

Increasing small landowners' opportunities by improving wood recovery from native forests' discarded logs.

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Introducción



DecisiónES
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Symposium on
Ecosystem Services,
Forest Management and
Decision Making



Introduction

14,6 M ha of native forest



1.6 million hectares of secondary-growth stands of *Nothofagus* forests, many presenting small diameters, non managed and in degraded conditions

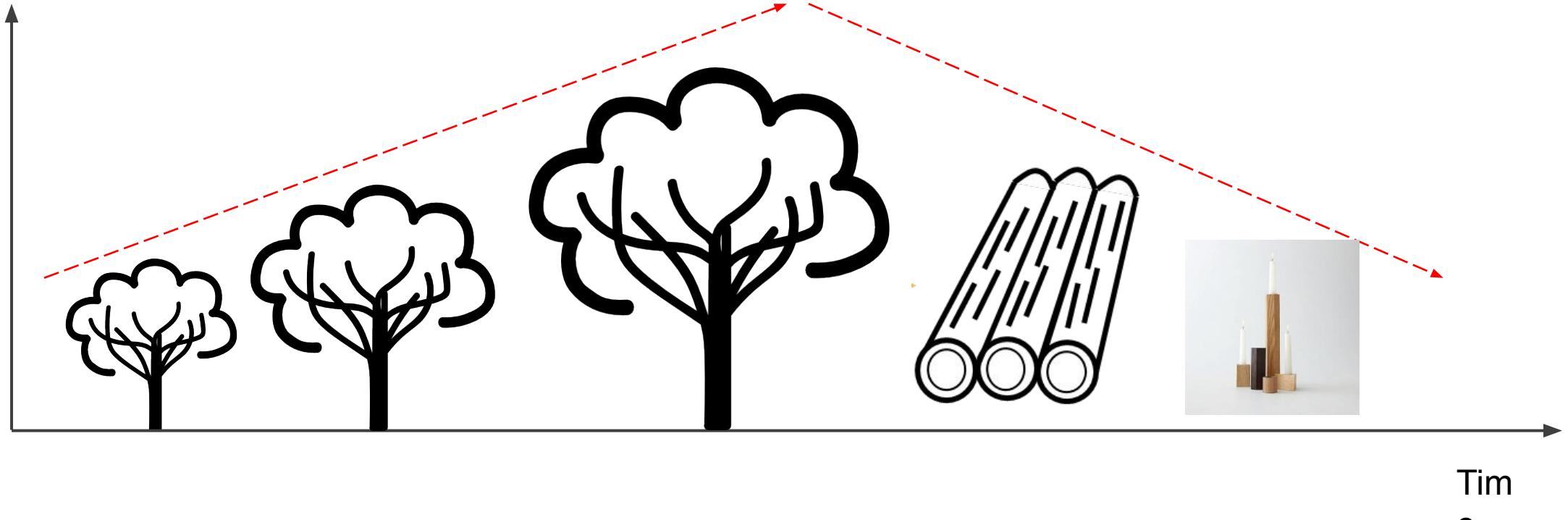
New tendencies are increasing the presence of wood in the markets based on small pieces but...



