Advancing the Sustainability and Quality of Thailand's Teak Forestry through Innovative Silviculture and Governance

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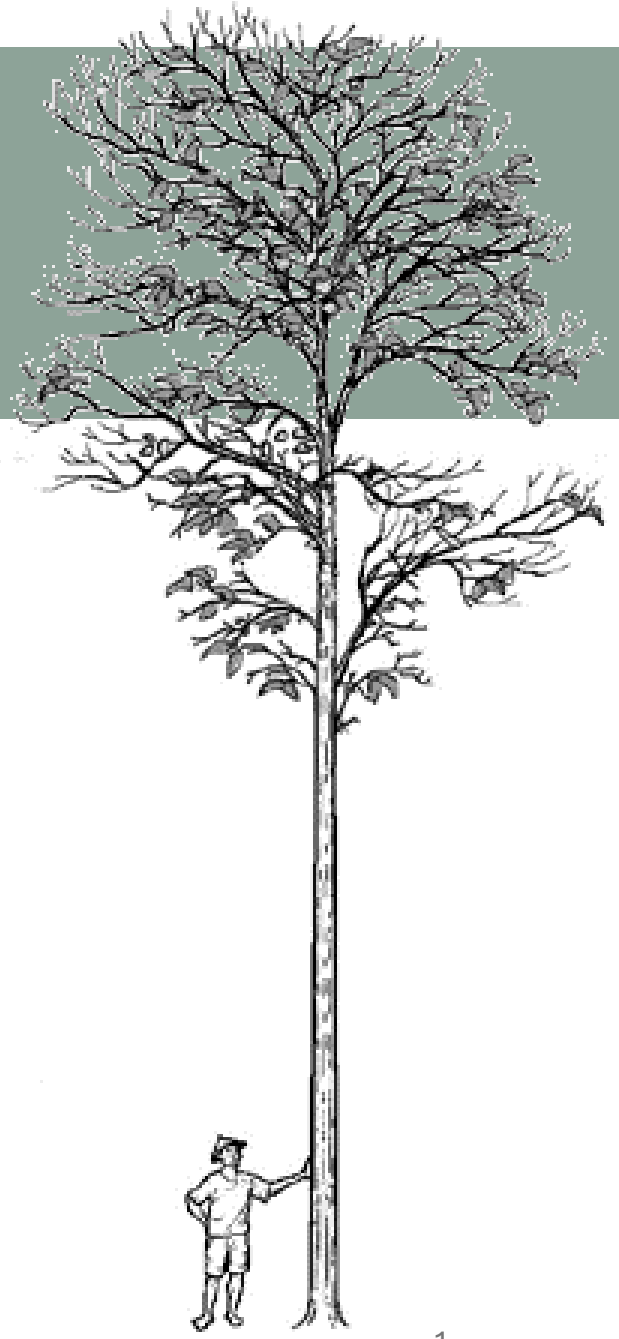
18 September 2024

Regional Workshop on

Enhancing Smallholder Plantations Towards Quality Timber Production of Teak and Other Economic Species and Carbon Neutrality in the Tropics

18-21 September 2024, Bangkok, Thailand



Content

Teak-growing smallholders are special

Silvicultural questions

- How many trees should a grower plant?
- When should a grower harvest?
- Should a grower invest in quality?

Recommendations

- Log grading system
- Grower & marketing associations

Conclusions

FIO …
State-owned
forest enterprise

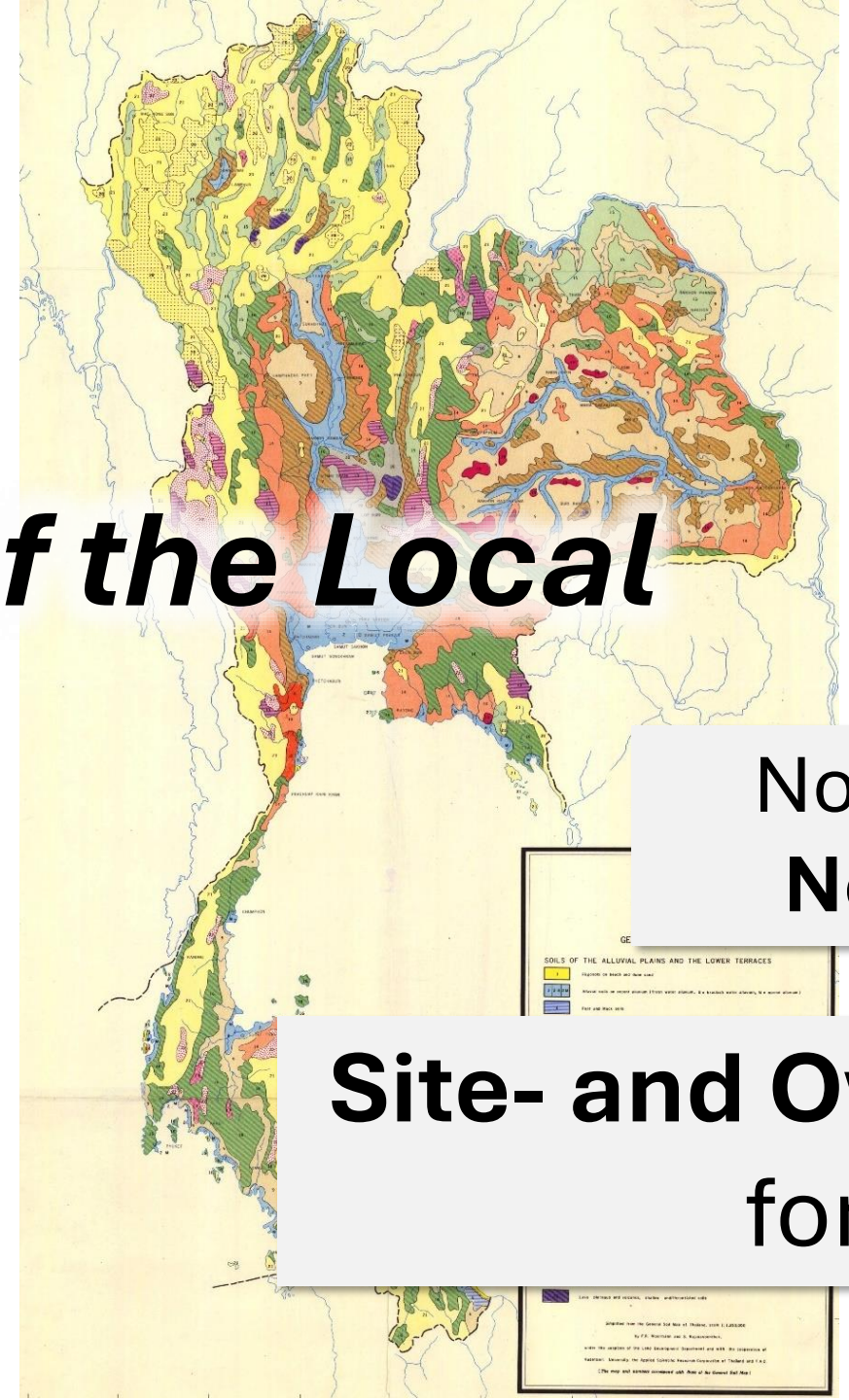
Maximizing *public* welfare (now & future)

