Achieving Food Security in SSA through Food Value Chains

IFPRI Policy Seminar
8th of June 2015
GlobE – Global Food Security

Initiative of the

Federal Ministry of Education and Research (BMBF) in cooperation with the

Federal Ministry for Economic Cooperation and Development (BMZ)

Total budget: approx. 50 M Euro
BMBF funding initiative within the National Research Strategy „Bioeconomy 2030“

November 2010 started by the German Government: 5 key challenges of Bioeconomy 2030 to transform the oil-based to a biomass-based industry and society:

- **securing global nutrition**
- ensuring sustainable agricultural production
- producing healthy and safe foods
- using renewable resources for industry
- developing biomass-based energy
## Topics of the systemic approach of Food System

<table>
<thead>
<tr>
<th>Topics</th>
<th>Objectives</th>
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</thead>
<tbody>
<tr>
<td>Agricultural production / nutrition / health</td>
<td>German-African research networks which focus on the food system</td>
</tr>
<tr>
<td>Soil / water / material flows</td>
<td>Identifying and solving central problems related to food systems</td>
</tr>
<tr>
<td>Reducing of losses along the value chain</td>
<td>Developing regionally adapted research solutions</td>
</tr>
<tr>
<td>Rural and gender-specific structures / local solutions</td>
<td>Research capacities in Germany and in Africa</td>
</tr>
<tr>
<td>Plants / plant breeding</td>
<td></td>
</tr>
<tr>
<td>Biomass / bioenergy</td>
<td></td>
</tr>
<tr>
<td>Animals in the system</td>
<td></td>
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</tbody>
</table>
### Regional focus of the six „GlobE“ projects

<table>
<thead>
<tr>
<th>Name</th>
<th>Countries</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trans-SEC</td>
<td>Tanzania</td>
<td>Entire FVC</td>
</tr>
<tr>
<td>Urban Food+</td>
<td>Burkina Faso, Ghana, Mali, Cameroon</td>
<td>Urban agriculture</td>
</tr>
<tr>
<td>Wetlands</td>
<td>Kenya, Uganda, Rwanda, Tanzania</td>
<td>Wetlands</td>
</tr>
<tr>
<td>Hortinlea</td>
<td>Kenya, Tanzania, Ethiopia</td>
<td>Vegetables</td>
</tr>
<tr>
<td>Biomass Web</td>
<td>Ghana, Nigeria, Ethiopia</td>
<td>Biomass</td>
</tr>
<tr>
<td>Reload</td>
<td>Ethiopia, Uganda, Kenya</td>
<td>Post-harvest losses</td>
</tr>
</tbody>
</table>
SCALE-N

Scaling-Up Nutrition: Implementing Potentials of nutrition-sensitive and diversified agriculture to increase food security
Innovating Strategies to safeguard Food Security using Technology and Knowledge Transfer: A people-centred Approach

8 M Euro, total Budget
5 Years, total period
Definition Food Security

- Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO),
- Access, Availability, Utilization, Stability

Undernourishment, Malnutrition

- Stunting, 1000 days windows of opportunity for reversible effects

Sustainable project implementation

- Sustaining project success incl. up- and outscaling
Objectives

- Improving the **food situation** for the most-vulnerable rural poor
- **Identifying** and **testing** successful upgrading strategies along FVC to site-specific, sustainable settings
- **Implementation and dissemination** for national outreach, policy, extension, research
## Trans-SEC approach

### Six rules for our action research

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Using existing local knowledge</td>
<td>Not to reinvent the wheel</td>
</tr>
<tr>
<td>3 Incentive structure fosters scaling up/out of success</td>
<td>Micro-credit innovation funds &amp; round table of up-scaling</td>
</tr>
<tr>
<td>4 Research as guiding role</td>
<td>Tools minimize the risk, Support of decision processes Translation of findings</td>
</tr>
<tr>
<td>2 Holistic, system analysis focuses on gaps, bottlenecks for success</td>
<td>Empiric evidence on requirement criteria (ScalA)</td>
</tr>
<tr>
<td>5 Participation leads to local ownership and thus adoption</td>
<td>Cost-efficient in the long term</td>
</tr>
<tr>
<td>6 Conflict Prevention and Management System</td>
<td>Training, supervision intercultural sensitization</td>
</tr>
</tbody>
</table>
Objective of Trans-SEC

waste management, nutrient cycling

Natural Resources
How manage resources sustainably?