<https://www.ruffino.com.ar/productos/revestimiento-de-madera/>

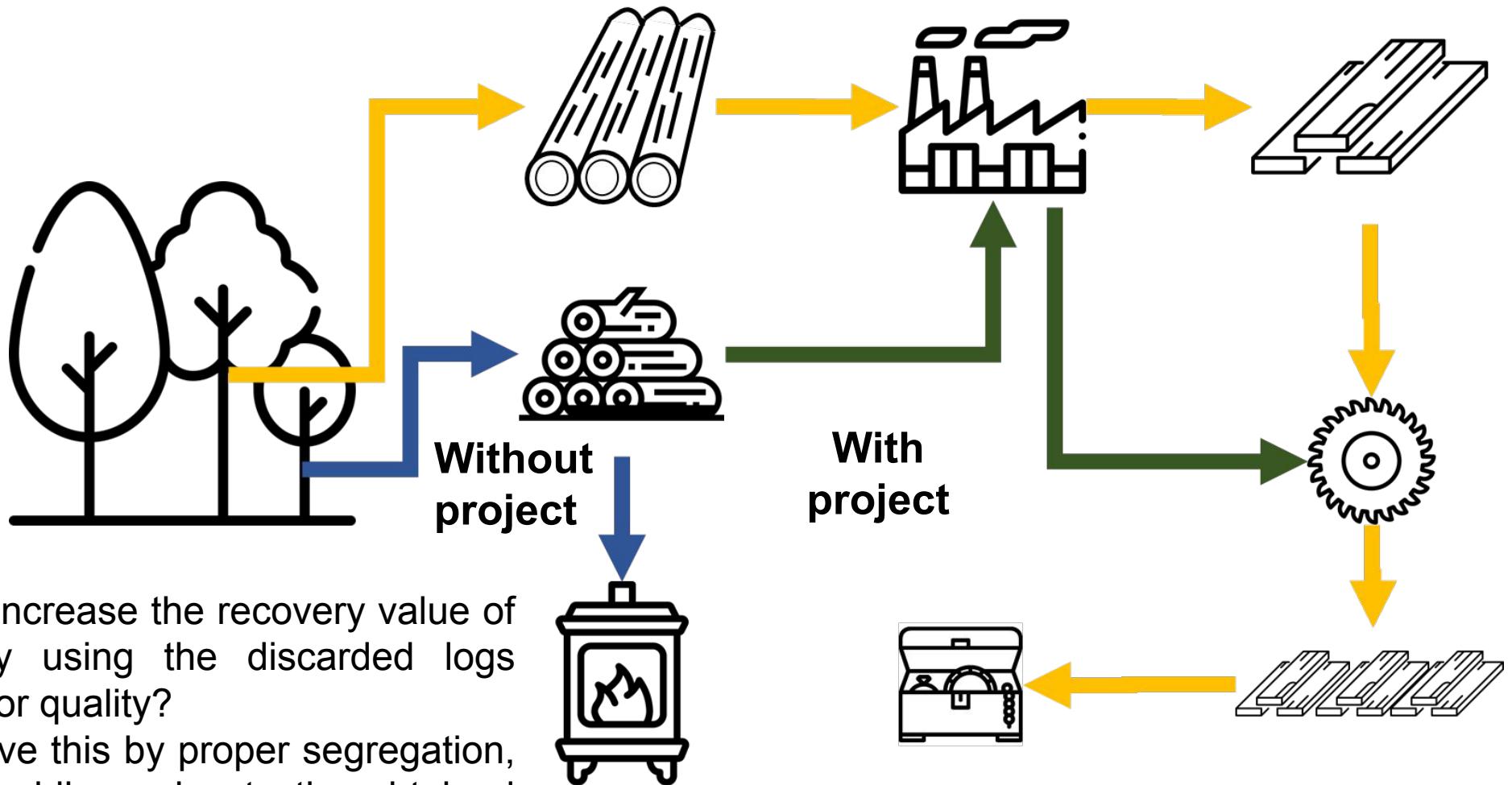


<https://www.amazon.com/Kittmip-Novelty-Creative-Adjustable-Bed-side/dp/B0C5CT5SYN>



