Soy Value Chain in Mozambique – Results and Challenges

Feed the Future Scaling Agricultural Technology/GLEE
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1. Actual Soy Situation in Mozambique
Soy in Mozambique

Small Farmers – Extension provided by CLUSA and others

Large Commercial Farms + Small Commercial Farmers providing Extension to Small Farmers

Plantation Forestry Companies providing Extension to Small Farmers

Feed / Poultry/ Oil industries
The context is positive for soy development in Mozambique

Soy is a new crop in Mozambique (beginning in 80-85 and then after 2005/06)

Agro-ecological conditions are favorable in various Mozambique regions for soy cropping

Soybean has growing demand in the domestic market (poultry industry growing at 60% per year, and large vegetable oil consumption)

The commercial private sector is increasing the investments in the soy value chain
Soy in Mozambique from the 09/10 season until now

Total National, per Year/crop season,

<table>
<thead>
<tr>
<th>Year/Crop Season</th>
<th>Nr de Agric</th>
<th>Área (ha)</th>
<th>Prod. (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camp 09/10 REAL</td>
<td>10,000</td>
<td>15,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Camp 10/11 REAL</td>
<td>10,000</td>
<td>20,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Camp 11/12 REAL</td>
<td>12,000</td>
<td>25,000</td>
<td>40,000</td>
</tr>
<tr>
<td>Camp 12/13 Real</td>
<td>15,000</td>
<td>30,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Camp 13/14 Plano</td>
<td>20,000</td>
<td>35,000</td>
<td>60,000</td>
</tr>
</tbody>
</table>
### Soy in Mozambique – Comparison by Season

<table>
<thead>
<tr>
<th></th>
<th>09/10 Season</th>
<th>12/13 Season</th>
<th>Estimated 13/14</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># of Farmers</strong></td>
<td>11,214</td>
<td><strong>24,071</strong></td>
<td>28,034</td>
<td>+ 4,000 / <strong>2.5 x</strong></td>
</tr>
<tr>
<td><strong>Area (ha)</strong></td>
<td>8,736</td>
<td><strong>30,987</strong></td>
<td>41,717</td>
<td>+10,730 / <strong>4.8 x</strong></td>
</tr>
<tr>
<td><strong>Tons Produced</strong></td>
<td>7,440</td>
<td><strong>35,020</strong></td>
<td>50,035</td>
<td>+15,000 / <strong>6.7 x</strong></td>
</tr>
<tr>
<td><strong>Ha/Farmer</strong></td>
<td>0.78</td>
<td><strong>1.29</strong></td>
<td><strong>1.49</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ton/Ha</strong></td>
<td>&lt;0.85</td>
<td><strong>1.13</strong></td>
<td><strong>1.20</strong></td>
<td></td>
</tr>
</tbody>
</table>
Main Reasons for Growth of Soy Production

- **Internal market** Strong domestic demand, increasing in various regions – feed, poultry and oil industries growing

- **Good farm-gate prices** to the producers: equivalent to $450-$615 USD/ton

- **Incentives** and a **technical package** for the producers, funded by donors, including: seed varieties, innoculant, high quality demo plots, field days, training sessions, etc

- **Other investments in the industry** Capital intensive farms and companies, in north and center regions, providing scale and knowledge to the industry as a whole
We expect soy production in Mozambique to **double** over the next two seasons to at least 70,000 tons per year!

**Estimated Soy Production**

- Soy production is growing at 40% per year through increases in:
  - **cultivated areas** and
  - **increases in yield**

1 Included around 6,000 Metric Tons crossing-over Malawi border; Source: TechnoServe (Southern Africa Regional Soy Study, 2011)
2. Producer profiles, farming systems and margins
Technology levels/Farming systems

• **Smallholder Farmer (SHF)**
  
  (<2 ha, avg)

• **Small Commercial Farmer (SCF)**

  (>2 ha and <50-100/200 ha)

