Promoting cotton BY-PRODUCTS in Eastern and Southern Africa
Project: 1617K - Funded by the United Nations Development Account - 2016-2019

Commercial products from cotton stalks

77th ICAC Plenary, Fourth Breakout Session
5 December 2018, Abidjan, Côte d'Ivoire

Kris Terauds - Commodities Branch
Outline of the presentation

• Overview of the project
• Project activities and deliverables
• Cooperation with CIRCOT
• By-products selected for development
• Financial projections for cotton stalk-based businesses
• Supply chain considerations
• Policy advantages
• Conclusions
• Project next steps
Overview of the project

<table>
<thead>
<tr>
<th>Title</th>
<th>Promoting cotton by-products in Eastern and Southern Africa (ESA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding source</td>
<td>United Nations Development Account (Project 1617K)</td>
</tr>
<tr>
<td>Countries</td>
<td>United Republic of Tanzania, Uganda, Zambia and Zimbabwe</td>
</tr>
<tr>
<td>Start date</td>
<td>March 2016</td>
</tr>
<tr>
<td>End date</td>
<td>December 2019</td>
</tr>
<tr>
<td>Total budget</td>
<td>US$ 591,000</td>
</tr>
<tr>
<td>Implementing agency</td>
<td>United Nations Conference on Trade and Development (UNCTAD)</td>
</tr>
<tr>
<td>Partners</td>
<td>United Nations Economic Commission for Africa (UNECA)</td>
</tr>
<tr>
<td></td>
<td>Common Market for Eastern and Southern Africa (COMESA)</td>
</tr>
</tbody>
</table>
Overview of the project (cont)

• Expected Accomplishment 1:
  • Improved capacity of cotton value chain stakeholders (government officials, the private sector and farmers) to assess the potential value, market situation and prospects for cotton by-products.

• Expected accomplishment 2:
  • Improved capacity of policymakers to (a) formulate evidence-based policies that improve the value added of cotton by-products; and (b) devise investment profiles to attract potential investors.

• Focus on new / pre-commercial opportunities, e.g. applications for cotton stalks, rather than upgrading opportunities, e.g. replacing obsolete oil extraction technologies.

• Approaches:
  • Process-based, not expert-based
  • Build capacity of country experts
  • Inclusive participation, with an emphasis on farmers and women
  • Inter-agency collaboration
  • South-South cooperation
Our project on by-products looks at “products derived from the non-lint parts of the cotton plant”.

Source: Adapted from Cotton Development Organisation, Uganda
Project activities run from 2016 until mid-2019, followed by an evaluation by end-2019.

**Complete**
- Surveys
- National capacity-building workshop (National Action Plan)

**Underway**
- Investment profiles
- Study visit

**Remaining**
- Draft pilot project plans and funding proposals
- Regional workshop
- Evaluation
Cooperation with India’s Central Institute for Research on Cotton Technology (CIRCOT)

• UNCTAD selected India as an example for project countries, due to:
  • Similarities between the production models and geographic densities;
  • India has revived its cotton sector by developing local value addition technologies and businesses, adapted to the rural context.

• CIRCOT researches, designs technologies and incubates businesses for post-harvest processing of cotton and its by-products.

• Close link with processors and machine fabricators.

**CIRCOT participation in project activities:**

• At each national workshop, presented its work on cotton applications for cotton by-products.

• Will host a study visit for project participants in January 2019.
All four project countries chose to develop a new value chain for cotton stalks.

**Cotton by-products selected for National Action Plans**

<table>
<thead>
<tr>
<th>Raw material</th>
<th>End product</th>
<th>Tanzania</th>
<th>Uganda</th>
<th>Zambia</th>
<th>Zimbabwe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stalks</td>
<td>Briquettes and pellets</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Stalks / hulls</td>
<td>Mushrooms</td>
<td></td>
<td>🟢</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cottonseed cake</td>
<td>Gossypol-free cake</td>
<td>🟢</td>
<td>🟢</td>
<td></td>
<td>🟢</td>
</tr>
<tr>
<td>Short staple cotton</td>
<td>Absorbent cotton wool</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
</tbody>
</table>
Using cotton stalks for briquettes, pellets and mushrooms can be a profitable, low-capital business.

