Conservation agriculture and drought-tolerant maize varieties 2014

By David Mariote, Christian Thierfelder and Peter Setimela
SANREM Innovation Annual Meeting Lab, 19-21 May, 2014 Washington DC USA
Objective of this project

• Develop sustainable, climate-smart technologies for smallholder farmers by integrating conservation agriculture and drought-tolerant maize varieties
• Overcome market constraints to seed availability in Mozambique
• Increase the knowledge and awareness of stakeholders about improved technologies
• Quantify the socio-economic impact of interventions on food security and farmers’ livelihood
Where do we operate?

- Active in Mozambique since 2006
- Experiences mainly in three provinces: Manica, Sofala and Tete
- Mainly mid-altitude and confined to maize-growing areas
- Mainly small scale farmers
Country: Mozambique
Maize yields compared to neighbouring countries (FAOSTAT-2012)

- Maize productivity is very low particularly under farmers management practices
Conservation Agriculture (CA) – a sustainable system

- CA comprises the following principles:
  - Minimal soil movement
  - Surface crop residue retention
  - Crop rotations and/or green manure cover crops
- Jab-planter
- Dibble stick
- Basal planting
- Hoe-planter
- AT Direct seeder
- Magoye ripper
FARMERS INVOLVED IN COMPOSTING PROCESS
CIMMYT’s partners in Mozambique

- The Mozambique National Agricultural Research and Extension Systems
- Seed producers and input suppliers
- IITA, IFDC
- International NGO’s (i.e. Total Land Care)
- Donors: USAID
Maize response to CA on different farmer’s fields, Lamego, 2012/2013
Mozambique - all communities
2012/2013

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

- Control treatment
- Basins
- Direct seeding

Communities
- Gimu
- Lamego
- Lamego Ndeja
- Maguai
- Malomue
- Mussianharo
- Nhamatiquite
- Nhamizhinga
- Nzewe
- Pumbuto
- Ulongue
- Mean

Gimu
Lamego
Lamego Ndeja
Maguai
Malomue
Mussianharo
Nhamatiquite
Nhamizhinga
Nzewe
Pumbuto
Ulongue
Mean

Maize grain yield (kg ha\(^{-1}\))
Varieties under different cropping systems, 2012/2013

![Graph showing maize grain yield for different varieties and treatments.](image-url)
Performance of maize varieties under CA in Sussundenga, 2012/2013

Maize grain yield [kg/ha]

Varieties
molecule czh0837 sc635 sc403 pan67 pGS61 czh0935 pristine601 pan53 zm309 sussuma matuba zm401 zm625 tsangano zm523

Maize grain yield [kg/ha]
Average maize grain yield in five target communities, Mozambique, 2008-2013

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

- Conventional practice
- Basin planting
- Direct seeding

Harvest year
2008 2009 2010 2011 2012 2013

Maize grain yield in five target communities, Mozambique, 2008-2013
Overall varietal performance in five target communities of Mozambique, 2008-2013

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

Varieties
- Matuba, no fert
- Matuba, fert
- ZM309, fert
- ZM401, fert
- ZM523, fert
- ZM625, fert

Legend:
- Conventional control
- Basin planting
- Direct seeding

Varieties
- Matuba, no fert
- Matuba, fert
- ZM309, fert
- ZM401, fert
- ZM523, fert
- ZM625, fert
Average cowpea grain yield in five target communities, Mozambique, 2010-2013

<table>
<thead>
<tr>
<th>Harvest year</th>
<th>Cowpea grain yield (kg ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Conventional practice</td>
</tr>
<tr>
<td>2011</td>
<td>Basin planting</td>
</tr>
<tr>
<td>2012</td>
<td>Direct seeding</td>
</tr>
<tr>
<td>2013</td>
<td>Direct seeding</td>
</tr>
</tbody>
</table>

Legend:
- Conventional practice
- Basin planting
- Direct seeding
Training events on cropping systems and improved varieties in eleven target communities

