Deutscher Tropentag, October 9-11, 2002, Witzenhausen
"Challenges to Organic Farming and Sustainable Land Use
in the Tropics and Subtropics"

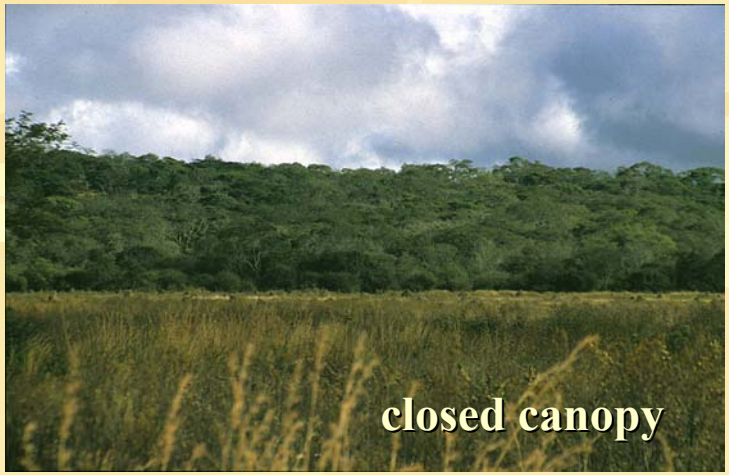
Sustainability of Forest Product Use in Zimbabwe

Oliver Braedt
(University of Hamburg)
Reinhold Glauner
(Federal Research Centre for
Forestry and Forest Products)

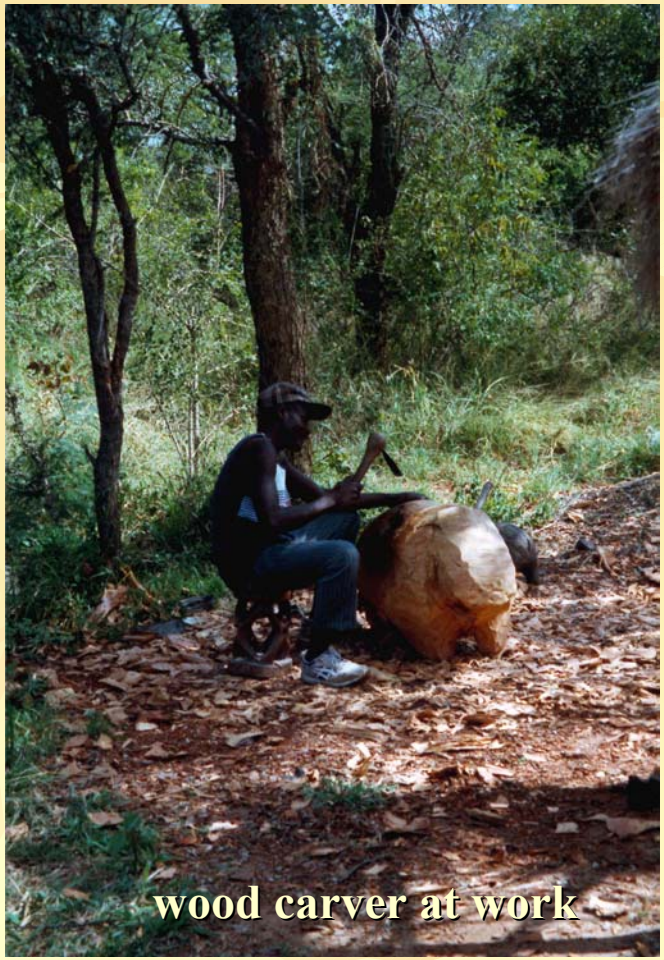
Study Site

- Zimbabwe is located in Southern Africa
- Chivi District in south-eastern part of Zimbabwe along major tourist routes
- Project area (Wards 16, 18, 20) approx. 37 000 ha
- Elevation approx. 700 m.a.s.l.
- 600 mm annual rainfall (CV 40%)
- PNV: Tropical Dry Deciduous Forest –
  Miombo Forests