Aim

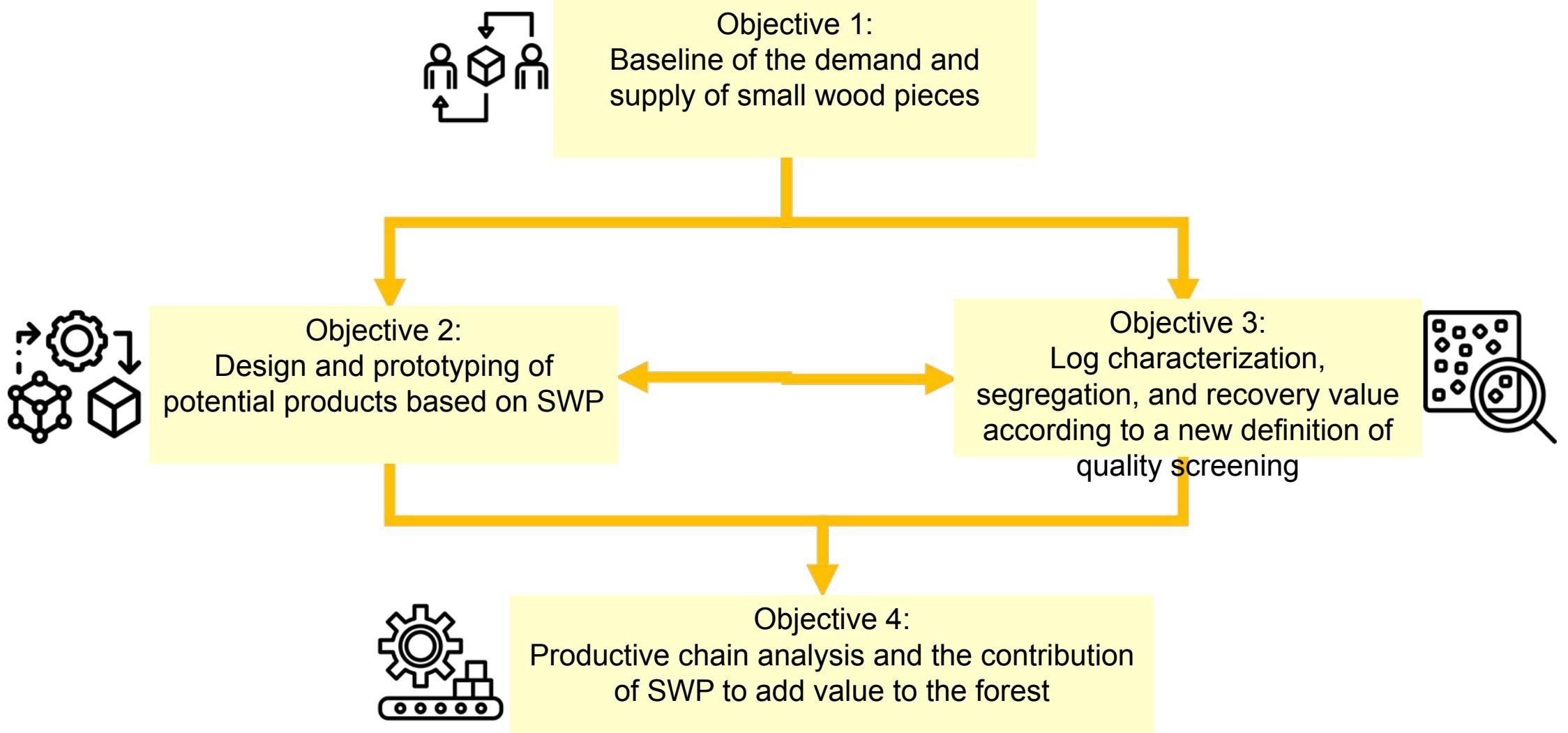
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Aim: Is it possible to increase the recovery value of the native forest by using the discarded logs because of their size or quality?

Is it possible to achieve this by proper segregation, log breakdown, and adding value to the obtained lumber instead of using it as firewood?

Objectives



Methodology



Existing information:

Forest inventories, growth projections, market studies, field sampling, etc.



Visits, interviews, focal groups:

Relevant actors of the supply chain, from the forest to the final consumer



Methodology



Very degraded forest: we chose in very degraded native forests, post-harvest or thinning slash, the range of logs rejected by the formal sawing industry.