<table>
<thead>
<tr>
<th>Event</th>
<th>No. of participants</th>
<th>No of males</th>
<th>No of females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community awareness</td>
<td>450</td>
<td>267</td>
<td>183</td>
</tr>
<tr>
<td>Evaluation meetings</td>
<td>300</td>
<td>170</td>
<td>130</td>
</tr>
<tr>
<td>Farmer to farmer exchange</td>
<td>169</td>
<td>55</td>
<td>114</td>
</tr>
<tr>
<td>Field days</td>
<td>702</td>
<td>356</td>
<td>346</td>
</tr>
<tr>
<td>Study tours</td>
<td>12</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Trainings</td>
<td>147</td>
<td>83</td>
<td>64</td>
</tr>
<tr>
<td>Planning meeting</td>
<td>22</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Variety demonstration field days</td>
<td>1700</td>
<td>521</td>
<td>1179</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3502</strong></td>
<td><strong>1482</strong></td>
<td><strong>2020</strong></td>
</tr>
</tbody>
</table>
Extend of adoption* in different target communities

<table>
<thead>
<tr>
<th>District</th>
<th>Name of community</th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nhamatanda</td>
<td>Lamego John Segredo</td>
<td>62</td>
<td>22</td>
<td>84</td>
</tr>
<tr>
<td>Nhamatanda</td>
<td>Lamego Ndeja</td>
<td>44</td>
<td>23</td>
<td>67</td>
</tr>
<tr>
<td>Gondola</td>
<td>Pumbuto</td>
<td>25</td>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>Sussundenga</td>
<td>Nhamatiquite</td>
<td>257</td>
<td>171</td>
<td>428</td>
</tr>
<tr>
<td>Báruè</td>
<td>Mussianharo</td>
<td>27</td>
<td>37</td>
<td>64</td>
</tr>
<tr>
<td>Báruè</td>
<td>Nhamizhinga</td>
<td>78</td>
<td>31</td>
<td>109</td>
</tr>
<tr>
<td>Báruè</td>
<td>Malomue</td>
<td>21</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>Angonia</td>
<td>Nzewe, Ulongue</td>
<td>22</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td>Tsangano</td>
<td>Gimo, Maguai</td>
<td>39</td>
<td>12</td>
<td>51</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>575</td>
<td>336</td>
<td>911</td>
</tr>
</tbody>
</table>

*adoption under this project is defined as uptake without external input support from the project
Seed production in 2012/2013 cropping season by seed companies and IIAM

<table>
<thead>
<tr>
<th>Variety</th>
<th>Type</th>
<th>Year of release</th>
<th>Amount of seed produced (tons)</th>
<th>Seed Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molocue</td>
<td>Hybrid</td>
<td>2011</td>
<td>50</td>
<td>Lozane Seed</td>
</tr>
<tr>
<td>ZM309</td>
<td>OPV</td>
<td>2013</td>
<td>300</td>
<td>Dengo Commercial, Bonimar, Ndzarayapela</td>
</tr>
<tr>
<td>ZM523</td>
<td>OPV</td>
<td>2011</td>
<td>500</td>
<td>Dengo Commercial</td>
</tr>
<tr>
<td>OLIPA</td>
<td>Hybrid</td>
<td>2010</td>
<td>50</td>
<td>Lozane Seed; Moz Seeds</td>
</tr>
<tr>
<td>SP1</td>
<td>Hybrid</td>
<td>2013</td>
<td>20</td>
<td>Semente Perfeita</td>
</tr>
<tr>
<td>Pristine 601</td>
<td>Hybrid</td>
<td>2013</td>
<td>200</td>
<td>Moz Seeds,</td>
</tr>
<tr>
<td>Various other lines</td>
<td>Breeders’ seed</td>
<td>2013</td>
<td>3</td>
<td>IIAM</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1123</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

• We have made good progress to achieve the project goals!
• The results show that CA and drought tolerant varieties are viable and profitable technology interventions
• Change is a slow process – but what are the alternatives?
• How can we get to more adoption? The need for an integrated approach involving more partners....!
Plot under CA (Maize & Cow pea)
Maize & Cow pea plot with Mulching
Discussion with men & women
Differences between basins and jab planter plots
Discussion with women
Part of Nhamatanda CA Team
Thank you very much!