Teak-growing smallholders

Ensuring *family* welfare & security

- Living savings account
- Generational wealth
- On-farm timber
- Environmental benefits (shade, microclimate)

NOT profit maximization
BUT limited cash flow



Iron Law of the Local

Diversity of
site conditions,
forest owners,
markets,
stakeholders,
…

No one-size-fits-all
No best practice

Site- and Owner-adapted
forestry

Nelder density experiment in Laos

Pachas et al. 2019 10.1016/j.foreco.2018.12.031

Example I

How many trees should a grower plant?

Depends on site conditions, funds, market, labor, knowledge, **personal preferences**, …

Nelder density experiment in Laos

Pachas et al. 2019 10.1016/j.foreco.2018.12.031

Example I

How many trees should a grower plant?

6 m × 6 m

- Fewer plants needed
- No thinning needed
- Intercropping (market?)

But

- Lower productivity
- Frequent pruning needed
- No redundancy of trees

Nelder density experiment in Laos

Pachas et al. 2019 10.1016/j.foreco.2018.12.031

Example I

How many trees should a grower plant?

2 m × 2 m

- Less pruning needed
- Pole production (market?)
- Redundancy of trees

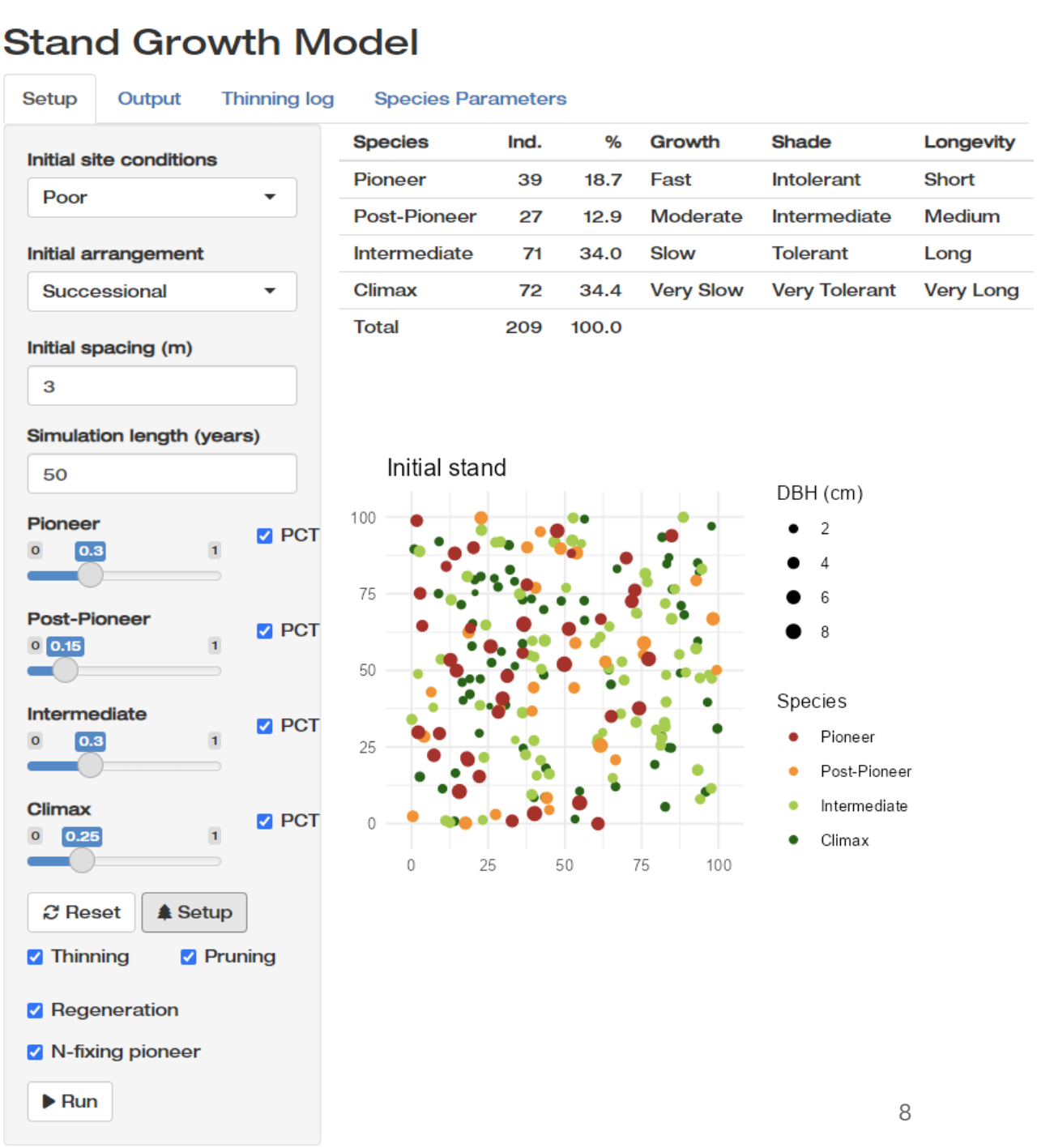
but

- Higher initial costs
- Frequent thinning needed
- No intercropping possible

Forest Stand Model

KUFF-SIMS

- Individual-based
- Spatially-explicit
- 4 species with varying traits
  pioneer (e.g. *Acacia spp.*)
  post-pioneer (e.g. *Tectona grandis*)
  intermediate (e.g. *Hopea odorata*)
  climax (e.g. *Shorea spp.*)
- Initial forest establishment
  site conditions, tree arrangements

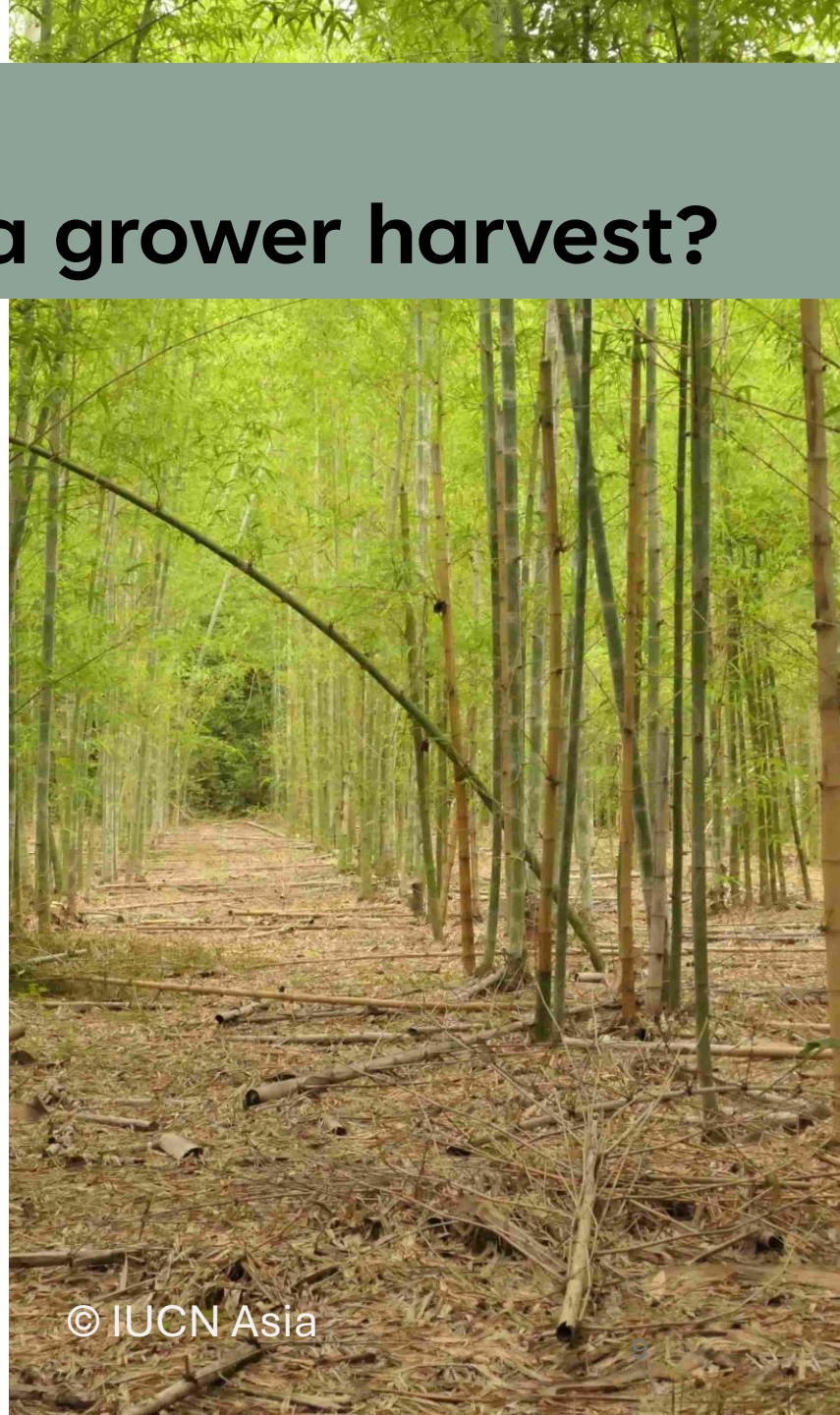


Example II

When should a grower harvest?