Methodology



We build a multidisciplinary group with forest engineers, economists, experts in focus group studies, and wood designers. In the field, we discussed the logs classification and possible segregation parameters, sampling methodologies, etc.



Methodology

Chilean log classification standard for *Nothofagus* species

Norma de clasificación NCh 3223-2010

Fuente: Instituto Nacional de Normalización de Chile (2010)



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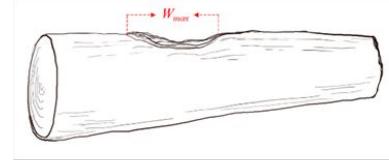
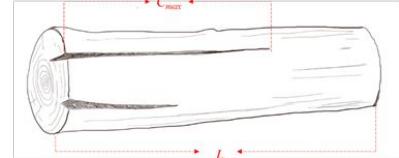
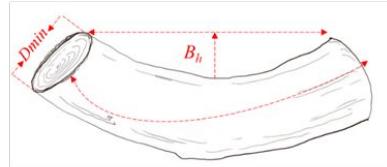
Centro Nacional
CENAMAD
para la Industria de la Madera

DEFECTOS Y ESPECIFICACIONES	DEFINICIÓN DE GRADOS DE CALIDAD							
	A		B		C		D	
Dimensiones	$\varnothing \geq 40$ cm	$L \geq 2.5$ m	$\varnothing \geq 30$ cm	$L \geq 2.5$ m	$\varnothing \geq 20$ cm	$L \geq 2.5$ m	$\varnothing \geq 10$ cm	$L \geq 1$ m
Abolladuras (cantidad/tamaño)	Máx. 1 \leq 4 cm		Máx. 1 \leq 4 cm		Máx. 6 \leq 5 cm ó 2 \leq 15 cm		Máx. 8 \leq 5 cm ó 2 \leq 15 cm	
Abultamientos	No admite		No admite		No admite		Admite	
Cáncer	No admite		No admite		No admite		Admite	
Curvatura	No admite		$\leq 15\%$ para L troza < 2.5 m		$\leq 15\%$ para L troza < 2.5 m		$> 25\%$	
			$\leq 25\%$ para L troza ≥ 2.5 m		$\leq 25\%$ para L troza ≥ 2.5 m			
Daño insectos	No admite		No admite		No admite		Admite	
Rajaduras	No admite		En una cabeza, máx. 1, $L \leq 30$ cm		En una cabeza, máx. 2, $L \leq 50$ cm ; En dos cabezas, máx. 1, $L \leq 20$ cm		En una o dos cabezas, Máx. 3, $L \leq 80$ cm	
Manchas hongos (% en peor cabeza)	No admite		$\leq 30\%$		$\leq 40\%$		$> 40\%$	
Muñones y/o nudos	Máx. 2 \leq 10 cm		Máx. 4 \leq 10 cm		Máx. 10 \leq 10 cm		Ilimitada	
Pudrición (% en cualquier cabeza)	No admite		No admite		$\leq 30\%$		$> 30\% y < 50\%$	

Methodology

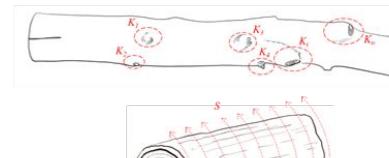
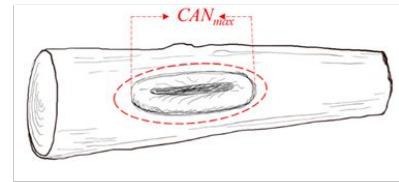
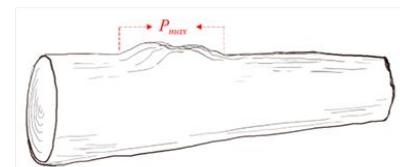
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(a) Curvature $CURV\% = \frac{B_h}{D_{min}} \times 100$