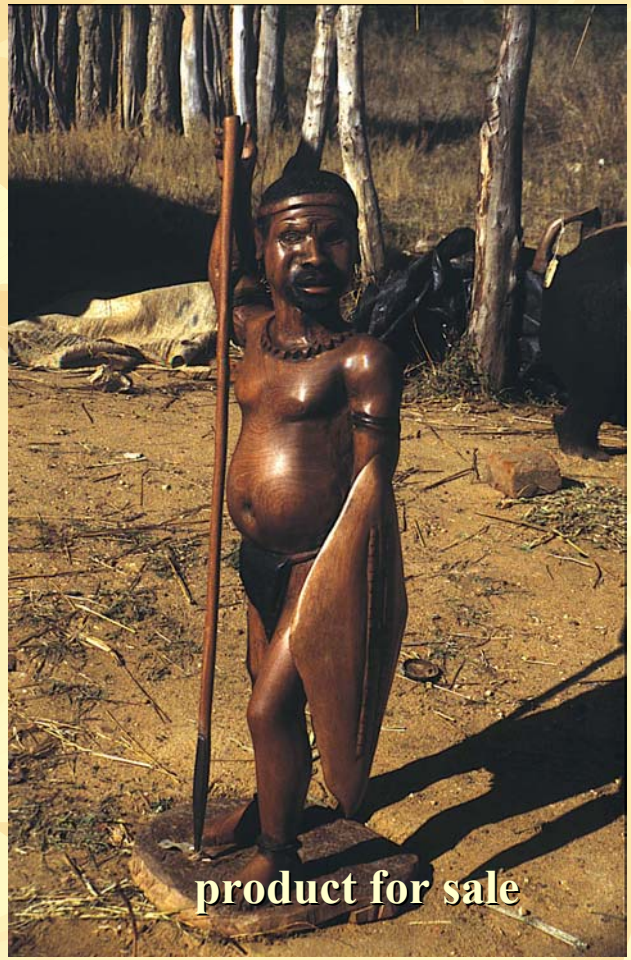
Miombo Forest



Carving Industries

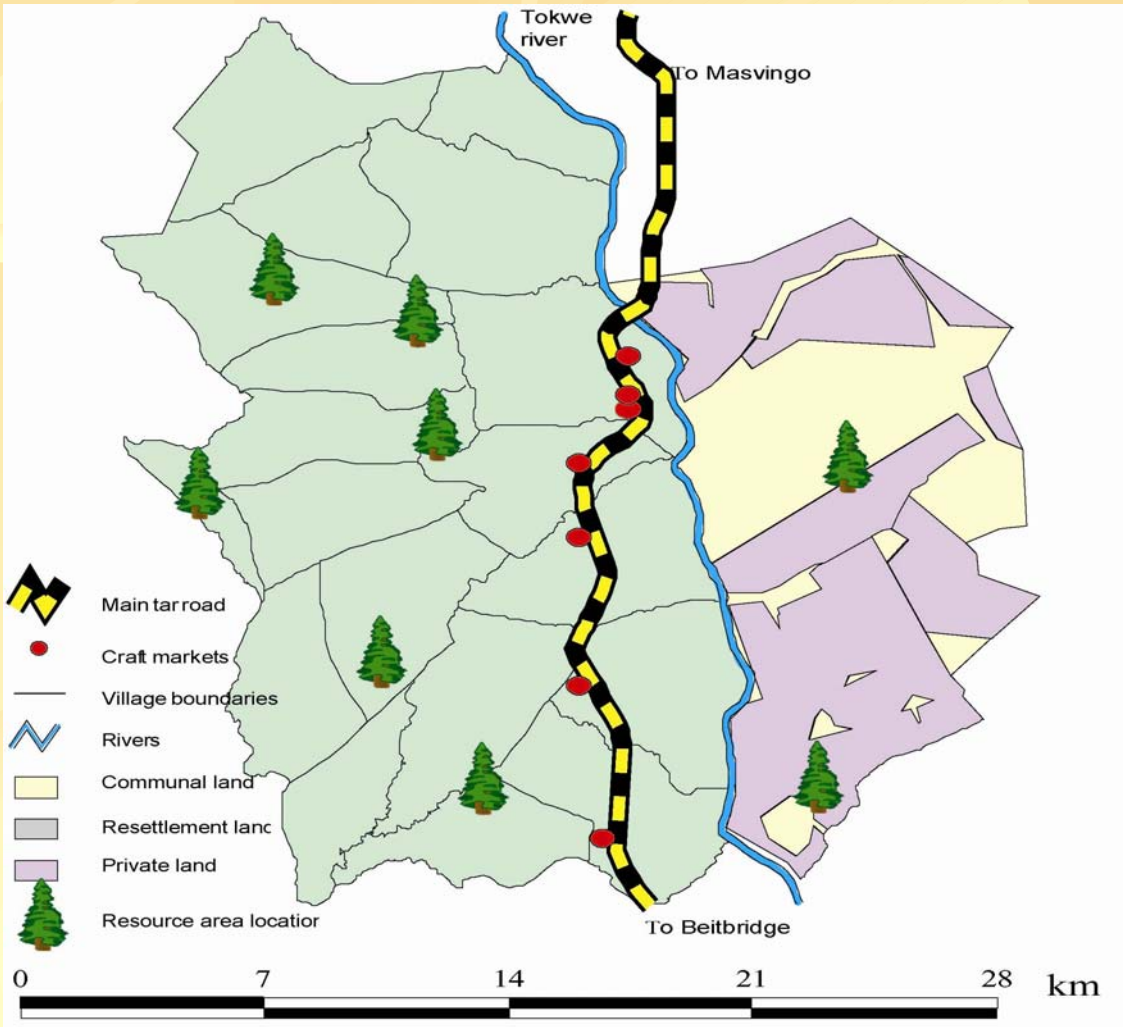


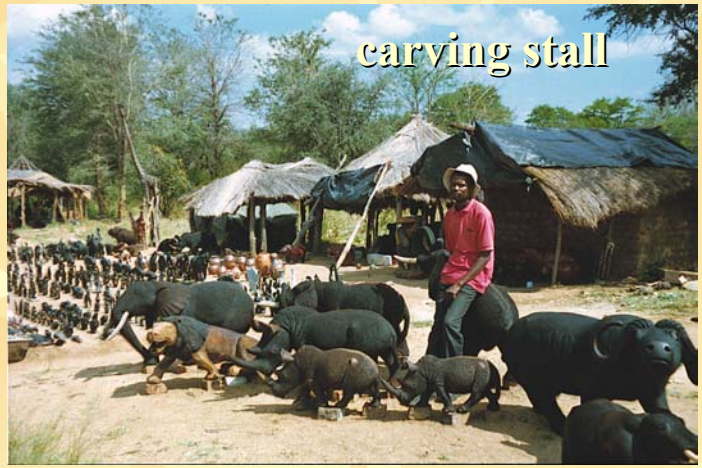
wood carver at work



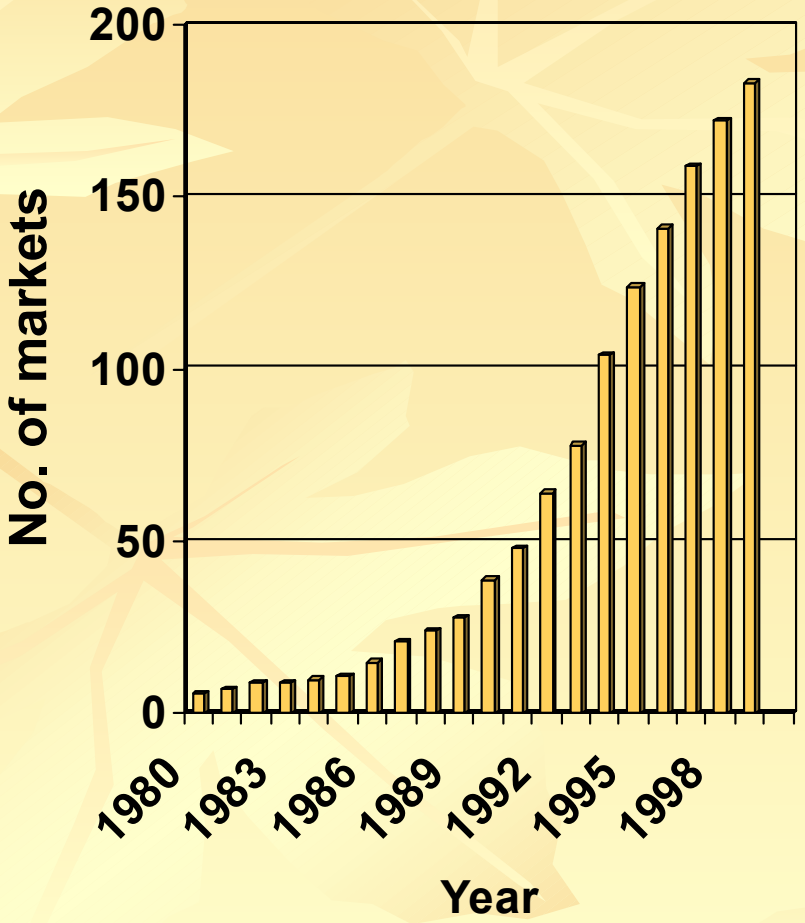
product for sale

Markets for Carving Industries





Socio-Economics



- Household income ca. **€140 yr^{-1}**
  - **€ 22 yr^{-1}** from forest products (firewood, fruits, etc.)
  - **€ 28 yr^{-1}** from carving sector
- Poor households benefit more from forest products than other households.
- Carvings are becoming increasingly important since independence (see figure).
- Land tenure should be considered.

Research Questions

- Is timber harvesting by carving industries presently sustainable?
- Is there a difference between land tenure?
- In which growth conditions is the forest presently?
- How would the forest develop under different use scenarios?
- Is it possible to sustain timber industries ?

Methods

- Timber inventory with pre-stratification acc. to land tenure (communal, resettlement, and private land)
- Diameter increment model acc. to Alder (1992, 1995)
- Simulation solely of species used for wood carvings
- Simulation of different scenarios