Get every **10** years THB **32,000** *or*
every **30** years THB **110,000 ?**

The value of time ...
Discount rate



Harvest
30-year-old trees
every **30 years**

Example II

When should a grower harvest?

120 trees

30 years

plantation

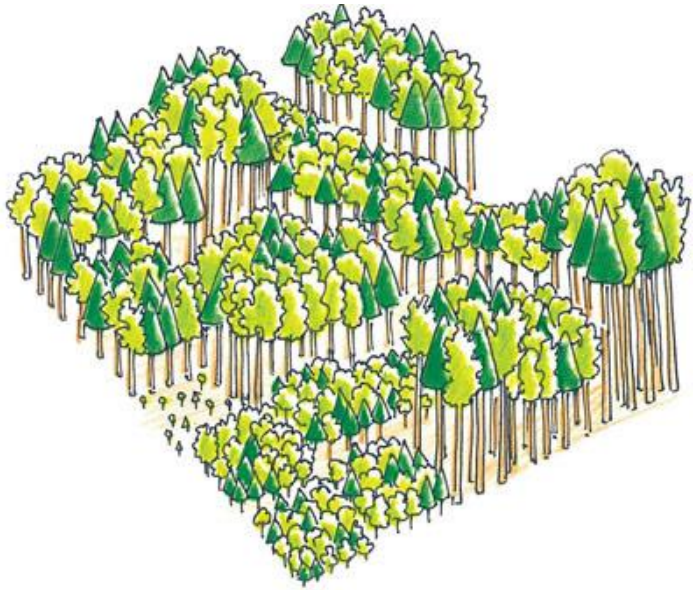
Year	Activity	Cash flow
0	Plant 120 trees	-4,800
30	Harvest 120 t.	110,000
	Plant 120 t.	-4,800
60	Harvest 120 t.	**110,000**
…	…	…

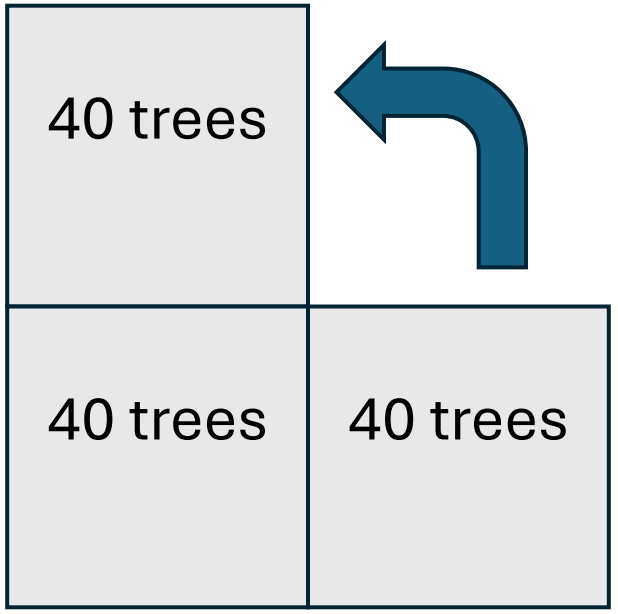
numbers for illustration only

Example II

When should a grower harvest?

Harvest
30-year-old trees
every **10 years**





plantation

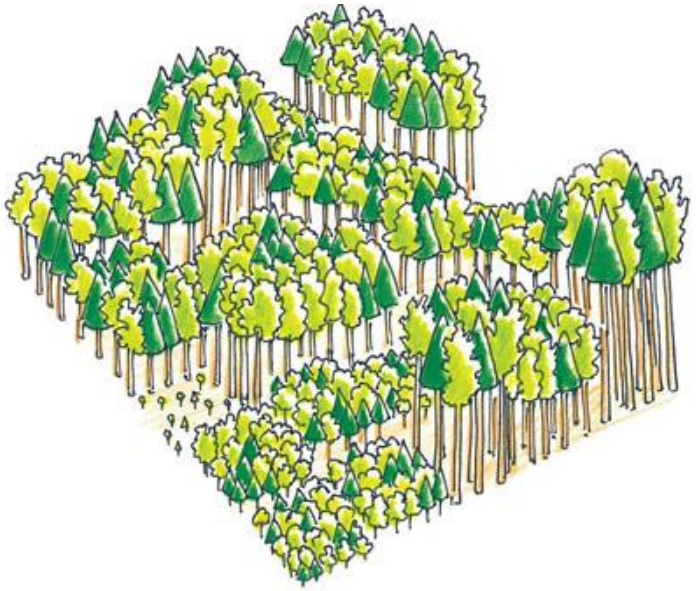
Year	Activity	Cash flow
0	Plant 120 trees	-4,800
10	Harvest 40 t.	8,000
	Plant 40	-1,600
20	Harvest 40	16,000
	Plant 40	-1,600
30	Harvest 40	32,000
	Plant 40	-1,600
40	Harvest 40	32,000
	Plant 40	-1,600