(c) Wounds $WOUND\% = \frac{W_{max}}{L} \times 100$

(d) Protuberances $PROT\% = \frac{P_{max}}{L} \times 100$



(e) Cankers $CANKER\% = \frac{CAN_{max}}{L} \times 100$

(f) Knots $KNOT\% = \frac{\sum K_i}{S} \times 100$

(a)

(b)

(c)

(d)

(e)

(f)

Quality class	Knots %	Curvature %	Insects attack and decay Prescence or absence	Wounds %	Checks %	Protuberances %	Canker %
0	0- 1%	0-25%	No decay, no insects attack	0-25%	0-25%	0-25%	0-25%
1	1 - 2%	25-50%	Decay or insect attack	25-50%	25-50%	25-50%	25-50%
2	2 -3%	50-75%	Decay and insect attack	50-75%	50-75%	50-75%	50-75%
3	> 3%	>75%		>75%	>75%	>75%	>75%

Methodolog y



Our horrible raw
material

Results

Log quality evaluation and segregation

Species	Log Class			
	0	1	2	3
<i>N. dombeyi</i>	5%	5%	11%	8%
<i>N. obliqua</i>	6%	10%	14%	2%
<i>P. lingue</i>	1%	2%	1%	0%
<i>G. avellana</i>	0%	2%	3%	1%
<i>L. hirsuta</i>	2%	6%	16%	5%
Others	0%	1%	1%	1%
All	13%	27%	45%	16%

On a sample of 177 logs

Length: 100 cm (51 - 144 cm)

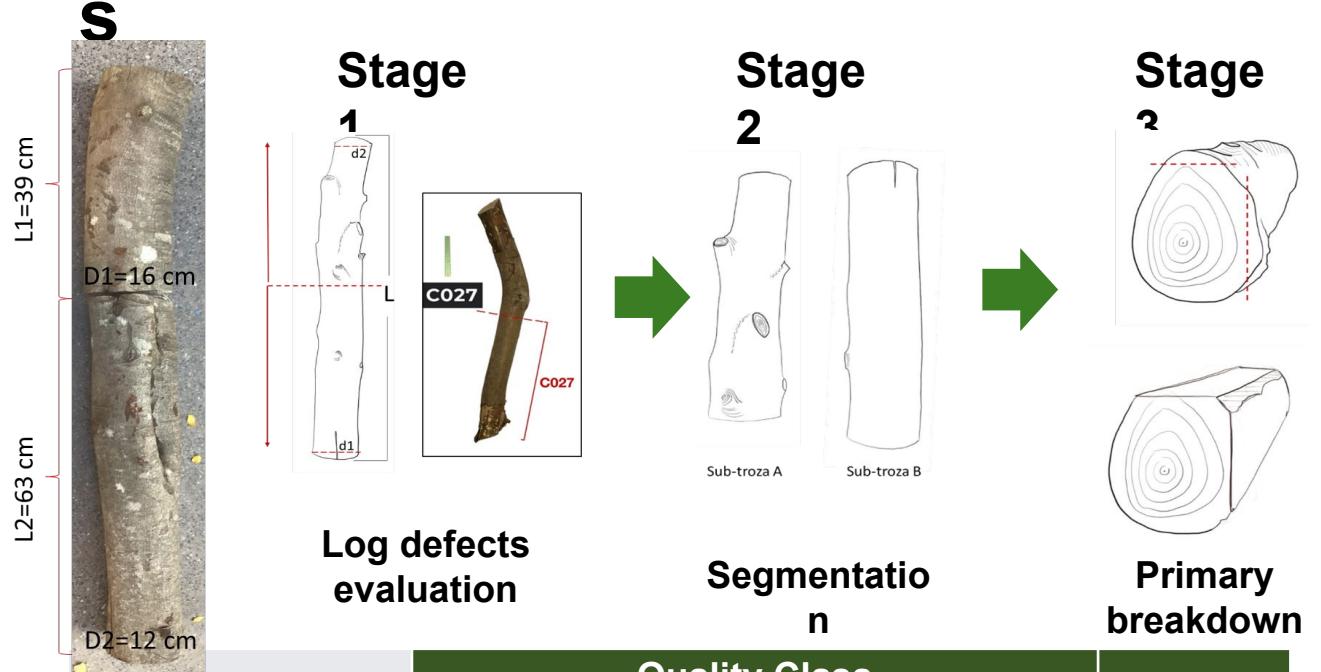
Lower diameter: 14.3 cm (7 - 25.5 cm)

