

Results of Recent Research on the Effectiveness of Community Based Concessions in the Mayan Biosphere Reserve of Guatemala

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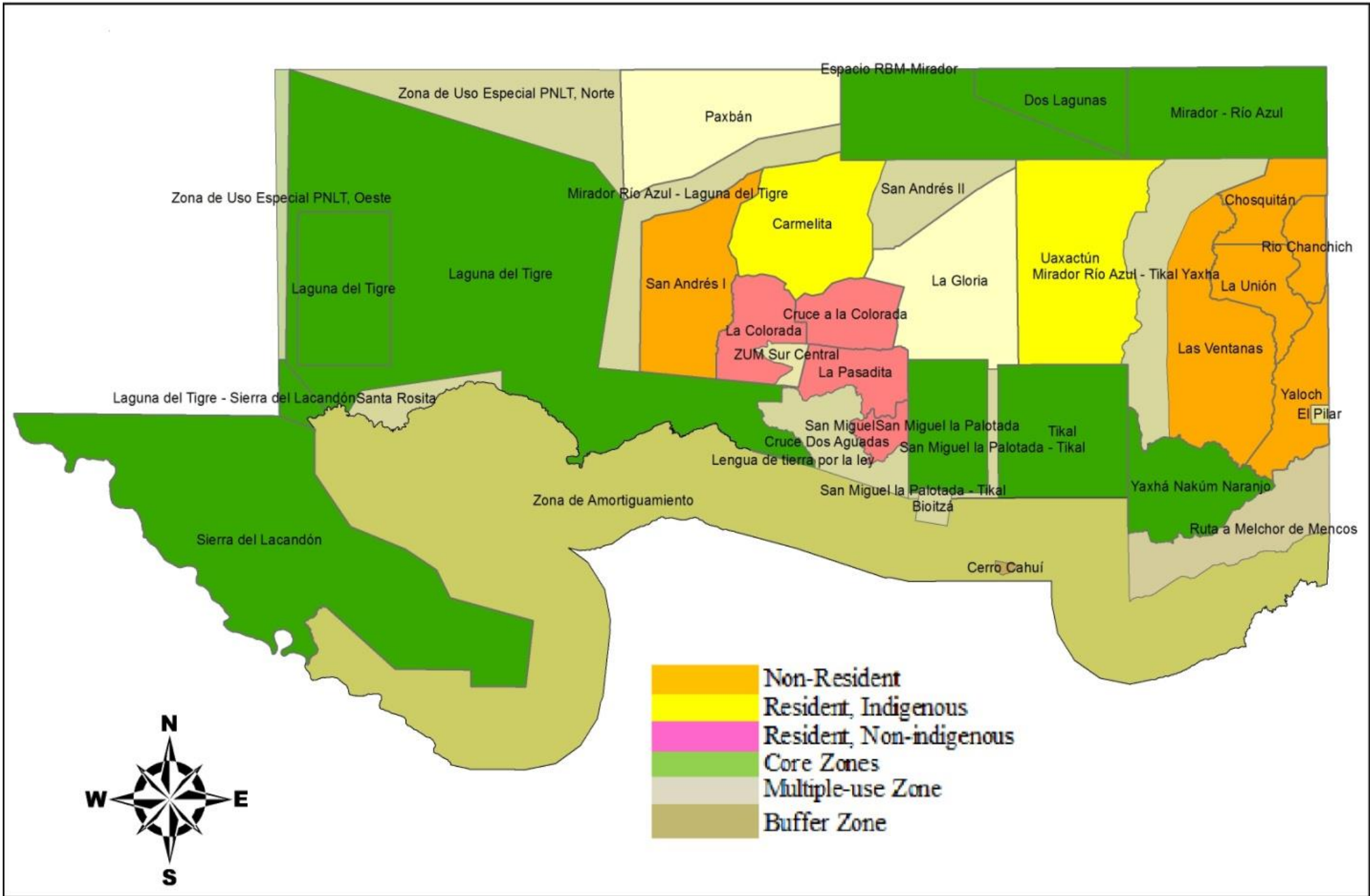
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Key points

- Results from previous survey and related work
 - Who did we survey and what did we find out about them?
 - What do individuals want from concessions?
 - What are the returns to land in concession areas?
 - Do concessions increase incomes?
 - Do concessions slow deforestation?
 - How valuable are concessions for carbon sequestration?
- Proposed future survey work.

General results of survey

- Conducted in Autumn 2012
- Surveyed concession and non-concession members in 22 communities.
- 494 individuals surveyed
- 20-25% of the membership of each of the 12 community concession groups



Concession members surveyed (total = 280)

Concession	# surveys	% sample
San Miguel	16	5.7%
Uaxactún	39	14.0%
Cruce a la Colorda	14	5.0%
Carmelita	23	8.2%
La Pasadita	26	9.3%
La Colorada	1	0.4%
El Esfuerzo	9	3.2%
Arbol Verde	74	26.0%
CUSTOSEL	16	5.7%
San Andrés	34	12.0%
Suchitecos	6	2.0%
Laborantes	13	4.6%
Selva Maya Norte	9	3.2%

Summary data from surveys

	Members	Non-members	Total Sample	#
Variable	Mean	Mean	Mean	
Head Male	0.88	0.83	0.86	494
Head Age	50	44.0	47	490
Head Educ.	4.3	4.3	4.3	493
Spouse Educ.	4.1	4.3	4.2	387
HH Size	5.4	5.2	5.3	494
Household Income (\$/yr)	6,020	5,155	5,651	494
Born in Petén (%)	54%	47%	51%	488
Concession Member (%)	--	--	57%	494
Membership Fee (Q)	1,797	--	1,797	125
Dividend Amount (Q)	5,079	--	5,079	95
Concession land (ha)	9.9	--	9.9	46
Prefer In-kind (%)	47%	54%	50%	402