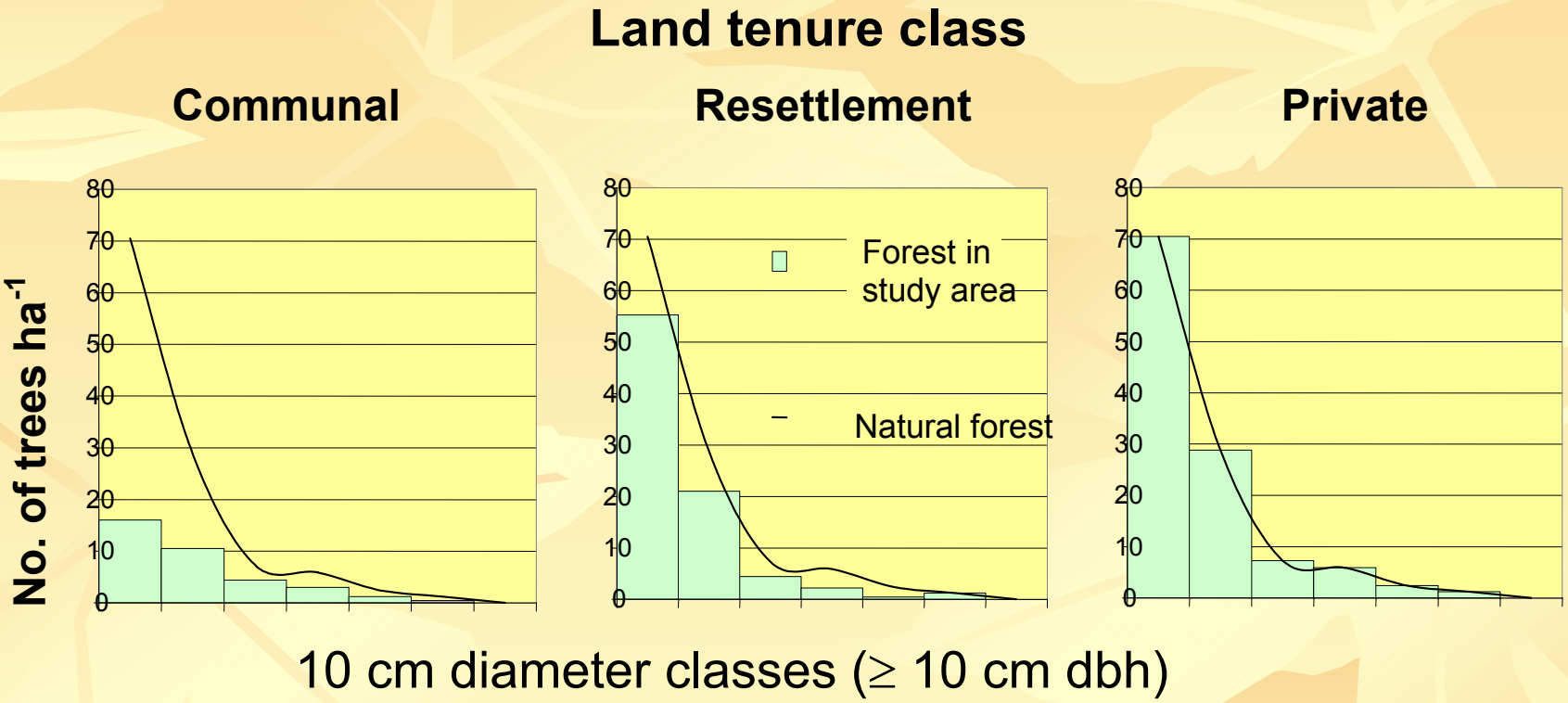
Diameter Increment Model

- Due to diameter increment (d_i), a certain number of trees (n_m) move from one to another diameter class (dc), e.g. if d_i = 0.5 mm yr^{-1}, dc = 10 cm → n_m =0.5mm/100mm=1/200; i.e. one out of 200 trees moves into the higher diameter class per year
- Diameter increment 0,03 - 0,05 cm yr^{-1}
- Due to mortality (n_o) or harvesting (n_h), trees "leave" the model to special data bases.
- Species: ***Afzelia quanzensis, Pterocarpus angolensis, Combretum imberbe, Kirkia acuminata***
