

# SOLID BIOMASS VALUE CHAINS

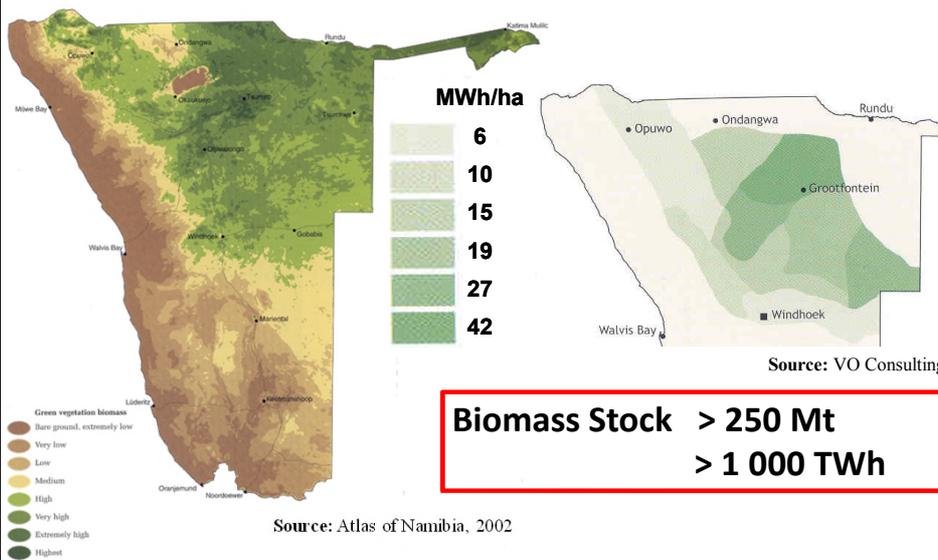
**Towards Establishing Value Chains for Bioenergy**  
 Capacity Building in South Africa, Namibia and Ghana  
 to Create Sustainable Non-food Bio- Supply Chains



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## The Resource: Woody Biomass



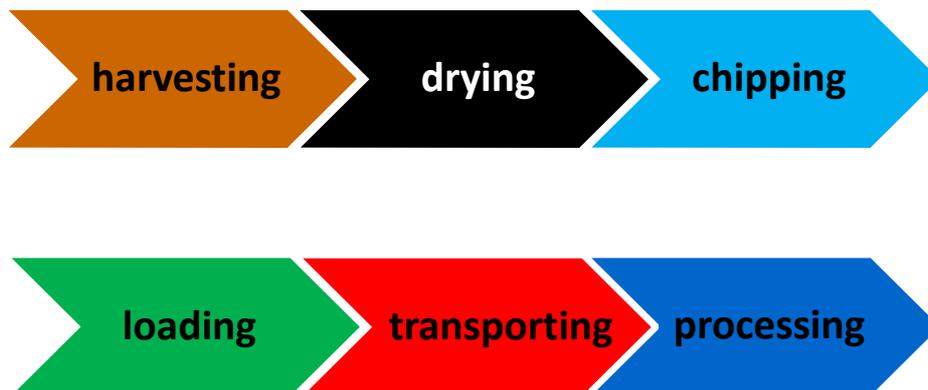
**Woody biomass density up to 25 t / ha**

## End Use Determines Value Chain Requirements



Sources: Internet

## Value Chains in Solid Biomass



Source: VO Consulting

# Solid Biomass Value Chain Part 1



manual / semi-mechanised / mechanised



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

Source: VO Consulting

## Dilemma Part 1

	MANUAL	SEMI-MECHANISED	FULLY MECHANISED
<b>Equipment import requirements</b>	N\$ 750 per harvester per year	N\$ 9,000 per harvester per year	~ N\$ 200,000 per harvester per year
<b>Fuel import requirements</b>	None	> N\$ 17,500 per harvester per year	> N\$ 120,000 per harvester per year
<b>Harvesting jobs created per 4,400 wet ton harvesting operation per year</b>	42	13	1
<b>Salaries generated per 4,400 t harvesting operation per year</b>	~ N\$ 554,000 per year	~ N\$ 200,000 per year	~ N\$ 24,000 per year

Source: VO Consulting

## Dilemma Part 2

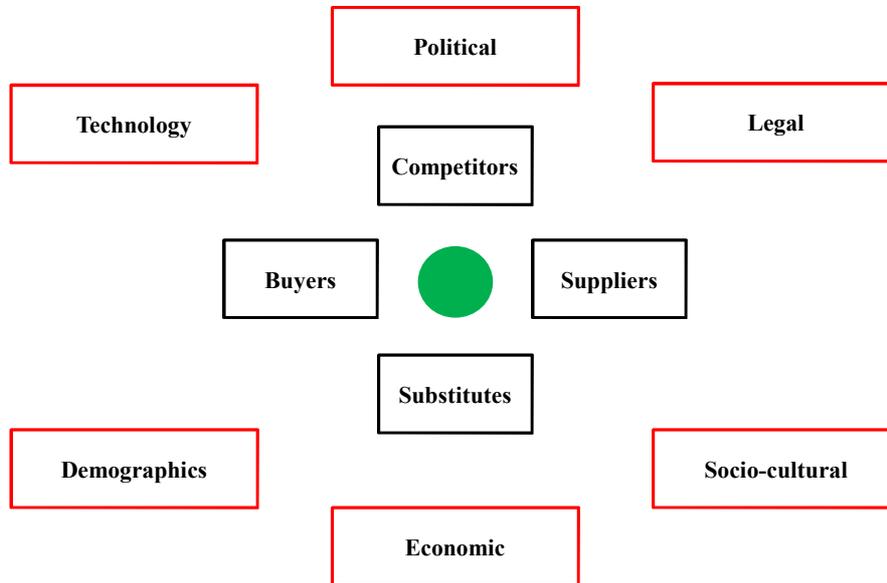
<b>Bush-to-electricity power plant capacity</b>	<b>1 MWe</b>
Electricity generated per year [GWh/a]	6
Wood required per year [ wet tons wood/a]	7,300
Jobs created – manual harvesting	70
Jobs created – semi-mechanised harvesting	21
Jobs created – mechanised harvesting	2
Salaries paid per year if harvesting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

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



## 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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