu optimieren. Die Nahrungsmittel-Wertschöpfungsketten werden ganzheitlich betrachtet und analysiert: Natürliche Ressourcen, Nahrungsmittelproduktion, Weiterverarbeitung, Vermarktung, Konsum, Recycling. Trans-SEC wird dazu Aktionsforschung in vier Dörfern (4000 Haushalte) der Zielregionen Morogoro und Dodoma durchführen und darüber hinaus über die eingebundenen NGOs, das Referat „Nationale Ernährungssicherung“ des Tanzanischen Ministeriums für Landwirtschaft, Ernährung und Genossenschaften und weitere Akteure (Produzenten, KMUs) Ergebnisse für den nationalen und internationalen Kontext generieren. Verbreitungs– und Transferstrategien werden direkt mit den beteiligten Akteuren entwickelt und umgesetzt, um bereits während der Projektlaufzeit und auch darüber hinaus einen direkten Beitrag zur nachhaltigen Verbesserung der Existenzgrundlage von Kleinbauern zu erzielen. Dazu dienen On-farm-Forschung, die kontinuierliche Arbeit mit lokalen und regionalen Fokusgruppen, und zahlreiche thematische Workshops. Indirekte Wirkungen durch Verbreitungsstrategien über Beratungsdienste, Landwirtschaftsschulen und nationale Politikprogramme werden ab dem vierten Jahr von Trans-SEC erwartet.

Trans-SEC bettet kontinuierliche Schulungsprogramme ein: 20 Doktoranden, 21 Forschungsaufenthalte an deutschen Partnerinstituten, eine zweiwöchige Doktoranden-Summerschool sowie die Einbindung des BMZ-finanzierten SLE für ca. 8 Ausbildungsteilnehmer ermöglichen breite Fortbildungsmöglichkeiten.