  Albizia amara, Albizia antunesiana, Dalbergia melanoxilon Ozoroa insignis, Sclerocarya birrea

Defining scenarios (100 years)

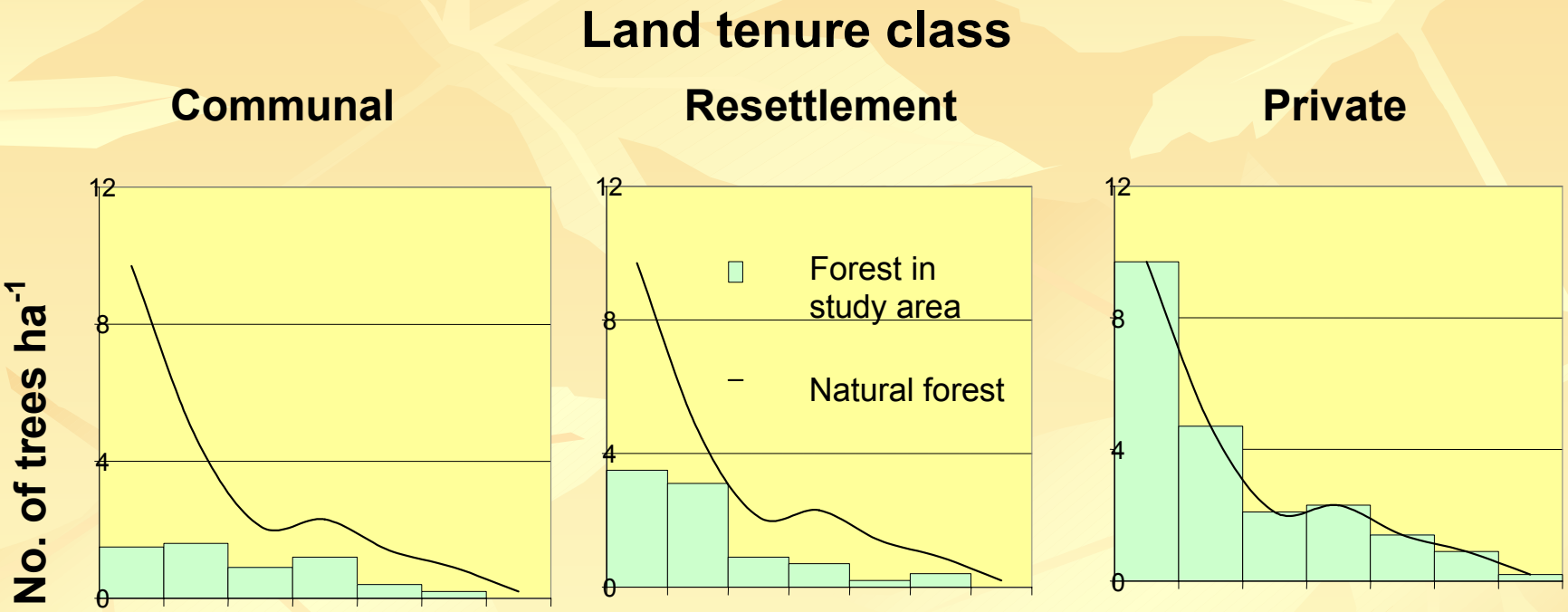
No use scenario	self-explanatory, however not realistically achievable
Current demand scenario	present harvesting levels and consumption pattern are maintained (1,400 $m^3\ yr^{-1}$ ⇔ 0.03 $m^3 ha^{-1} yr^{-1}$)
Stable tree stock scenario	present growing stock conditions are maintained

