Minimum Tillage Use Rates in Zambia: Evidence from District-Representative Data

Hambulo Ngoma, Brian P. Mulenga, T.S. Jayne, Nicholas Sitko, Jordan Chamberlin, & Stephen Kabwe

Agriculture Cooperating Partners Meeting on Conservation Agriculture, Embassy of Finland,
Lusaka, Zambia
10th June 2014
Motivation

- Wide differences in MT adoption/use rates reported in existing studies
- Most of the existing studies are based on targeted population, specific regions, small samples, & only provide a snapshot
- Our analysis uses nationally representative agric. dataset, Crop Forecast Survey (CFS) spanning 5 years (2008-2012) to examine trends of MT use at different levels, & determine drivers of use, & identify sources of variation in reported estimates
Data

- CFS data, statistically representative at district and national levels; 2008–2012, with a total of 63,000 households over the 5 years
- FGDs in 3 districts with 69 farmers
- Key informant interviews with CFU project staff, MAL extension officers and researchers
- Literature review
- CFS collected data using semi-structured questionnaire on:
  - Demographics, landholding, field size & use
  - Main tillage method used in each field → basis for our estimates
Methods

- Descriptive analysis used to generate trend tables and graphs
- Used econometric model to determine factors influencing MT use
Results & Discussion
1. MT use rates low (<5%) nationally but rising
2. MT use higher than national averages in areas of intense CF promotion
## Top 10 MT use districts; 9 of these are in CFU CAPII

<table>
<thead>
<tr>
<th>Province</th>
<th>Top 10 MT use districts 2008-2012</th>
<th>Use rate as at 2012 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>Chibombo</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Mumbwa</td>
<td>7.1</td>
</tr>
<tr>
<td>Eastern</td>
<td>Chipata</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>Katete</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>Lundazi</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>Petauke</td>
<td>4.2</td>
</tr>
<tr>
<td>Lusaka</td>
<td>Chongwe</td>
<td>7.3</td>
</tr>
<tr>
<td>Muchinga</td>
<td>Chama</td>
<td>22.0</td>
</tr>
<tr>
<td>Southern</td>
<td>Mazabuka</td>
<td>11.3</td>
</tr>
<tr>
<td>Western</td>
<td>Kaoma</td>
<td>1.1</td>
</tr>
</tbody>
</table>
Understanding low use rates

FGDs & Key informant interviews:

- Provision of “material handouts” to “lure” farmers
- High labor demands
- Dry season land preparation conflicts with off-farm activities e.g. marketing, & trading
- Resource constraint
  - poor resource farmers may not afford purchased inputs e.g. herbicides
- Scarcity of ripping services
Drivers of MT use after controlling for other factors

- Increased land access improves uptake of basins and ripping practices
- Following a drought season, farmers increase MT use
- Following season of floods farmer use of MT reduces response to rainfall variability
- Incidences of cattle diseases negatively affect uptake of ripping, and ADP in general
- Presence of CFU in a district positively influences uptake of ripping
What Explains Variations in Adoption/Use Rates

- Two plausible explanations:
  1. Sampling design
  2. Variable(s) of interest (question asked)
Main Conclusions

- We find low but rising use rates nationally < 5% as at 2012
- There is potential to increase MT uptake as indicated by areas of longstanding intensive promotion
- Farmers with relatively large landholdings more likely to adopt/use MT
- More support needed to collection and dissemination of weather data
- Cattle diseases control need to be ramped up and promotion of tractor ripping services
- Findings differ mainly due to varying sample frame, & variable of interest
- Joint study by stakeholders is necessary to harmonize the sample frame, & definitions
Triangulating Plausible Adoption/Use Rates

1. National
   - 2003: 3.3% (Kabwe and Donovan)
   - 2008: 1.8 – 5% (Ngoma et al and Arslihan et al)
   - 2012: 4% (Ngoma et al)

2. High Promotion/High Potential Districts
   - 2012: 8.87 – 18.2% (Ngoma et al and Kasanga and Daka)

3. Among Target Populations (i.e. proximity to lead farmer or interaction with cotton distributors)
   - 2012: 13 - 21.5% (Grabowski et al and, Kasanga and Daka)
   - 2003: 2.3-7.2% (Haggblade and Tembo 2003, uses PHS)
THANK YOU
http://www.iapri.org.zm/

Or

http://www.aec.msu.edu/fs2/zambia/index.htm

Plot No. 26A Middleway Road, Kabulonga
PostNet Box 99, Kabulonga
Lusaka, Zambia
Tel: +260 211 261194/97
Fax: +260 211 261199