Out scaling climate smart Agriculture technologies in Malawi, Zambia and Zimbabwe

Piloting CSA technologies
## Project sites

<table>
<thead>
<tr>
<th>No</th>
<th>Country</th>
<th>District</th>
<th>Site</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Altitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Malawi</td>
<td>Zomba</td>
<td>Songani</td>
<td>-15.336</td>
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<td>Zaka</td>
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<td>Zaka</td>
<td>Bvukururu</td>
<td>-20.175</td>
<td>31.380</td>
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</tr>
</tbody>
</table>
What has been promoted so far

- Maize P/Peas Rotation
- Maize G/nuts Rotation
- Maize/cowpeas rotation
- DT Maize
Piloted new CSA technology: Doubled-up legume system
Rainfall in cropping season 2017/2018

Diagram a) shows cumulative rainfall (mm d⁻¹) for locations Chinguluwe, Chipeni, Linga, and Zidyana. Diagram b) shows cumulative rainfall (mm d⁻¹) for Lemu, Matandika, Malula, and Songani. Diagram c) shows cumulative rainfall (mm d⁻¹) for Hoya, Kapara, Changie, Kawalala, and Mtaya. Diagram d) shows cumulative rainfall (mm d⁻¹) for Bvukururu, Zishiri, and Monze.
Central Malawi sites, maize yields, 2017/2018

Maize grain yield (kg ha⁻¹)

- Conventional ridge tillage, maize-legume rotation
- Conservation agriculture, maize-legume rotation
- Conservation agriculture, maize/legume intercropping-legume rotation

Chinguluwe Chipeni Linga Mwansambo Zidyana

b
ab
a
a
a
a
b
a
a
b
ab
a
b
a
ab
Central Malawi sites, groundnut yields, 2017/2018

Legume grain yield (kg ha\(^{-1}\))

<table>
<thead>
<tr>
<th>Site</th>
<th>Conventional ridge tillage, legume-maize rotation</th>
<th>Conservation agriculture, legume-maize rotation</th>
<th>Conservation agriculture intercropping, legume-maize rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinguluwe</td>
<td>b</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Chipeni</td>
<td>a</td>
<td>a</td>
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<tr>
<td>Linga</td>
<td>a</td>
<td>a</td>
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</tr>
<tr>
<td>Mwansambo</td>
<td>b</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Zidyana</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>

Note: Different letters indicate significant differences (e.g., a vs. b).
Southern Zimbabwe/Zambia sites, maize yields, 2017/2018

Maize grain yield (kg ha\(^{-1}\))

- Conventional tillage maize-legume rotation
- Conservation agriculture ripline seeding, maize-legume rotation
- Conservation agriculture AT direct seeding, maize-legume rotation
- Conservation agriculture, basin planting, maize-legume rotation

Bvukuru, Zishiri, Monze

Graph showing differences in maize yield across different farming methods and sites.
Southern Zimbabwe/Zambia sites, cowpea yields, 2017/2018

Legume grain yield (kg ha\(^{-1}\))

- Conventional tillage, legume-maize rotation
- Conservation agriculture, ripline seeding, legume-maize rotation
- Conservation agriculture, AT direct seeding, legume-maize rotation
- Conservation agriculture, basin planting, legume-maize rotation

Locations:
- Bvukururu
- Zishiri
- Monze

Significance levels indicated by letters (e.g., a, b) follow the same pattern across locations.
Soil carbon measurements 2017/2018

Central Malawi (manual)
South Malawi (manual)
Eastern Zambia (manual)
Eastern Zambia (animal traction)
Southern Zimbabwe (manual and animal traction)
Southern Zambia (animal traction)

Soil carbon (%)

0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6

CRT, maize-rot
DiS, maize/legume-rot
DiS, maize-rot
DiS, maize-rot
CP, maize
DiS, maize/legume intercrop
CP, maize-rot
DS, maize-rot
CP, maize-rot
RI, maize-rot
DS, maize-rot
BA, maize-rot
CP, maize-rot
DS, maize-rot
Conclusion

• Generally CA treatments outperformed the conventional practice
• In some sites those yield difference were not significant
• Groundnut yields generally favourable to CSA in 2017/2018 – cowpea yields more variable
• Soil carbon: only in two agro-ecologies there was a significant carbon benefit
• Need for a strong diversification component to increase soil carbon (Powlson et al. 2016)
• More results are available in the Pilot Report
Thank you for your interest!