Optimal forest management for timber value and carbon sequestration benefits in tropical planted forests: a case study of household foresters in Vietnam

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ONLINE APPENDIX

Table A1. *Forest management practices for timber production in Yen Bai Province, Vietnam*[a]

Questions by interviewers	**Answers by household foresters**	**Sample proportion[c] (%)**
Capital for plantation forests[b]	Receiving a subsidy from the Government to grow trees	4.8
	Self-supported capital	73.4
	Borrowing from relatives and friends	21.8
Harvesting decisions based on:	Timber age	48.3
	Family financial status	28.4
	Other reasons, e.g., Government's policies, and decisions of adjacent households	23.3
Decisions regarding tree species	Profitability of the species	48.0
	Financial status	25.5
	Other reasons: decisions of adjacent households, and self-supported capital	26.5
Agreeing to delay harvesting if they were financially supported	Yes	93.4
Giving the expected level of payment based on[b]:	Living costs and debt	46.2
	Productions costs or other incomes	20.6
	Price and volume uncertainties	10.3
	Other reasons: better prices for large-sized trees, bank's interest rates	22.9

[a] Only one response was permitted for each question.

[b] Open-ended questions.

[c] Total sample size was 271 household foresters.

Table A2. *Forest management practices for a carbon pooling project in Yen Bai Province, Vietnam*[a]

Questions by interviewers	**Answers by foresters**	**Sample proportion[b] (%)**
Participating in a carbon pooling project:	Yes	89.0
	No	11.0
If Yes, because:	Would benefit from technical support, forest protection, and economies of scale	42.9
	Have more capital to invest in their forest	5.0
	Have environmental benefits	13.4
	Other reasons: would benefit their community, to support the Government policies	38.7
Carbon pooling paper work	A contract between households and the investor would be necessary	47.3
	Requesting more information on the rules of the project	21.8
	Having no ideas about procedures to establish the project	31.0
Expecting any obstacles to a carbon pooling agreement	No	22.9
	Yes, catastrophic risks and price uncertainty	15.9
	Yes, the investors going bankrupt	8.1
	Yes, poor households may cut trees earlier	4.8
	Yes, other obstacles	5.9
	No view (about whether or not obstacles would occur)	42.4

[a] Only one response was permitted for each question

[b] Total sample size was 271 household foresters.

Table A3. *Functions and parameters used in the model in order to calculate the optimal rotation age for household planted forests in Yen Bai Province, Vietnam*

Functions/Parameters	***E. urophylla***	***A. mangium***
Discount rate	8%	8%
Timber function	$q(x_t) = -1.38x_t^2 + 40.33x_t - 94.07$ where x_t denotes timber age of stand in period t, and $q(x_t)$ represents timber volume at age x_t.	$q(x_t) = -0.3x_t^2 + 28.06x_t - 63.33$
Timber price million VND (USD) cubic meter^{-1}	0.37 (21.76)	0.33 (19.41)
Planting cost million VND (USD) ha^{-1}	6.85 (402.94)	6.77 (398.24)
Carbon price million VND (USD) tonne^{-1}	0.051 (3)	0.051 (3)
Carbon sequestration function	$Q_c(x_t) = -0.07x_t^2 + 6.02x_t + 11.57$ where $Q_c(x_t)$ represents the carbon amount (tonne ha^{-1}) sequestered up to age x_t.	$Q_c(x_t) = -0.03x_t^2 + 4.97x_t + 66.11$

Data source: Nghiem (2011) unless otherwise indicated

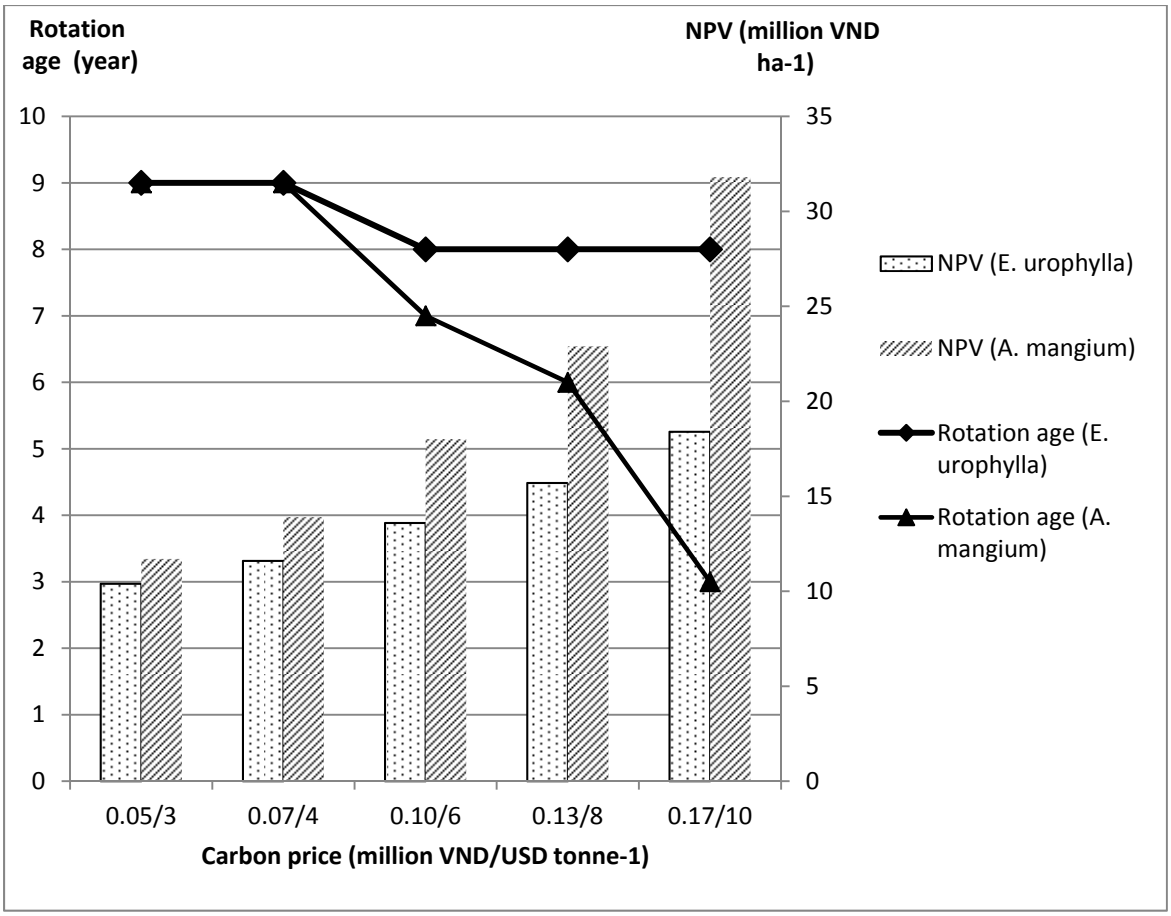

Figure A1. *Sensitivity analysis of the optimal carbon rotation age relative to increasing prices for carbon sequestration for household planted forests in Yen Bai Province, Vietnam*