ICTs, Small Enterprise and Agriculture
Examples from Kenya and Tanzania
- Work in progress-

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Presented at:
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Agenda

• Introduction
• Value chain approaches
• Hypothesis and research questions
• Methods and research process
• Results
• Conclusion and Outlook
Introduction

This presentation contains
• Conceptual considerations
• Hypotheses and
• First results
of a four year research project (in its second year)
• funded by the German Ministry of Research and Education (seed money) and
• applied by the German Research foundation.
Introduction

Relevance:
• Today various businesses (e.g. accenture and vodaphone), donors (e.g. UNDP) and applied studies (e.g. Mukhebi 2008) promote ICT solutions for development (ICT4D) in the Global South in general and in agriculture in particular.
• However, in science the ICT4D debate is mainly based on applied studies and
• differentiated explanatory conceptual frameworks in how far and why ICT can contribute to development are few (see also the critique by Heeks 2010 and Pfaff 2009).

Our aim:
To contribute to the ICT4D debate in agriculture by linking it to conceptual considerations of Value Chain approaches
ICT for Development

Key arguments for development in business:
• Better access to knowledge
• Improving efficiency in the supply chain
• Creating jobs in ICT related services
• Opens possibilities to better response to shock (connection to social networks)
• Facilitating the delivery of financial and other services
• Direct connections to markets (disintermediation) (e.g. Aker/Mbiti 2010; Unwin 2009; UNDP 2012)

Critics:
• Positive effects are limited or poorly developed so far.
• Supplementing other knowledge channels=>exclusion of those who do not use it
• Lead to increased international competition (Donner/Escobari 2010; Molony 2008; Carmody 2012)
Value Chain approaches

• Besides local linkages, businesses even in rural areas of the Global South are more and more integrated in supra-regional commodity chains
• based on the flow of products, the exchange of information and power relations
• The recent scientific discussion on value chains considers these interrelations. Prominent concepts are:
  – The global commodity chain approach (GCC; Gereffi, 1996, 2001)
  – The global value chain approach (GVC; Gereffi et al., 2005; Gibbon et al., 2008)
  – The global production network approach (GPN; Henderson et al., 2002; Coe et al., 2008)
Value Chain approaches – key arguments

- Value chains constitute on the flows of goods and money but also on knowledge flows and power relations between the actors.
- The agricultural sector is often considered to be strongly influenced by powerful buyers (especially supermarket chains, which can dictate their terms and conditions e.g. via private standards).
- The coordination of a chain is especially dependent on the complexity of knowledge transfer, the codification of knowledge and the capabilities of the actors involved.
- For agricultural production, the flow of information is increasingly important; it presents possibilities to upgrade processes (in other words to innovate to increase the value of products, processes or of functions) to stay competitive.
Superior research questions

• In how far can ICT influence the coordination in international value chains?

• In how far can the usage of ICT influence the position of farmers in interregional value chains?
Hypothesis (based on a literature review on value chains and ICT4D)

H1: The usage of ICT can influence small scale based value chains in the Sub-Saharan Africa in different ways. This includes:

- Dynamics concerning financial and material flows
- Structural changes of the value chain
- Dynamics in knowledge exchange
- Dynamics in governance and coordination

In this way ICT can significantly (not necessarily positively) influence the chances of farmers of being integrated into commercial value chains and the chances to sell their products.

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Hypothesis (based on a literature review on value chains and ICT4D)

H2: The ICT driven dynamics in the value chains are influenced and can be explained by different variables. These include:

- The different types of ICT
- The complexity of the knowledge and its ability to be codified to be exchanged via ICT
- Capabilities and characteristics of the businesses and actors
- The different types of distribution channels in the chain
- The degree of professionalization and ICT usage in the rest of the value chain

In this way limitations and chances of farmers to use ICT can be explained. The testing of these hypothesis can help to derive applied recommendations.
Research questions for today

1. What are the different types of ICT used by farmers and how do they influence the agricultural value chain?
2. What are capabilities of farmers influencing ICT use?
3. In how far can ICT influence agricultural value chains in Kenya and Tanzania regarding:
   - Dynamics in knowledge exchange,
   - Dynamics in governance and coordination and
   - Structural changes of the value chain?
Methods and research process

• Mixed methods approach
• Empirical field studies in Mt. Kenya Region and Mwanza in 2013
• Selection criteria:
  – Horticultural production (vegetables and/or fruits)
  – Commercial production (business-to-business marketing, not including selling to individual consumer)
• 368 standardized surveys and 20 qualitative interviews with producers
• Randomly selection of respondents by gatekeepers (e.g. local village chiefs) and snow ball sampling
• Selection research area: large numbers targeted respondents, different value chains and integration levels (domestic vs. export production)
Questionaire (possible indicators)

**Capability of actors:** e.g. turnover, educational level, size of farm

**Types of distribution channel:** e.g. use of standards, target customers

**Structural change:** e.g. middlemen or exporter

**Knowledge exchange:** e.g. simple (e.g. market prices) and complex knowledge (e.g. production techniques)

**Governance and coordination:** e.g. bargaining position with buyers and seller

**Different types of ICT:** e.g. media used for farming (mobile phone, internet)

**Financial flows:** e.g. mobile payment

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### Overview of data sample

<table>
<thead>
<tr>
<th>Country of residence (n=368)</th>
<th>In %</th>
<th>Educational level</th>
<th>In %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>52%</td>
<td>None and primary</td>
<td>69%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>48%</td>
<td>higher than primary</td>
<td>30%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size of farms</th>
<th>In %</th>
<th>Monthly turnover (n=299)</th>
<th>Median value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 acre</td>
<td>78%</td>
<td>Selling to trader</td>
<td>13%</td>
</tr>
<tr>
<td>&gt; 2.1 acre</td>
<td>22%</td>
<td>Selling to exporter</td>
<td>27%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>In %</th>
<th>Selling to middlemen</th>
<th>47%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30 years</td>
<td>19%</td>
<td>Selling to others</td>
<td>12%</td>
</tr>
<tr>
<td>31- 50 years</td>
<td>63%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 51 years</td>
<td>16%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<th>In %</th>
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<th>12%</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>68%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>31%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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# Results