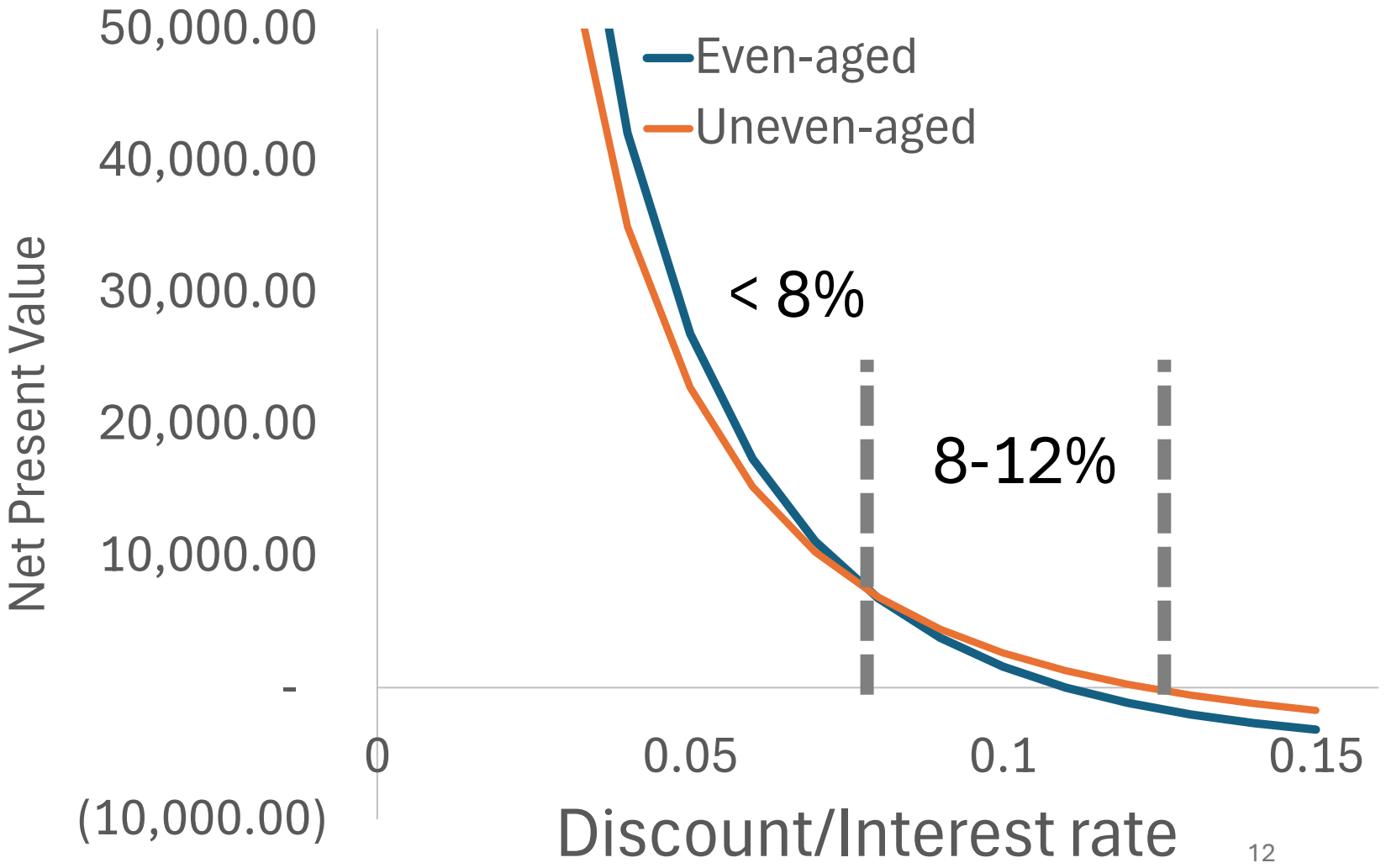
numbers for illustration only

Example II

When should a grower harvest?

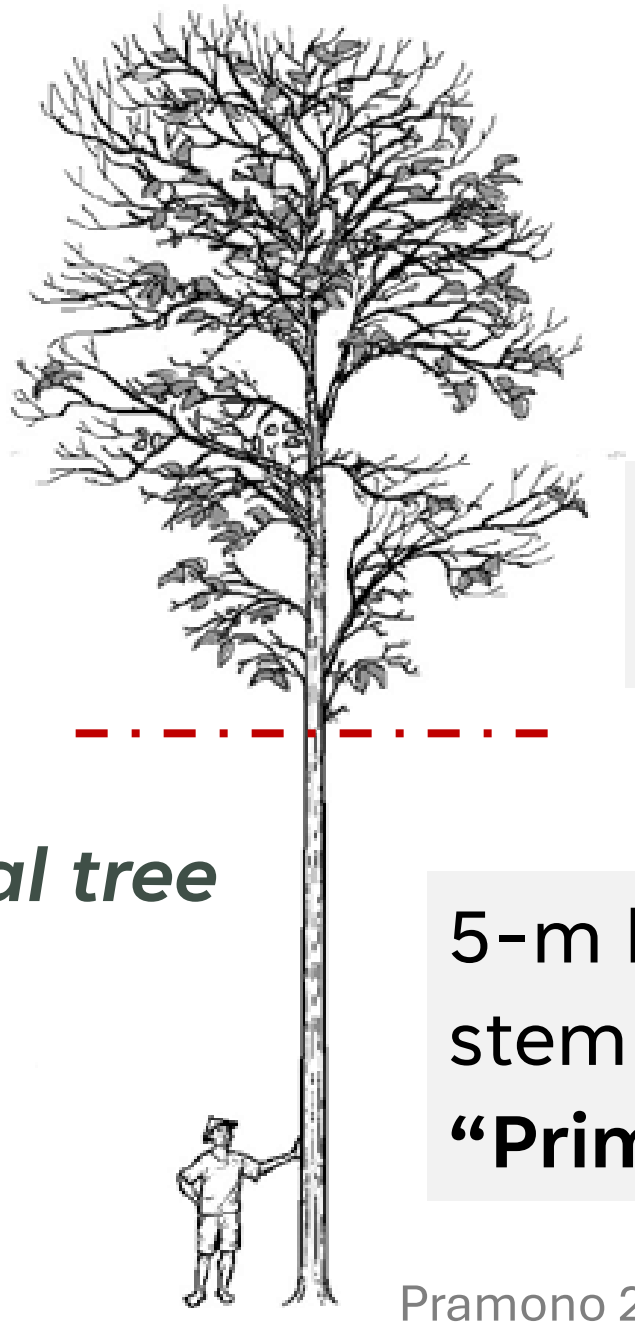
Harvest
30-year-old trees
every **30 years** *or*
every **10 years?**