• **Large Commercial Farmer (LCF)**

  (>100 or >200 ha)
Smallholder Farmer – Angonia in Tete Province
SIWAMA/SCF Cooperative: - Seed multiplication field (40 ha)
Weed control with animal traction
Small Commercial Farmer – Alto Zambezia - 12/13 Season:
10 ha soy seed multiplication + 7 ha soy grain + 5 ha sugar bean +
4 ha irrigated horticulture
Rei do Agro - Large Commercial Farm – 12/13 season:  690 ha (+/-1,300 tons soybeans) + 250 ha extension to 61 small farmers
<table>
<thead>
<tr>
<th>Farmer region</th>
<th>Yield – kg/ha</th>
<th>Cost – Mt/kg</th>
<th>Income – Mt/kg</th>
<th>Margin / Profit (Mt/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Niassa</td>
<td>800</td>
<td>10.53</td>
<td>13.00</td>
<td>2.47</td>
</tr>
<tr>
<td></td>
<td>1,000</td>
<td>8.42</td>
<td>13.00</td>
<td>4.58</td>
</tr>
<tr>
<td></td>
<td>1,200</td>
<td>7.02</td>
<td>13.00</td>
<td>5.98</td>
</tr>
<tr>
<td>B-Alto Molocué-Zambezia</td>
<td>1,000</td>
<td>10.69</td>
<td>14.00</td>
<td>3.31</td>
</tr>
<tr>
<td></td>
<td>1,250</td>
<td>8.55</td>
<td>14.00</td>
<td>5.45</td>
</tr>
<tr>
<td></td>
<td>1,500</td>
<td>7.12</td>
<td>14.00</td>
<td>6.88</td>
</tr>
<tr>
<td>C-Gurué-Zambezia</td>
<td>1,000</td>
<td>13.20</td>
<td>16.00</td>
<td>2.80</td>
</tr>
<tr>
<td></td>
<td>1,500</td>
<td>8.80</td>
<td>16.00</td>
<td>7.20</td>
</tr>
<tr>
<td></td>
<td>2,000</td>
<td>6.60</td>
<td>16.00</td>
<td>9.40</td>
</tr>
</tbody>
</table>

Profit Margin:
- from 2.80–4.60 Mt/kg, equivalent to $95-$160 USD per ton, for an average 1,000 kg/ha
- from 5.45–6.00 Mt/kg, equivalent to $185-$205 USD per ton, for an average 1.200–1.250 kg/ha
3. Model / Strategy
Usually, investment in agribusiness in Mozambique by major new (usually foreign) investors is based on:

Mozambique needs large commercial farms to achieve economies of scale, and to increase availability of technologies and knowledge, however there are SIGNIFICANT RISKS:

- **Land conflicts** with local small farmers and traditional rural leaders;
- **Poorly trained local staff** for correct using of intensive capital equipment;
- Significant difficulties related to **logistics of key inputs** – requiring high inventories, and underutilized assets;
- Major possibility of **other problems** such as theft and improper use.
- Lack of understanding of **social aspects and labor** with impact on productivity.
An investment in agribusiness MUST be made according to the Mozambique reality:

A good BALANCE between core farming and an out grower/extension services model to smallholder farmers, based on capitalization of SCF/small commercial farmers!

Concentrate the intensive investment in core farm:

- Add value “supplied” by own-farm production plus production purchased to small farmers, grown with assistance from the commercial farm
- Definition of the “area of influence” - better integration – reinforce linkages and mutual “dependence” on an economic basis

Agricultural services can be provided to the “out growers and small commercial farmers” by the large commercial farm:

- Improved inputs – better seed varieties, agro chemicals, inoculant, etc
- Some agricultural services, such as mechanization, agro-processing, use of irrigation, training, etc
TechnoServe actions in Mozambique promoting this approach:

**Direct support** to large commercial farms and small commercial farms using the out grower model

- Selling/distribution of improved seed varieties and **innoculant** to small farmers, on declining subsidy basis - executed by the commercial farms (LCFs + SCFs) in their zone of influence

**Technical support** –
- **Training** (3 courses/3 days each, per crop season)
- Subsidy for **Demo Plots** installation
- **Field Days**
- **Scholarships** for sons/daughters of key SCFs
- **Co-financing** salaries/recruitment of **young agricultural technicians** (in LCFs and some SCFs)

**Facilitate linkages/contacts** between buyers/feed and poultry industries, etc with producers - periodic meetings, support the creation of business associations, cooperatives, etc.
Importance of the triangle: LCFs/companies - local commercial banks - SCF/small commercial farmers