## Overview of ICT user types

<table>
<thead>
<tr>
<th>Complexity</th>
<th>n=368</th>
<th>None ICT user</th>
<th>Only voice user</th>
<th>Voice and text user</th>
<th>Voice, text and internet user</th>
</tr>
</thead>
<tbody>
<tr>
<td>In percent</td>
<td>16%</td>
<td>14%</td>
<td>62%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>In total</td>
<td>57 n=363</td>
<td>n=326</td>
<td>n=329</td>
<td>n=331</td>
<td></td>
</tr>
</tbody>
</table>

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## Results
### Capabilities and characteristics of ICT user

<table>
<thead>
<tr>
<th>Variables</th>
<th>None ICT user</th>
<th>Voice user</th>
<th>Text user</th>
<th>Internet user</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None and primary</td>
<td>++</td>
<td></td>
<td>- -</td>
<td>- -</td>
</tr>
<tr>
<td>higher than primary</td>
<td>- -</td>
<td></td>
<td></td>
<td>+++</td>
</tr>
</tbody>
</table>

**Correlation between selected variables and ICT user types**
- - -  = very disproportionately low (= significant at the 1 percent level)
- -  = disproportionately low (= significant at the 5 percent level)
+ +  = disproportionately high (= significant at 5 percent level)
+++  = very disproportionately high (= significant at the 1 percent level)

→ Education positively influences the use of ICT and in particular use of internet, but generally everybody can use a mobile phone.
## Results

**Dimensions of knowledge access (Indicator for knowledge exchange)**

<table>
<thead>
<tr>
<th></th>
<th>None use of ICT (n=57)</th>
<th>Voice user (n=52)</th>
<th>Text user (n=277)</th>
<th>Internet user (n=41)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very good to medium access to knowledge (n=277)</strong></td>
<td>52%*</td>
<td>71%</td>
<td>83%</td>
<td>80%</td>
</tr>
<tr>
<td><strong>Very good to medium access to simple knowledge (n=271)</strong></td>
<td>51%*</td>
<td>70%</td>
<td>83%</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Very good to medium access to complex knowledge (n=197)</strong></td>
<td>24%*</td>
<td>57%</td>
<td>63%</td>
<td>69%</td>
</tr>
</tbody>
</table>

* = significant at the 5 percent level

→ The use of ICT influences the knowledge exchange
→ Types of ICT have no influence the access to knowledge

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## Results

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</tr>
</tbody>
</table>

→ The use of ICT contributes to a better access to simple and complex knowledge
→ The more sophisticated the ICT use the higher the chance to have good access to complex knowledge

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## Results
Dimension in bargaining position (Indicator for governance and coordination)

<table>
<thead>
<tr>
<th>Overview of ICT user types and bargaining position with buyers and with suppliers</th>
<th>Superior bargaining position with buyers</th>
<th>Superior bargaining position with suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>None use of ICT</td>
<td>53%</td>
<td>32%</td>
</tr>
<tr>
<td>Voice Use</td>
<td>59%</td>
<td>38%</td>
</tr>
<tr>
<td>Text Use</td>
<td>42%</td>
<td>31%</td>
</tr>
<tr>
<td>Internet Use</td>
<td>54%</td>
<td>37%</td>
</tr>
</tbody>
</table>

→ No impact of ICT could be indicated on the power relations between farmers and buyers/ input suppliers

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Results

Dynamics on distribution systems (Indicator for structural changes)

Overview of ICT user types and types of buyers

<table>
<thead>
<tr>
<th></th>
<th>Exporter</th>
<th>Middlemen</th>
</tr>
</thead>
<tbody>
<tr>
<td>None use of ICT</td>
<td>16%</td>
<td>55%</td>
</tr>
<tr>
<td>Voice Use</td>
<td>32%</td>
<td>58%</td>
</tr>
<tr>
<td>Text Use</td>
<td>27%</td>
<td>45%</td>
</tr>
<tr>
<td>Internet Use</td>
<td>47%</td>
<td>60%</td>
</tr>
</tbody>
</table>

→ ICT impacts the distribution system and causes some structural changes
→ The role of middlemen does not diminish

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Preliminary conclusion and outlook

Our results so far indicate that:

H1: The usage of ICT can influence small scale based value chains in the Sub-Saharan Africa in different ways. This includes:
- financial flows ✓
- Structural changes ✓
- knowledge exchange ✓
- governance and coordination

H2: The ICT driven dynamics in the value chains are influenced and can be explained by different variables. These include:
- The different types of ICT ✓
- The complexity of the knowledge ✓
- Capabilities of the actors ✓
- The different types of distribution channels in the chain ✓
- The degree of professionalization ✓

Outlook: checking the other hypotheses, qualitative interpretation of results, identification of causalities, further discussion and deriving conceptual implications on ICT4D and the explanations of dynamics in value chains

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Thank you for your attention!

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