Example III

Should a grower invest in quality?



Ideal tree

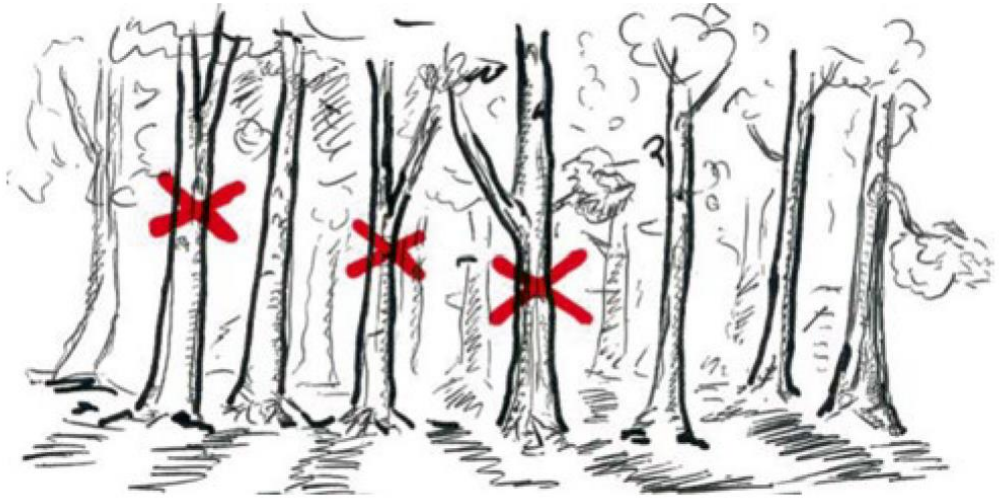
Large crown
“Growth machine”

5-m high-quality stem section
“Prime asset”

Pramono 2010

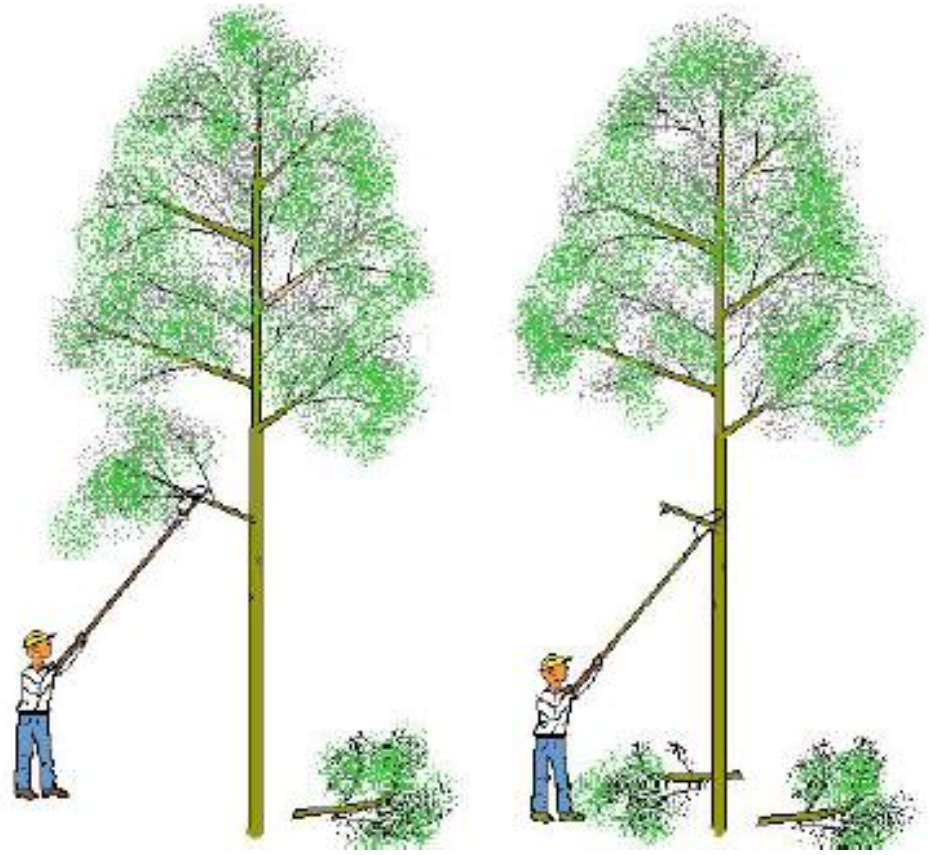
Example III

Should a grower invest in quality?



