Conservation Agriculture: Some Evidence from the Baseline Survey

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CASFESA Project Implementation Region

- 30 villages – 15 treatment and 15 control
- 10 sub-locations
- 6 locations
- 4 divisions
- 2 districts
Baseline Survey Sampling

Baseline survey-300 hhs

16 villages - 8 from treatment and 8 from control - random drawing

Proportional sampling depending on total hh of the villages

Random drawing from each village
# Household Head Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Control Village</th>
<th>Treatment village</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female headed household (%)</td>
<td>19.8</td>
<td>21.23</td>
</tr>
<tr>
<td>Age of the household head (years)</td>
<td>53.85</td>
<td>56.68</td>
</tr>
<tr>
<td>Education of the hh head (years)</td>
<td>7.26</td>
<td>7.42</td>
</tr>
</tbody>
</table>
Landholdings and Maize area

- Majority of the maize farmers are smallholders.
- The average landholding is 1.8 acres.
- The proportion of land allocated for maize in the 2012 cropping year was 35.5% of the total farm size.

Table 1: Total farm size and area under maize

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average (acres) landholdings</td>
<td>1.8</td>
<td>2.28</td>
</tr>
<tr>
<td>Average maize area (acres)</td>
<td>0.6</td>
<td>0.87</td>
</tr>
</tbody>
</table>
Maize Variety and Fertilizer Usage

- Inorganic fertilizer and Hybrid maize variety usage were over 90%

*Fig 1 Maize Varieties Grown in Embu County*
Fig 2 Maize yield (kg/ha) for different varieties for the main season

Yields (Kg/ha)

Maize varieties

- Hybrid
- OPV
- Local
- Average all

Control villages
Treatment villages
Fig 3 Use of selected inputs (% households)

- Hired labour
- Use of pesticides
- Use of herbicides
- Improved maize variety adoption
- Manure adoption
- Fertilizer adoption

Treatment villages n=179
Control villages N=121
Adoption of Conservation Agriculture

- Adoption of CA in Embu is still low.
- Both the Zero tillage and crop rotation adoption are below 15%.
- Intercropping and crop residue retention however is high over 60% each.
- Adoption of all the three components of CA together is very low, less than 1%; Fig 4.
Figure 4 Adoption of CA in Embu County

- Amount of Residue retained by the minimum tillage adopters
- Crop residue retention for the minimum tillage adopters
- Intercropping, minimum tillage and crop residue retention
- Intercropping and minimum tillage
- Crop rotation
- Crop residue retention
- Intercropping
- Minimum tillage

Farmer Proportion (%)
CA in Embu county cont...

● Majority (over 50%) of those practicing minimum tillage retained crop residues.

● However, the proportion of crop residue retained is about 15% of the total residue.

● The main crops intercropped with maize were Beans, coffee, Banana and Irish potato Fig 5.
Crop residue utilization (% of total amounts)

- Crop residues have other uses (Table 2); hence explaining the low field retention

<table>
<thead>
<tr>
<th>Utilization</th>
<th>Maize</th>
<th>Beans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left on land for soil fertility</td>
<td>15.2</td>
<td>15.5</td>
</tr>
<tr>
<td>Burnt in the field</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Used as firewood</td>
<td>0.8</td>
<td>0.7</td>
</tr>
<tr>
<td>Feed for livestock</td>
<td>76.9</td>
<td>76.4</td>
</tr>
<tr>
<td>Used for construction</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Compost making</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>sold</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Other uses</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Fig 5 Common crops intercropped with Maize

Crop intercropped with maize

Proportions (%)

Beans
Irish Potatoes
Coffee
Bananas
Crop Rotation

- Crop rotation pattern was recorded using recall questions for 3 years.
- Maize was the main crop grown in the plots over the three years.
- Beans had been rotated though it appears that in the survey year (2012) the proportions of farmers growing them had declined.
Crop planted between 2010 and 2012

Figure 4 Crop rotation program

- Maize
- Beans
- Coffee
- Bananas

Year

2012

2011

2010
# Gross Margins

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conventional tilled plots</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total revenue (KSh/ha)</td>
<td>67832.0</td>
<td>65150.27</td>
<td>69564.0</td>
<td>59008.8</td>
<td>0.55</td>
</tr>
<tr>
<td><strong>Variable costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed costs (KSh/ha)</td>
<td>6682.8</td>
<td>56937.66</td>
<td>4496.8</td>
<td>8603.2</td>
<td>0.24</td>
</tr>
<tr>
<td>Fertilizer costs ksh/ha</td>
<td>8141.6</td>
<td>8797.8</td>
<td>7125.33</td>
<td>5765.72</td>
<td>0.12</td>
</tr>
<tr>
<td>Herbicide costs Ksh/ha</td>
<td>80.52</td>
<td>1079.87</td>
<td><strong>399.39</strong></td>
<td>1346.52</td>
<td><strong>0.04</strong></td>
</tr>
<tr>
<td>Family labor costs Ksh/ha</td>
<td><strong>16938.0</strong></td>
<td>16232.76</td>
<td>11271.48</td>
<td>10837.7</td>
<td><strong>0.00</strong></td>
</tr>
<tr>
<td>Hired Labor costs ksh/ha</td>
<td><strong>16490.0</strong></td>
<td>15360.25</td>
<td>12439.55</td>
<td>9802.67</td>
<td><strong>0.01</strong></td>
</tr>
<tr>
<td><strong>Total costs of production</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ksh/ha</td>
<td>41507.64</td>
<td>32190.14</td>
<td>37901.32</td>
<td>38088.94</td>
<td>0.22</td>
</tr>
<tr>
<td>Gross margins Ksh/ha</td>
<td>26282.32</td>
<td>37002.39</td>
<td><strong>33218.93</strong></td>
<td>44303.53</td>
<td><strong>0.09</strong></td>
</tr>
</tbody>
</table>
Observations

• Farmers don’t perceive CA as a combined technology.
• They practice components of CA but as an individual technique.
• Uptaking CA as a combined technology will depend on their experience with it.
• Using the technology correctly will be crucial.
Thank You