Results – Inventory (all species)



Diameter frequency for all tree species acc. to land tenure class

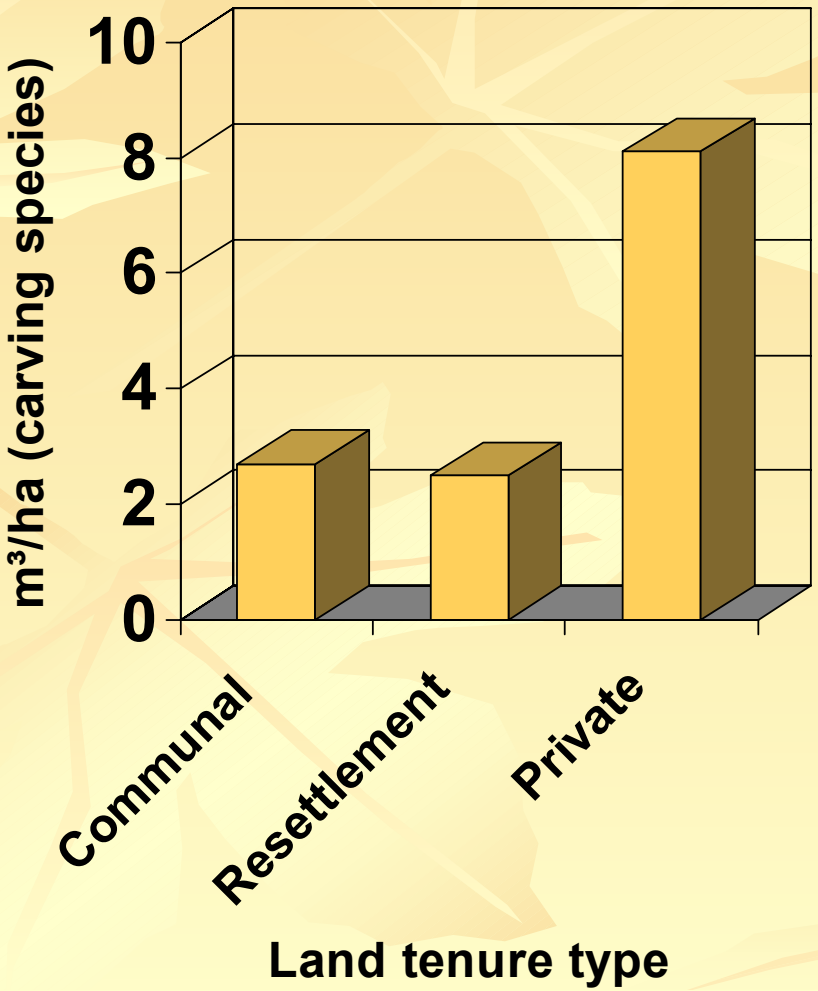
Results – Inventory (carving species)



10 cm diameter classes (≥ 10 cm dbh)