Remove crooked & forked trees *(negative selection)*

Richter 2015
10.1007/978-3-319-07422-1

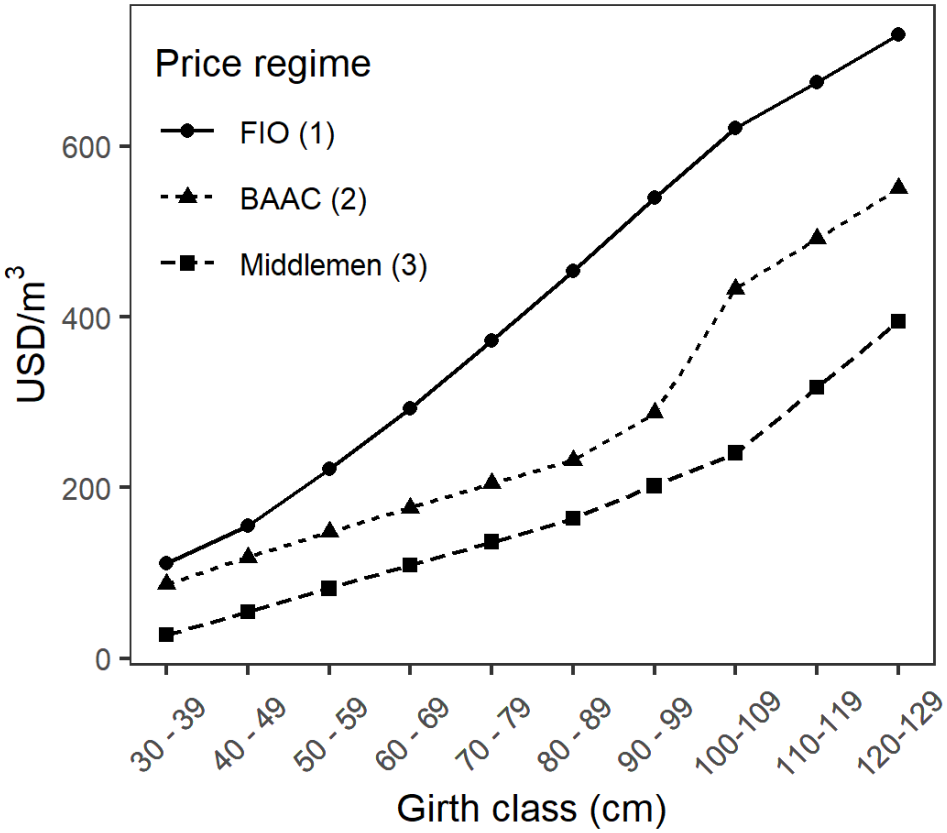


http://teak-woods.blogspot.com/

Create knot-free timber *(pruning)*

Example III

Should a grower invest in quality?



Only if I can expect a quality premium!

Where is the price signal for high-quality timber in Thailand?

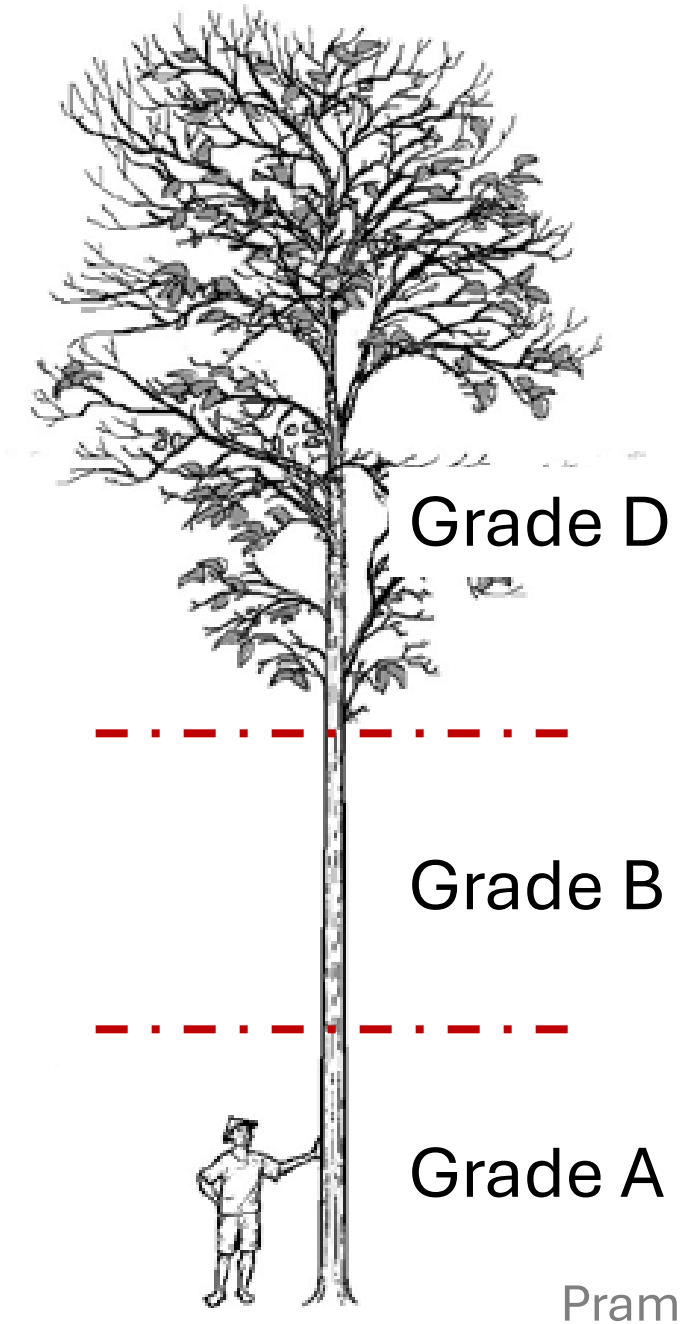
Starfinger et al. (under review)

Long-term commitments along value chain

Timber industry must create partnerships and incentives today to secure supply of high-quality timber in 20-30+ years.