Larger diameter: 15.9 cm (8 – 33.6 cm)



60% classified as very bad quality logs (Log classes 2 and 3)

Result

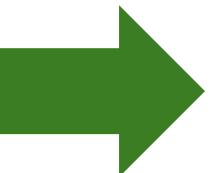


	Quality Class				Total
	0	1	2	3	
<i>Nothofagus obliqua</i>	45%	27%	34%	N/A	34%
<i>Nothofagus dombeyi</i>	33%	34%	51%	49%	42%
<i>Lomatia hirsuta</i>	N/A	36%	N/A	N/A	36%
<i>Gevuina avellana</i>	39%	39%	N/A	N/A	39%
<i>Persea lingue</i>	46%	38%	N/A	N/A	39%
Others					21%
Total	42%	31%	39%	33%	34%

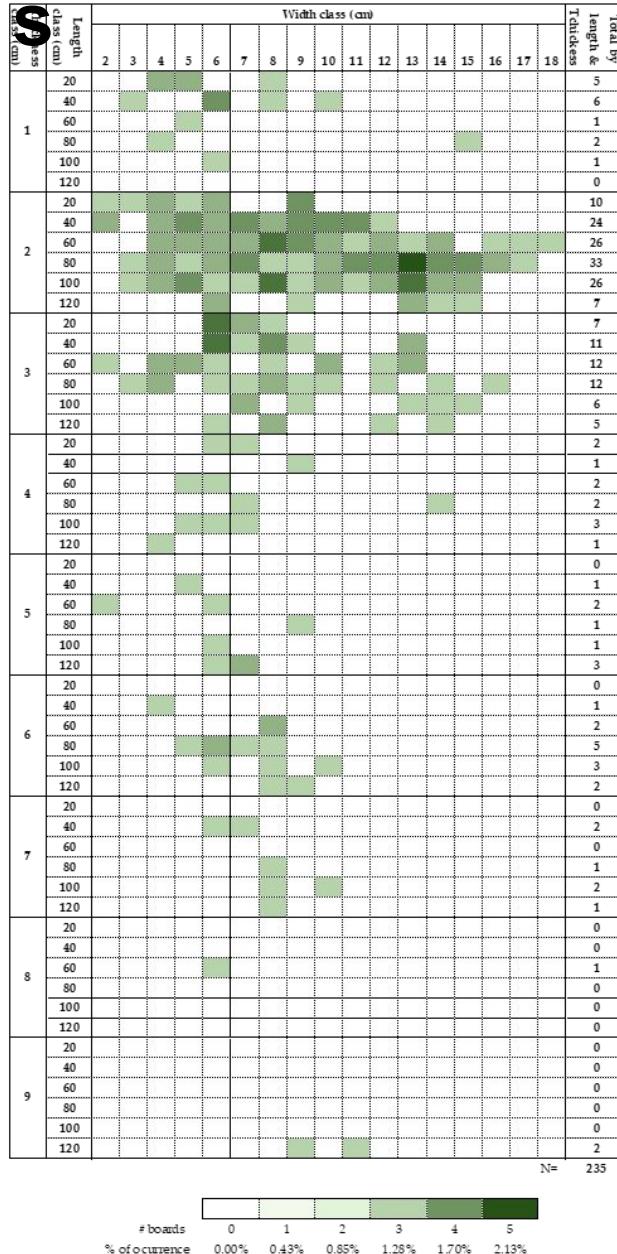
The global yield (sawn wood volume/log volume): 34% (sd 13,4%).

