SOLID BIOMASS VALUE CHAINS

Towards Establishing Value Chains for Bioenergy
Capacity Building in South Africa, Namibia and Ghana
to Create Sustainable Non-food Bio- Supply Chains

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Swakopmund, Namibia

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The Resource: Woody Biomass

Biomass Stock  > 250 Mt
> 1 000 TWh

Woody biomass density up to 25 t / ha

Source: Atlas of Namibia, 2002
Source: VO Consulting
End Use Determines Value Chain Requirements

Value Chains in Solid Biomass

harvesting  drying  chipping

loading  transporting  processing

Source: VO Consulting
Solid Biomass Value Chain Part 1

**harvesting** manual / semi-mechanised / mechanised

<table>
<thead>
<tr>
<th>Harvesting invader bush</th>
<th>Axe/panga</th>
<th>Bush cutter</th>
<th>Skid steer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons required to harvest 4,400 tons per year [t/a]</td>
<td>42</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Cost per ton of wet biomass harvested [N$/t]</td>
<td>132</td>
<td>119</td>
<td>89</td>
</tr>
</tbody>
</table>

Source: VO Consulting

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**Dilemma Part 1**

<table>
<thead>
<tr>
<th>Equipment import requirements</th>
<th>MANUAL</th>
<th>SEMI-MECHANISED</th>
<th>FULLY MECHANISED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment import requirements</td>
<td>NS 750 per harvester per year</td>
<td>NS 9,000 per harvester per year</td>
<td>~ NS 200,000 per harvester per year</td>
</tr>
<tr>
<td>Fuel import requirements</td>
<td>None</td>
<td>&gt; NS 17,500 per harvester per year</td>
<td>&gt; NS 120,000 per harvester per year</td>
</tr>
<tr>
<td>Harvesting jobs created per 4,400 wet ton harvesting operation per year</td>
<td>42</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Salaries generated per 4,400 t harvesting operation per year</td>
<td>~ NS 554,000 per year</td>
<td>~ NS 200,000 per year</td>
<td>~ NS 24,000 per year</td>
</tr>
</tbody>
</table>

Source: VO Consulting
Dilemma Part 2

<table>
<thead>
<tr>
<th>Bush-to-electricity power plant capacity</th>
<th>1 MWe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity generated per year [GWh/a]</td>
<td>6</td>
</tr>
<tr>
<td>Wood required per year [ wet tons wood/a]</td>
<td>7,300</td>
</tr>
<tr>
<td>Jobs created – manual harvesting</td>
<td>70</td>
</tr>
<tr>
<td>Jobs created – semi-mechanised harvesting</td>
<td>21</td>
</tr>
<tr>
<td>Jobs created – mechanised harvesting</td>
<td>2</td>
</tr>
<tr>
<td>Salaries paid per year if harvesting is done manually [‘000 NS/a]</td>
<td>924</td>
</tr>
<tr>
<td>Salaries paid per year if harvesting is done mechanically [‘000 NS/a]</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: VO Consulting

Value Chain Potentials

- **Rural jobs = local cash**
  - harvesting
  - operators
  - entrepreneurship (fuel, heat & electricity)
  - services on- and off-site
  - maintenance on- and off-site
  - suppliers
  - caterers
  - tourists
  - .....  

- **Rural economy**
  - service centers
  - suppliers
  - housing
  - entertainment
  - viability of local service provision in education, health etc
  - tourism industry
  - .....
The Value Creation Space

- Political
- Legal
- Technology
- Competitors
- Buyers
- Suppliers
- Substitutes
- Demographics
- Economic
- Socio-cultural

Biomass Opportunities & Constraints

**Opportunities**
- jobs
- rural development
- income diversification
- local value creation & value addition
- local resource use
- ecosystem services

**Constraints**
- vision of rural development
- land tenure
- water
- rural to urban migration
- impacts on biodiversity
- trade offs (e.g. conservation vs. development)
- opportunity cost(s) uncertain
- institutional capacities, ownership & drivers
Lessons for Namibia’s Bioenergy Sector

• Vision
• Policy & Regulation – energy policy/bioenergy policy/RE policy
• Institutional roles – decentralisation – rural development
• Project start-up & support (of angels & demons)
• Funding – project development, start-up & expansion
• R&D and market support
• Land use – issues – agendas – conflicts
• Labour
• Nexus of food – water – energy – national development

*Development does not just happen.*

Thank you!

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