WOOD VALUE CHAIN

Hoeben et al. 2023
10.1007/s40725-023-00191-4



Pramono 2010

Recommendation I

Log grading system

Log grading systems exist in …

Myanmar, Sri Lanka, Indonesia, Laos, Malaysia, Philippines, PNG (SEALPA), …

Why is there no
Thai Teak Quality Evaluation System?

Transparent & fair pricing

Recommendation II

Empower forest farmers through associations

Forest Farmer Organizations

Resource mobilization	Funding, labor, equipment Knowledge-sharing Hire professional managers
Marketing & commercialization	Reduce transaction costs Increase bargaining power Economies of scale or scope

Hintz et al. 2021
10.1016/j.forpol.2021.102460

Recommendation II

Empower forest farmers through associations

https://revolve.media/the-city-forest-nexus/

How much timber do we need for a forest-based bioeconomy?

Thai Production (ITTO, 2022)

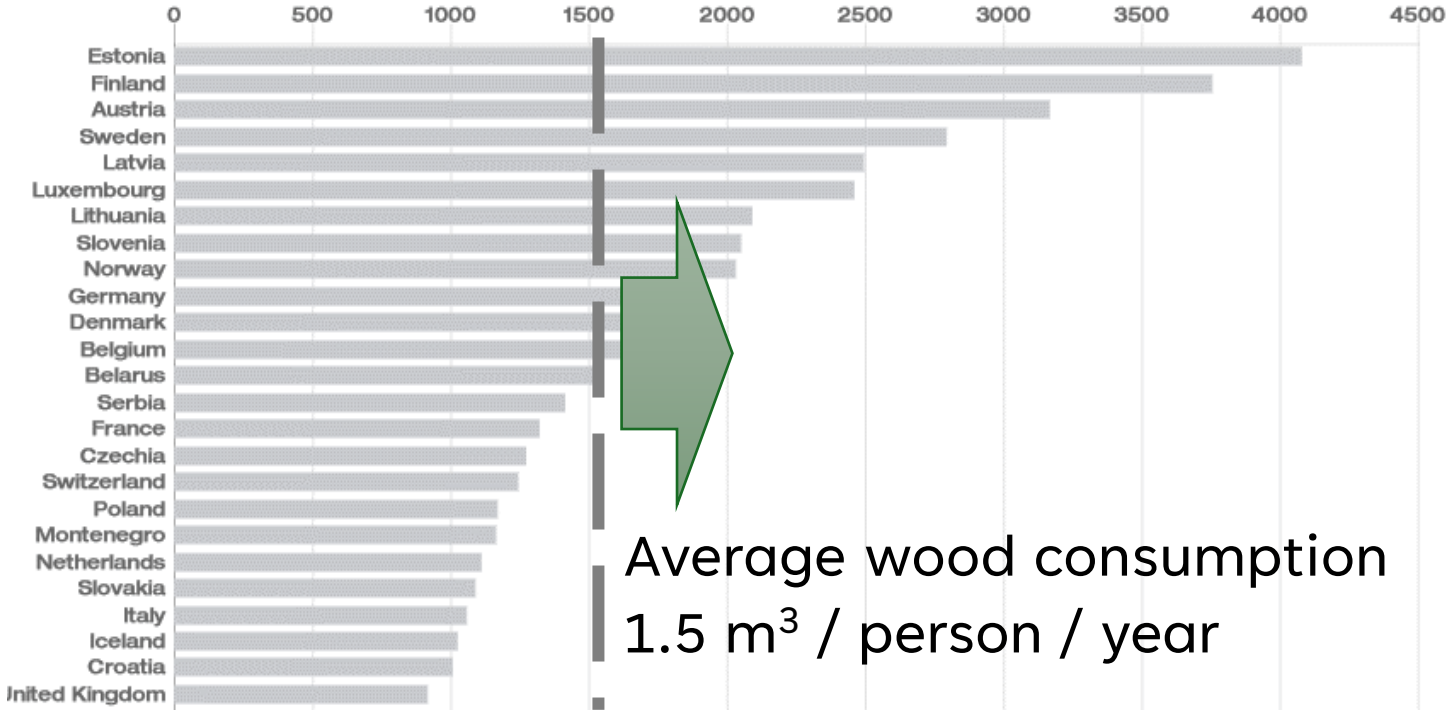
industrial roundwood:
17 million m^3

Sawnwood: 4.2 million m^3

Min. Timber needed

71.6 population × 1.5 m^3 =

<u>107.4 million m^3/yr</u>



Conclusions

Teak-growing smallholders

- Teak for family welfare not maximizing profits
- Success relies on **empowerment**: association, professional management, bargaining power

Timber processors

- Invest in long-term trust-based relations
- Transparent price schemes for timber quality

State agencies

- Reduce regulatory burdens
- Smallholders have different objectives
- Provide participatory extension & innovation

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