Crop Production
How produce crops more efficiently?

Processing
How add value though processing?

Markets
How add value / income through markets?

Consumption
How improve consumption patterns / diets?

FVC

water harvesting, erosion prevention

inter-cropping, fertiliser

less energy, efficient PH processing and storage

certification, better market integration

nutrition education

e.g.:
### Trans-SEC: 15 partners

<table>
<thead>
<tr>
<th>Partner</th>
<th>Institution</th>
<th>Contact Person</th>
<th>Email</th>
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<tbody>
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</table>
## Network platform: Model Region

### New projects in Trans-SEC case studies

| New Project: EU Commission IPTS | Trans-SEC – ZALF is for the country Tanzania official partner of the IPTS EU-Commission Project "Technical and scientific Support to agriculture and Food and Nutrition Security sectors" financed by DEVCO-JRC. This project aims at 1. improving information systems, 2. Policy & economic analysis for decision-making processes and 3. scientific advice. |
| Institute of Rural Development Planning (IRDP) | IRDP is the main Institute for Rural Development in Tanzania and was the lead partner in implementing Chololo |
| New Project: Macsur I | The Knowledge Hub FACCE MACSUR brings together the excellence of research in modelling grasslands, livestock, crops, farms, and agricultural trade in order to illustrate to political |
| STAR Project | Unmanned Are |

### New institutes within consortium

| New Partner: Institute for Conflict Management | A Memorandum of Understanding was completed between the Institute for Conflict Management (IKM) at European University Viadrina Frankfurt (Oder) and the Leibniz-Centre for Agricultural Landscape Research (ZALF e.V.) in order to formalize bilateral cooperation, which focuses on the research on "Development and implementation of a conflict prevention and moderation system" for large international research projects. |
| New Partner: Centre for Rural Development | The Centre for Rural development (SLE) is involved in Trans-SEC as a partner of the Humboldt University Berlin. SLE researchers will conduct studies analysing the food security and relevant innovation systems in Tanzania. Using SLE approaches and tools the researchers will conduct a baseline and an impact study at different levels before and after implementing the Trans-SEC upgrading strategies. |

= Funding involved (total 12 M Euro)
Strategy (total 12 M Euro)

From national up-scaling cases to Smart Up-Scale Centres

- **Globe I+2**
  - 2013
  - Coordinator: ZALF
  - 0,2 M
  - BMELF/GIZ

- **ReACCT**
  - 2013
  - Coordinator: ZALF
  - 1,3 M GIZ

- **Biofuel evaluation for Tanzanian Technological Efficiency using Renewables – integrated Strategies**
  - Coordinator: ZALF
  - 1,1 M GIZ

- **Sub-Saharan**
  - 2013
  - Coordinator: IFPRI
  - 1,3 M GIZ

- **IPTS EU Commission**
  - 2015
  - Coordinator: ZALF
  - 1,3 M GIZ

- **M&B Gates**
  - 2015
  - Coordinator: ZALF
  - 1,1 M GIZ

- **Eco-village (EU)**
  - 2018
  - Coordinator: ZALF
  - 1,3 M GIZ

- **MACSUR II**
  - 2018
  - Coordinator: ZALF
  - 1,1 M GIZ

- **Trans-SEC I+2**
  - 2018
  - Innovating pro-poor strategies to safeguard Food Security using technology and knowledge transfer

- **BMEL SCALE-N**
  - 2020
  - Scaling-Up Nutrition: Implementing Potentials of nutrition-sensitive and diversified agriculture

- **Embrapa**
  - EU Horizon 2020

- **From national up-scaling cases to Smart Up-Scale Centres**

- **Strategy (total 12 M Euro)**
Steps of Trans-SEC

Improvement of **food situation** for the most-vulnerable rural poor

4 Villages

- 1000 HH
  - Region1: Morogoro
  - Region2: Dodoma

**Identification/Testing** of successful upgrading strategies along FVC to site-specific, sustainable setting

- **Sub-humid region:** Maize, Sesame, pigeon pea
  - Ilakala/Changarawe
- **Semi-arid region:** Millet, Sunflower, groundnut
  - Ilolo & Idifu