- Facilitate access to bank loans for SCFs, selecting the more developed in agro-technique and agro-commercial aspects
- Help insure that all soy produced is purchased at good farm gate prices
3.a. Capitalization of SCFs based on Seed Multiplication
SM4ESCF – Seed Multiplication, Zambezia: Capitalization of 50 SCFs:
- Tractor for land preparation and threshing + Small Irrigation scheme + Demo Plots, Field days, Training + Creation of a new Cooperative with a Seed Processing Unit
Certified soy seed / produced by SCF, grading C3
(selling price = $1 USD/kg)
4. Technology diffusion
Main agricultural factors linked with yield/ha

- Production
- Planting date
- Thinning date
- Harvesting / maturation
- Pest control / IPM (?)
- # plants per Ha (>250,000)
- Weed control, correct timing

Weed control, correct timing
Demo Plot — Model used 12/13 season
(135 installed – 125 approved/good performance)
2 Field Day in 12/13 season = 6,100 small farmers
25% women, average 46 small farmers / demo plot field day

1°. – March (pre-harvesting)

2°. - May (after be harvested – already weighed / bagged)
## Demo Plots

- **Global data – 12/13 season:**

<table>
<thead>
<tr>
<th>Região</th>
<th>Rendimentos por Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1A</td>
</tr>
<tr>
<td>NORTE</td>
<td>1,083</td>
</tr>
<tr>
<td>CENTRO</td>
<td>922</td>
</tr>
<tr>
<td>ANGÓNIA</td>
<td>1,020</td>
</tr>
<tr>
<td>Rend. média por hectare (kg)</td>
<td>1,048</td>
</tr>
</tbody>
</table>

+472/ha avg with inoculant (dosage 200 gr/ha);
+365 kg/ha with SSP (dosage 200 kg/ha)
Innoculant, peat-based “MASTERFIX” (dosage 200 gr/ha) – used in 11,700 ha in 12/13 season
Innoculant = higher yields/ha
Soybean planted with zero tillage / Zambezia - new technique with key aspects regarding zero tillage + direct planting = soil conservation / cost reductions
5. Market
Domestic soy demand is based on growth of the feed industry for poultry production.

Average annual % increasing
Soy grain - sales volume in Moz – progress since 09/10 till 12/13 season (farm gate price basis)

Totais Nacionais, por Ano, desde 2009/10

- Camp 09/10 REAL
- Camp 10/11 REAL
- Camp 11/12 REAL
- Camp 12/13 Real

volume: mil US$, Mt por Agric, Prod. (ton)
In 2020, Mozambique and main neighbor countries will continue to import soy and soy cake, although at lower rates.

**2010, deficit in k MT**
- DRC: -35
- Angola: -45
- Zambia: -56
- Zimbabwe: -225
- South Africa: -2,129
- Mozambique: +2,692
- Malawi: -119

Includes volume of soy crude-oil imported to be refined.

**2020, deficit in k MT**
- DRC: -30
- Angola: -41
- Zambia: -3
- Zimbabwe: -85
- Mozambique: +53
- South Africa: -1,879
- Malawi: -3

Only Zambia has potential production to achieve excess.

Fonte: Estudo TechnoServe (Southern Africa Regional Soy Study, 2011)
Manual threshing – Small farmer – Gurue/Zambezia
Small farmer: manual cleaning, post-harvest, before bagging - Zambezia Province
Threshing machine / SCF - Manica Province
Africa Century LCF silos with elevators and dryer - capacity for 4,000 ton grain
Alif Quimica, Quelimane – solvent extraction plant in construction, 30-40 ton/day = 10,000 ton/year of soybean
Solvent plant - Abílio Antunes - Manica: Largest soy buyer in Moz = 11,500 ton in 2012, 13,500 ton in 2013 - capacity 60 ton/day = 18,000 ton/year
6. Challenges
TNS Soy actions now are focused on:

1. **Capitalization SCFs** - expand from 50 to 100 with equipment, irrigation, seed cooperatives

2. **Diffusion of technology** – maintain same approach

3. **Maintain vision for soy in Mozambique** – collect and diffuse data and information

4. **Seed Multiplication** – intensification through capitalization of SCFs

5. **Support / Facilitate New Investments** - LCFs with intensive capital ONLY IF promoting out grower model through SCFs

6. **Define soy zones** -
   - precise varieties
   - preferred farming systems