

# **SELECTIVE LOGGING IN NATIVE FOREST: ECONOMIC ANALYSIS**

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# MOTIVATION

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- Law 26.331 has the purpose of protecting native forests.

This regulation set out the conservation categories that the provinces have to apply to classify forest lands.

- **Category I (red):** high level of conservation. The forest land can't be use.
- **Category II (yellow):** medium conservation level. Selective logging is allowed.
- **Category III (green):** low conservation level. Land owners can ask to change the use of land.
- In Misiones province, it is observed that native forest degradation continued in spite of existence of native forest management regulations.

# OBJECTIVE

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- **Hypothesis:** the market value of lands under category II (YELLOW) is higher than the land expected value resulting of a sustainable native forest use.
- **Objective:** estimate the potential native forest land value under sustainable management and analyze the economic incentives that induce to deviate from this.

# METHODOLOGIE

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- $LEV = P * V_0 + \frac{[P * V(T) * e^{-iT} - C]}{(1 - e^{-iT})} \approx P * V_0 + \frac{P * V(T)}{e^{iT} - 1}$
- LEV: the maximum willingness to pay by agents for land covered with native forests (Arosa Gómez, 1996).
- Where **P** is stump price of native species, **V** is stump wood volume, **T** is the time point of logging and **i** is the interest rate.
- $P * V_0$  represents the stump use today.
- Model assumptions:
  - ✓ perfect functioning of capital and land market,
  - ✓ constant lumber prices.

# FOREST USE CRITERIAS

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- **Minimum Diameter Cuts (MDC):** Minimum breast diameter that must be respected to cut down trees. Because of the typical low final remnant of tree stock after the MDC logging, it is assumed that once the trees are cut down, that the remnant forest will not have future commercial value.
- **Sustainable Criteria:** it estimates the possible lumber to be extracted considering the growing rate of each native species under an optimal cutting cycle, the mortality and renovation rates. The objective is to conserve a tree stock sufficient to allow future cycles uses.



# DATA USED FOR THE ESTIMATIONS

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- The growing estimates are based on data obtained from study case installed in a forest used 60 years ago in San Antonio (Misiones, Argentina).
- The most important species were considered, taking into account both hard wood values and predominance in the study case (*Cedrela fissilis*, *Balfourodendron riedelianum*, *Cabralea canjerana*, *Nectandra lanceolata*, *Apuleia leiocarpa*, *Myrocarpus frondosus*, *Parapiptadenia rigida*, *Didymopanax morototoni* and others species).
- Estimates were based on forest growth table, constructed from the mean growth by species classified in two categories: under 50 cm DBH and over 50 cm DBH.

# DATA USED FOR THE ESTIMATIONS

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- The Prices used for the native species correspond to the July/2018 prices published by COIFORM, expressed in U\$S dollars/m<sup>3</sup> at the July/2018 exchange rate.
- The interest rate combines:
  - a) The United States of America free of risk rate, mean 3,15 % (10 years USA bonds),
  - b) the Argentine risk rate, 6,03 % and
  - c) the forestry sector risk rate, 9,7 % (price variability of native species lumber).

Resulting Interest rate = 18,9 %.

# RESULTS AND DISCUSSION

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		LEV (USD/ha)	
Interest rates	Criteria used		
	MDC	Sustainable	Sustainable
		20 years cycles	40 years cycles
1%	<b>919,9</b>	2877,26	2677,27
5%		623,09	616,75
10%		376,72	460,05
15%		314,01	439,4
<b>18,90%</b>		<b>276,75</b>	<b>435,29</b>

- It is observed that, unless the interest rate used is very low, the MDC criteria offers better results than sustainable use criteria's.



# RESULTS AND DISCUSSION

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- If the land market functions correctly, it would be expected that land prices would tend to the best LEV found between the 3 criterias used.
- Because of the most frequent Argentine Interest Rate, LEV ought to tend to results estimated using MDC.
- Compared to actual prices there is evidence that a buyer expecting to apply sustainable use will not be ready to pay more than USD 435 (40 years sustainable cycle)
- But, If the intention is to harvest the trees allowed by law, buyers ought to be ready to pay between a minimum USD 300.ha<sup>-1</sup> and maximum USD 920.ha<sup>-1</sup>.

# CONCLUSIONS

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- The market prices are higher than the ones expected to be obtained from sustainable use criteria.
- Because the actual law allows immediate intensive use (MDC), land owners have no economic incentives to implement sustainable native forest managements.
- This fact and others, like illegal deforestation (low penalties) promote higher prices of land covered by native forests.

**THANK YOU VERY MUCH!**

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