**Dissemination/Implementation** for national outreach, policy, extension, research

- National Up-scaling Centre
  - Research
  - Policy
  - Extension
  - Region

- Up-Scaling Centre-Network
  - Cross-country
  - Approach
Procedure of Trans-SEC

Out and up-scaling
- Local, regional, national Policies
- Farmer field groups & schools

Model Systems
- Scenario framework
- Future simulation
- Climate proofing

Stakeholders along FVC
- Mixed groups
- Local ownership
- Mapping
- Gender
- Pro-poor

Inventory UPS
- 52 ups at national level
- Food security-relevant
- Defining major constrains

Participatory Testing of UPS
- Implementation
- Monitoring
- Evaluation

UPS Selection
- Typologizing the FVC and their components in the CSS
- Participatory selection & UPS prioritizing based on inventory and within given capacities

UPS Impact Assessment
- Household survey 900 HH in 4 CSS, 2 control villages
- Participatory ex-ante IA

Model Systems
- Scenario framework
- Future simulation
- Climate proofing

Stakeholders along FVC
- Mixed groups
- Local ownership
- Mapping
- Gender
- Pro-poor

Inventory UPS
- 52 ups at national level
- Food security-relevant
- Defining major constrains
### Selection of Inventory 52 UPS

#### Natural Resources
1. Rainwater harvesting (tie-ridges, infiltration pits)
2. Fertiliser micro-dosing ("deep fertiliser placement")
3. Optimised weeding

#### Crop Production
1. Crop byproducts for bioenergy
2. Improved processing (trainings, business models for purchasing machines)
3. Improved on-farm wood supply (tree planting/integration)
4. Improved cooking stoves

#### Processing Waste Management
1. New product development (horizontal and vertical coordination, high value crops, surplus cereals, and livestock products)
2. Optimised crop storage (profitable, market oriented, reducing PH losses)
3. Poultry-crop integration (for enhanced rural income and food security)
4. Market access system (m-IMAS, mobile based)

#### Bioenergy
1. Household nutrition education
2. Kitchen gardens (indigenous fruits and vegetables for dietary diversification)
Selection of Upgrading Strategies

1. Rainwater harvesting (tie-ridges, infiltration pits)
2. Fertiliser micro-dosing (”deep fertiliser placement”)
3. Optimised weeding

Features:
1st year baby plots

Idifu 73 households
Ilolo 53 households
Changarawe 43 HH
Ilakala 52
-> lower doses than recommend
(money amount equal to 2-4 chicken/ha)

Sub-humid region:
Maize, Sesame, pigeon pea Ilakala/Changarawe
Semi-arid region:
Millet, Sunflower, groundnut
Ilolo & Idifu
### Selection of Upgrading Strategies

<table>
<thead>
<tr>
<th>Processing Waste Management Bioenergy</th>
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<tbody>
<tr>
<td>1. Crop byproducts for bioenergy</td>
</tr>
<tr>
<td>2. Improved processing (trainings, business models for purchasing machines)</td>
</tr>
<tr>
<td>3. Improved on-farm wood supply (tree planting/integration)</td>
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<tr>
<td>4. Improved cooking stoves</td>
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</tbody>
</table>

**Features:**
- Pyroliser (Maize cob charcoal production)
- Maize shelling
- Crude oil pressing sunflower oil
- 500 stoves per village Low costs (2-3 Euro/stove)
- Training for trainers
- Nurseries (2000 trees, 4 species)
Selection of Upgrading Strategies

1. New product development (horizontal and vertical coordination, high value crops, surplus cereals, and livestock products)
2. Optimised crop storage (profitable, market oriented, reducing PH losses)
3. Poultry-crop integration (for enhanced rural income and food security)
4. Market access system (m-IMAS, mobile based)