Diameter frequency for tree species used for carving acc. to land tenure class

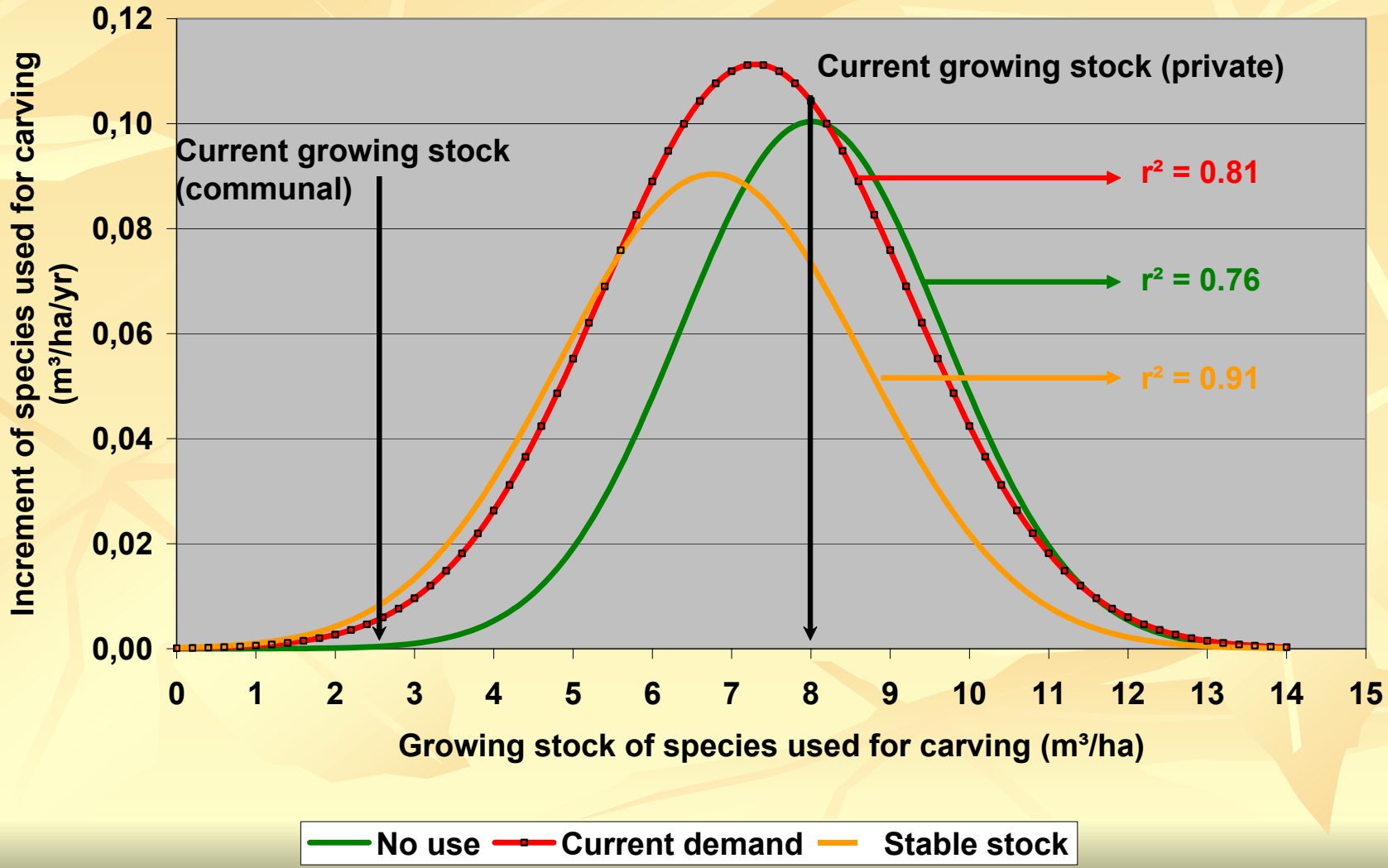
Results – Inventory (growing stock)



