Food security in Sub-Saharan Africa: A Fresh Look on Agricultural Mechanisation

How adapted financial products can make a difference

Presentation of the study and its results

Consultative Meeting on a Mechanization Strategy:
New models for sustainable agricultural mechanization in sub-Saharan Africa

December 2, 2016

Corinna Müller
The study combines the perspectives from both agricultural and financial sector

- More than 200 theoretical and empirical studies
- About 40 qualitative interviews with experts worldwide
- Intense revision process and feedback loops with experts
- Numerous case studies
Agenda

Key questions and methodology

Mechanization as solution approach

Options for financing mechanization

Effects of mechanization

Conclusion
The whole value chain offers mechanization opportunities in different intensities

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Production</th>
<th>Processing</th>
<th>Storage</th>
<th>Transport</th>
</tr>
</thead>
</table>
| High: Large motorized machines | ![image](Image)
| Medium: small motorized machines | ![image](Image)
| Medium: Draught animals | ![image](Image)
| Low | ![image](Image) | ![image](Image) | ![image](Image) | ![image](Image) |
For smallholder farmers (majority in SSA), mechanization changes the production patterns.

Mixed Livelihoods ensure risk management

Mechanization → Income & costs → More commercial approach → Less diverse Livelihoods → New risk profile

Source: Drawing from Gradl et al. 2012.
Agenda

1. Key questions and methodology
2. Mechanization as solution approach
3. Options for financing mechanization
4. Effects of mechanization
5. Conclusion
Constraints in accessing financial services for mechanization exist on two levels

**Level 1 constraints:**
- Low financial literacy
- Low business literacy

**Level 2 constraints:**
- Availability of collateral
- Performance risk
- Capacity of financial institutions: lack of agroeconomic knowledge
- Communication
Different financial products can finance mechanization

- Saving products
- Investment loans
- Risk mitigation

- lack of securities
- new risk profile
- high costs

- Contract based securities
- Loan guarantee schemes
- Joint liability groups
- Leasing
- Matching grants
- Subsidies
Case Study: myAgro - Targeted savings with innovative distribution channels

**What?**

Non-profit Organization, active in Mali und Senegal

Sells agricultural products with layaway system:

- Local vendors sell *scratch-cards* worth $1 - $50
- Farmers text the code to an indicated number to lay away their savings to their myAgro account
- myAgro delivers high quality seeds, fertilizer and (small) tools
- The service includes financial training and transport

**How?**

**Effects?**

- Local and confidential way of saving
- Timely delivery
- High quality
- Correct application
Alternative business models are more important for social impact than financial products itself

<table>
<thead>
<tr>
<th>Private Ownership</th>
<th>Joint Ownership</th>
<th>External Ownership and Joint Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example</strong></td>
<td><strong>Machinery ring</strong></td>
<td><strong>Service Providers</strong></td>
</tr>
<tr>
<td>Farmers...</td>
<td>...buy own equipment</td>
<td>...pool resources</td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td>No competition for machinery</td>
<td>Access to funds for machinery</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>High cost</td>
<td>Competition for machinery during short crop operation periods</td>
</tr>
</tbody>
</table>
Case Study: CUMA - machinery ring in Benin

Coopérative d’Utilisation de Matériel Agricole in Benin
Cooperative to purchase and share machinery

**What?**

**How?**

1. Farmers contribute proportionately to farm size
2. Money is used for purchase and maintenance
3. Shared use of machinery

**Effects?**

- Increase of cultivated area
- Market-focus and specialization
- Additional labour for subsequent tasks
Case Study: Hello Tractor - innovative tractor-hiring in Nigeria

Social Enterprise in Nigeria
Provides tractor hiring services

What?

- Request tractor from owner via SMS
- Pre-payment through mobile money
- Performance of service
- Release of money to Smart Tractor owner

How?

- Bulk purchasing allows to save money compared to single purchases
- Women benefit from anonymity

Effects?

Source:
http://www.hellotractor.com/
http://www.mymarketing.it/dblog/articolo.asp?articolo=1278
Case Study: NWK Agri Services - outgrower scheme in Zambia

**What?**

Agribusiness company in Zambia
Acts as intermediary between farmers and banks

**How?**

According to cash flow
Negotiates and pays monthly


**Effects?**

Increased income
Less vulnerable to shocks
Supply to peripheral farmers
The shared usage and ownership models are a solution to central obstacles of mechanization for smallholders.

- Make (financing of) mechanization economically viable
- Enable purchase and maintenance of mechanization tools to be done jointly
- Improve usage of tools:
  - Training
  - Service by specialized operator
- Enable financial institutions access to smallholder farmers
Key questions and methodology

Mechanization as solution approach

Options for financing mechanization

Effects of mechanization

Conclusion
### Effects on people and land (I)

<table>
<thead>
<tr>
<th>Positive effects</th>
<th>Negative effects</th>
</tr>
</thead>
</table>
| **Improvement in the quality of life...**  
*is a major driver and effect of mechanization* | • Less hard manual labor  
• Better health condition |
| **Productivity of labour and land**  
*may increase directly or indirectly* | • Machinery increases productivity |
| **Income and employment effects...**  
*depend on the type of mechanization and can be negative* | • Decrease of income because of high operational costs  
• Decrease of labor demand  
(Substitution: labor $\rightarrow$ capital) |
## Effects on people and land (II)

<table>
<thead>
<tr>
<th>Mechanization effects on women</th>
<th>Positive effects</th>
<th>Negative effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>... are crucial, but hard to predict</td>
<td>• Decrease of hard manual labor</td>
<td>• Loss of income and bargaining power</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social structures...</th>
<th>Positive effects</th>
<th>Negative effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>... can become more unequal with respect to income and land</td>
<td>• Small and medium intensity of mechanization: Decrease of income inequality</td>
<td>• Intense mechanization: danger of land-grabbing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agro-ecological effects</th>
<th>Positive effects</th>
<th>Negative effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>... are ambiguous and depend on the mechanization tool and intensity</td>
<td></td>
<td>• Loss of biodiversity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expansion of agricultural area to important ecosystems</td>
</tr>
</tbody>
</table>
Agenda

Key questions and methodology

Mechanization as solution approach

Options for financing mechanization

Effects of mechanization

Conclusion
1. Adaptation of technology is central with respect to
   - Size and output of the farm
   - Context such as soil, availability of land, labor, etc.

2. Only demand-driven and profitable mechanization has sustainable positive effects. This requires viable business models and risk management.

3. Mechanization with technologies of low intensity is feasible at farm level; Mechanization with higher intensity is only accessible and financeable through shared ownership and usage models (for smallholders).

4. Financing needs of all involved actors have to be considered (not only farmers, but also machinery rings, service providers, aggregators).

5. Mechanization is necessary and will lead to structural change in the long run.
We hope we made you curious to read the study!

Food Security in Sub-Saharan Africa: A Fresh Look on Agricultural Mechanisation

How adapted financial solutions can make a difference

Christiane Ströh de Martínez
Marietta Feddersen
Anna Speicher
Grateful for your attention!

Dr. Christiane Ströh de Martínez
c.stroeh@joyn-coop.com

Corinna Mueller
c.mueller@joyn-coop.com

www.joyn-coop.com