Result

S



Result



a) *N. dombeyi*

Board quality				
	1	2	3	
Log quality	0	73%	27%	0%
	1	18%	55%	27%
	2	30%	60%	10%
	3	0%	75%	25%

b) *N. obliqua*

Board quality				
	1	2	3	
Log quality	0	39%	53%	8%
	1	33%	53%	14%
	2	21%	69%	10%
	3	0%	88%	13%

c) *P. lingue*

Board quality				
	1	2	3	
Log quality	0	25%	75%	0%
	1	65%	29%	6%
	2	0%	100%	0%
	3	N/A	N/A	N/A

d) *G. avellana*

Board quality				
	1	2	3	
Log quality	0	N/A	N/A	N/A
	1	67%	33%	0%
	2	36%	36%	29%
	3	N/A	N/A	N/A

e) Others

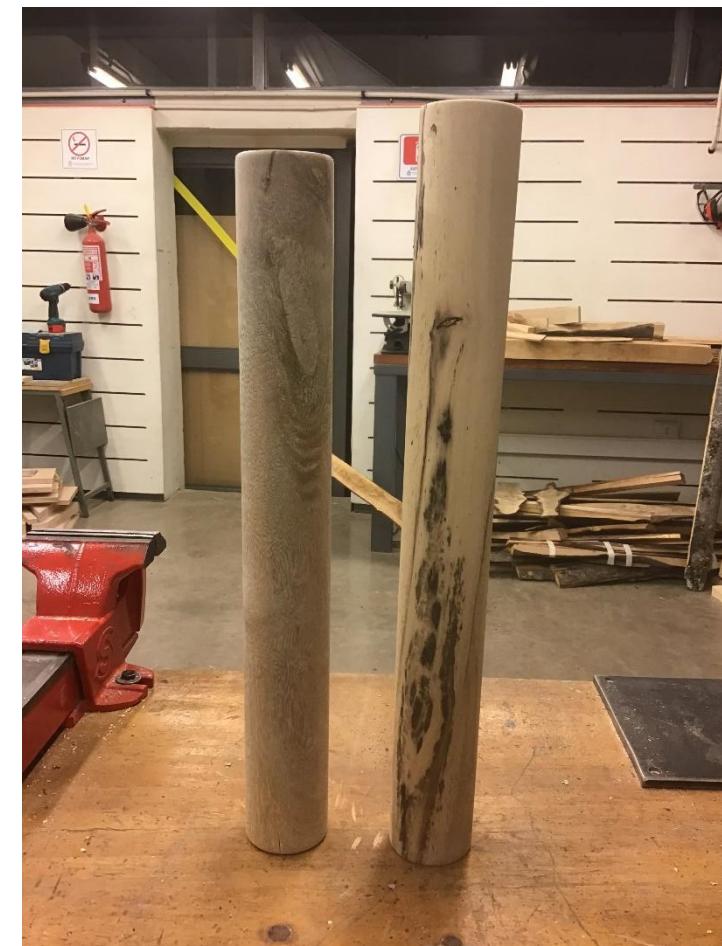
Board quality				
	1	2	3	
Log quality	0	N/A	N/A	N/A
	1	100%	0%	0%
	2	29%	71%	0%
	3	0%	100%	0%

f) All

Board quality				
	1	2	3	
Log quality	0	47%	47%	5%
	1	45%	44%	12%
	2	25%	63%	12%
	3	0%	84%	16%