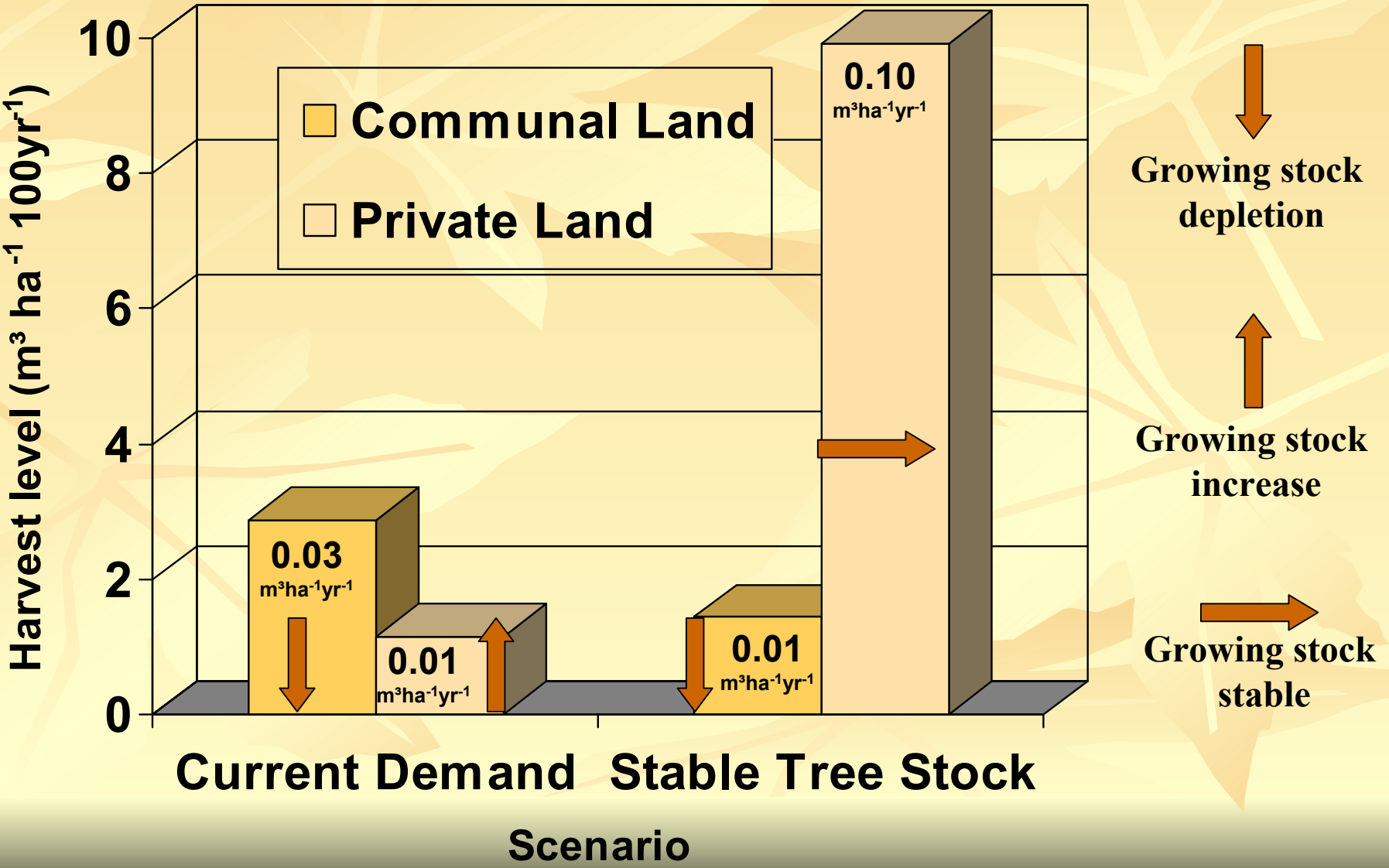
- Low growing stock levels of carving species on communal and resettlement land with no significant difference.
- Adequate (≅ natural) resources on private land.

Results – Growing stock development

Results – Timber increment



Results – Harvesting levels



Conclusions

- Timber harvesting for carving industries can be sustainably managed on private land. However, on communal and resettlement land, forest structure has fallen below the line for self-regeneration.
- It needs political solutions to relieve pressure on communal land to rehabilitate resources (e.g. enrichment planting) to obtain optimal production levels.
- Resources on private land would be sufficient to support carvers with wood while maintaining present production levels; even a three-fold increase would be feasible.