### Financial projections, selected stalk-based businesses

<table>
<thead>
<tr>
<th>Item</th>
<th>Briquetting plant</th>
<th>Pelleting plant</th>
<th>Mushroom farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>20 MT/day</td>
<td>4 MT/day</td>
<td>3,600 kg/yr</td>
</tr>
<tr>
<td>Total capital investment (US$)</td>
<td>69,000</td>
<td>25,000</td>
<td>14,850</td>
</tr>
<tr>
<td>Total revenues / year (US$)</td>
<td>350,000</td>
<td>59,000</td>
<td>5,832</td>
</tr>
<tr>
<td>Net profits / year (US$)</td>
<td>35,000</td>
<td>8,000</td>
<td>3,644</td>
</tr>
<tr>
<td>Net profit margin</td>
<td>10%</td>
<td>14%</td>
<td>25%</td>
</tr>
<tr>
<td>Return on investment, annual</td>
<td>53%</td>
<td>32%</td>
<td>25%</td>
</tr>
<tr>
<td>Investment payback period (months)</td>
<td>23</td>
<td>38</td>
<td>49</td>
</tr>
</tbody>
</table>

Sources: Estimates by UNCTAD, CIRCOT and Uganda Industrial Research Institute
An effective supply chain is prerequisite for mounting successful stalk-based businesses.

**Raw material and logistics**

- Commercializing stalks would require modifying any pest management rules requiring their destruction
- Briquette and pellet plants require a supply chain organized around mobile chipping machines
- Briquette plants must source other biomass raw material outside the 3-4-month cotton season
- Briquetting plant of 4 MT/day requires approximately 1,000 MT/year of biomass, equivalent to 300-400 ha, on average, or a catchment radius of 25-30 km

**Scale and scope**

- Pelleting plant, mushroom farm: multi-family cottage business
- Briquetting plant: commercial business with employees
- Pelleting plant can produce fuel, animal feed and fertilizer pellets

**Markets**

- Pellets (fuel): households and restaurants
- Briquettes: industries and institutions with large boilers
- Mushrooms: local markets, hotels and restaurants
In project countries, selected cotton stalk-based products respond well to policy priorities.

<table>
<thead>
<tr>
<th>Policy priority</th>
<th>Biomass briquettes / pellets</th>
<th>Mushrooms from cotton stalks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income opportunities for farmers</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Small-scale, rural business opportunities, including for women</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>New business opportunities for entrepreneurs</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Improved nutrition</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>Substitution of fossil fuels</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Substitution of wood charcoal (deforestation)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Reduced pollution</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

• Accessible commercial technologies exist to establish a value chain for cotton stalks, based on small-scale, low-capital, rural businesses.

• Briquette, pellet and mushroom businesses can be profitable and scalable – from multi-family cottage activities, to SMEs.

• Farmers can invest directly (pellets and mushrooms) in these activities or earn additional income by selling chipped stalks to entrepreneurs.

• The main challenge is to establish a cost-effective supply chain for raw material, based on mobile chipping machines.

• Biomass fuels respond to policy priorities on forest conservation, emissions reduction and substitution of wood charcoal and fossil fuels.
Project next steps

• Remaining project activities:
  • Complete investment profiles for priority cotton by-products;
  • Study visit to CIRCOT in Nagpur, India, 14-18 January 2019;
  • Regional workshop, May-June 2019;
  • Project evaluation, by end 2019.

• Work with country focal points to draft selected initiatives into project plans and funding proposals for next phase of work.

• Propose a similar project to other cotton-producing countries in Africa.

• Coordinate with joint WTO-UNCTAD-ITC initiative on cotton by-products.
For more information

• Project site, including all project documents:
  https://unctad.org/en/Pages/SUC/Commodities/SUC-Project-1617K.aspx

• Contact Kris Terauds:
  • kris.terauds@un.org
  • +41.22.917.5931