We obtained 235 pieces of different qualities and dimensions

Results



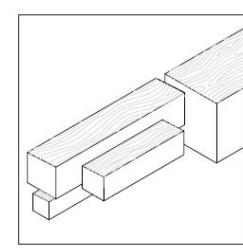
Different pieces were prototyped

Results

Catalog of products and cutstock concept



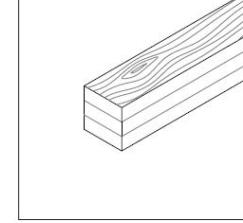
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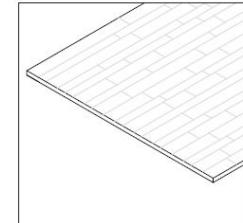
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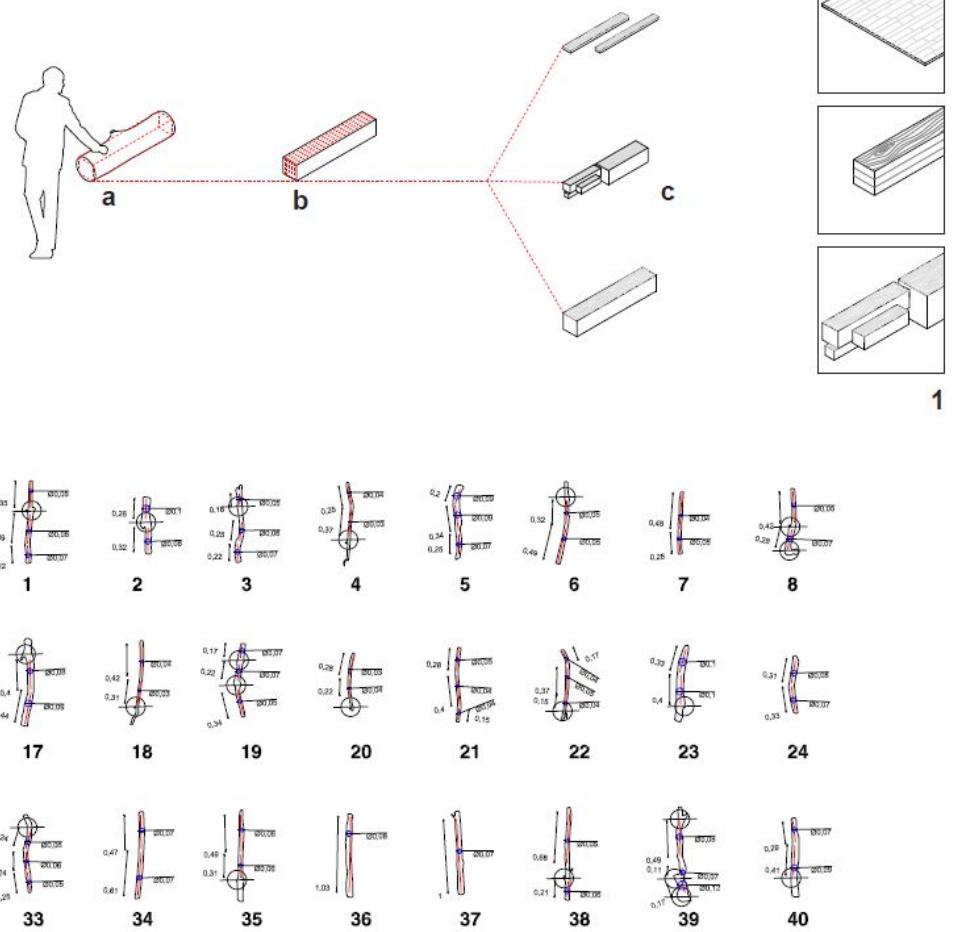
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3

1 Avellano (*Gevuina avellana*)
2 Roble (*Nothofagus obliqua*)

SELECCIÓN Y CATALOGACIÓN DE TROZAS



Main implications



- Add value to the forest industry supply chain
- Give reasons to the owners to apply proper silviculture instead of replacing or degrading the forest
- Maintain carbon stock in solid products instead of firewood
- Add supply to artisans and different producers



Next steps

- Development of an affordable portable micro-sawmill and wood dryer technology
- Organization of small owners and technology transfer
- Development of a cut-stocks market and a cut-stock culture
- Economic evaluation based on the new technologies' operation





MUITO
~~OBRIGADA~~

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