Features:
- Sunflower crude oil selling on local, regional markets -> Two entire villages (1000 HH each)
- Market-oriented storage through IRRI super bag 2 Euro + „vihenge“ traditional storage (loam container) -> In all villages (30 1st y and 250 HH per village)
- Poultry breeding incl. a demonstration site for out-scaling - Starting with 27 farmers
- Server-based mobile market system for all mobile users.
### Selection of Upgrading Strategies

#### Consumption

1. Household nutrition education
2. Kitchen gardens (indigenous fruits and vegetables for dietary diversification)

**Features:**
- Kitchen garden education (30 HH per village per year with subsequent outscaling activities)
- Pocket garden
- In each sub-village 1 demonstration plot
- Implementation during dry season
- Continuous education over year
5 Innovation funds incl. micro credits

6 Cooperative (TFC)

On station on farm pressing regional, local market training

mother and baby plots crude oil

1 2 3 4

Natural Resources Crop Production Processing Markets Consumption

FVC
## Sunflower Case

### Sub-Saharan Africa high cost of marketing

<table>
<thead>
<tr>
<th>Metric</th>
<th>Africa</th>
<th>Other developing countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paved road density (km/km² of arable land)</td>
<td>0.34</td>
<td>1.34</td>
</tr>
<tr>
<td>Population with access to electricity (%)</td>
<td>14</td>
<td>41</td>
</tr>
<tr>
<td>Population with access to improved potable water (%)</td>
<td>61</td>
<td>72</td>
</tr>
<tr>
<td>Power tariffs ($/kwh)</td>
<td>0.02-0.46</td>
<td>0.05-0.1</td>
</tr>
<tr>
<td>Transportation cost ($/ton/km)</td>
<td>0.04-0.14</td>
<td>0.01-0.04</td>
</tr>
<tr>
<td>Tariffs of urban potable water ($/cu m)</td>
<td>0.86-6.56</td>
<td>0.03-0.6</td>
</tr>
</tbody>
</table>

The high transaction costs is a result of low investment in marketing infrastructure.
Sunflower Case

Allocation of agricultural public expenditure by function

Only 13% of Ag budget allocated to marketing

One solution for addressing high marketing costs is *reinventing* horizontal and vertical linkages that existed during the farmer cooperative movement era, 1930-70.
Sunflower Case

Reinventing the Horizontal & Vertical Linkages of Smallholder Farmers in SSA

• The future belongs to the organized & Success belongs to the organized – Cooperative movement in 1930s-1970s followed well-organized horizontally and vertically linked production, processing and marketing systems, which provided:
  • Input credit & timely delivery
  • Organized transportation, grading, bulking and storage of crop produce
  • Advisory services on both production & marketing knowledge
  • Processing of export crops (coffee, tea, cotton, tobacco, pyrethrum, cashew nuts, etc)
  • Marketing services – including direct export of commodity without passing thru a centralized & government controlled body

— Cooperative leaders were democratically elected even during the traditional (chiefs) period – when election was uncommon.
Sunflower Case

Deterioration of cooperative development in SSA & potential for their reinvention

– 1980s-2000 – chaotic period with heavy-handed government operated parastatals - Crop development Authorities (CDA) – which supplanted the role played by cooperatives interference in the cooperatives

– 2000-todate: Back to the future: New locally incorporated companies are now offering promise of re-inventing old successful horizontal and vertical linkage production & marketing.

• Horticultural companies with outgrower schemes –
• Large-scale milling and processing companies – Azam, Mt Meru millers etc
• Fish processing
• Supermarkets with local and international procurement arrangement

– Our study in Tanzania is working to establish horizontal and vertical linkages of farmers with edible oil processors & chicken
Sunflower Case

Edible oil import as share of total food import in SSA & major importing countries

- SSA
- Mozambique
- South Africa
- Zimbabwe
- Mauritania
- Madagascar
- Uganda
- Rwanda
- Zambia
- Kenya
- Togo
- Ethiopia
- Tanzania
- Benin
- Djibouti

Edible oil import as percent of total food import
Sunflower Case

Net edible oil import per capita by Income groups

Source: UNCTAD
Asante Sana

Thank you

Dankeschön