Job held by head of household

- 7% (33) Did work related to forestry or NTFPs
- 44% (218) considered themselves farmers
- 7% (34) worked for the government or are teachers
- 7% (35) are self-employed or small business owners
- 7% (33) are carpenters, construction workers, brick-layers, etc.
- 3% (13) work in a tourism-related job
- 12% (60) reported other employment
- Not all job categories are reported if under 4%

Results on Farming

Variable	Average total sample
Do you possess some land	54% (269)
% of land in same community	64%
Manzanas owned	15.8 M
Engaged in farming?	90%
Manzanas farmed	5.1
Crops sold	
Maize	98%
Frijole	49%
Chile	5%
Pepitoria	15%
Other	5%
Avg Farming Revenue (Q)	9,183
Rent land to others	23 of 266
Area (M) / Rent per Manzana (Q)	5.3M / 204Q
Rent from others	69 of 266
Area (M) / Rent per Manzana (Q)	6.5M / 355Q

Attitudes about forest resources

Question	Agree	Neutral	Disagree	Don't Know	N/A
I depend on the resources from the forest for my livelihood or income?	41%	5%	53%	1%	--
In 10 years I will still be doing forest-related work or activities?	31%	5%	6%	5%	53%
I am very worried about the future of the forests of the Petén?	96%	2%	2%	0%	--
Everyone should be able to harvest wood and products from the MBR?	7%	1%	91%	1%	--
How important are....	Not Important	Important	Very Important	Don't Know	
Strict conservation of the forest with no extraction of any kind?	38%	43%	16%	3%	--
Protection of historical and cultural resources such as Tikal and Mirador?	1%	57%	40%	1%	--
Extraction of forest resources?	5%	65%	29%	1%	--

Reason for joining concession (Can state multiple responses)

Reason for joining	# responses	Proportion responding
Better job opportunities	109	39%
Benefits associated with membership	73	26%
Conservation/Protect the forest	56	20%
Had family in the group	30	11%
Wanted legal access to forest products	29	10%
Other reason	25	9%
Everyone else was becoming a member	13	5%
NGO encouraged them	12	4%
Was forced to join but didn't want to	8	3%

What is the primary role of concessions







Question	Not Important	Important	Very Important
Jobs for members:	0%	58%	42%
Sustainable management of forest resources:	0%	61%	39%
Benefits to the community:	0%	65%	35%

38% of concession members said their economic condition was the same after joining as before

50% of concession members said their economic condition was better after joining as before

Experiment: what should concessions look like?

- Asked individuals a series of questions about their preferences for concession approaches
 - Land distribution: 0, 10, 20 Manazanas
 - Dividends (cash) or In-kind benefits (scholarships, medicine, improvements to health clinic)
 - Activities in addition to harvesting timber: Ecotourism or NTFPs.

Concession A	Concession B	Neither
<p>10 manzanas*</p> 	<p>20 manzanas*</p> 	
<p>In-kind Benefits</p>  <p>Life insurance, scholarships, medicine and equipment for the health center</p>	<p>Individual Dividends</p>  <p>Payment of Approximately Q10.000</p>	<p>I do not want to join either concession</p>
<p>Ecotourism</p> 	<p>Non-timber Forest Products</p> 	
<p>Payments of Q600/month for 5 years</p>	<p>Payments of Q200/month for 5 years</p>	

Results from experiments on what individuals want from concessions

Members

- Resident concessions
 - Prefer NTFP over ecotourism
 - Prefer to have land allocation
 - Prefer in-kind benefits over cash
- Non-resident concessions
 - Prefer ecotourism over NTFP
 - Do not want land allocation
 - Prefer in-kind benefits over cash

Non-Members

- Prefer land allocation
- Prefer in-kind benefits over cash
- Prefer ecotourism over NTFPs.

Concession returns

- Evaluation of economic returns based on annual reports provided by concessions and survey data (for estimate of agriculture returns)

	Non Timber Forest Products	Timber	Carbon	Total
	Q/ha/yr			
Concessions	76Q	53Q	133Q	262Q

Do concessions increase incomes of concessionaires compared to non-concessionaires

- Base analysis on survey data
- Consider differences in concession types based on the table to the right.

Type	Concession Name	Year Formed
Long-Inhabited	Carmelita	1997
	Uaxactún	2000
Recently Inhabited	San Miguel	1994
	La Pasadita	1997
	La Colorada	2001
	Cruce a la Colorada	2001
Non-Resident	Suchitecos (Río Chanchich)	1998
	Laborantes (Chosquitán)	2000
	San Andrés (AFISAP)	2000
	Arbol Verde (Las Ventanas)	2001
	El Esfuerzo (Yaloch)	2002
	CUSTOSEL (La Unión)	2002

The Model

$$Income_i = \beta_0 + \beta_c C_i + X_i' \beta_i + \alpha + \gamma + \varepsilon_i$$

- β_0 is a constant
- $\beta_c C_i$ is the impact of being a member on the income of person i
 - $C_i=1$ if person i is a member
 - $C_i=0$ if person i is not a member
- $X_i' \beta_i$ is the impact of the other characteristics on the income of person i
- α is the effect if the person lives in a recently inhabited concession
- γ is the effect if the person lives in a non-resident concession
- ε_i represents the possible error in the model

The impact on income, total population

This table presents a model of income as a function of a number of factors.

The results indicate that being a member of a concession increases income by 4771Q per year

Taking out a load reduces income

Living in communities with non-resident concession members increases income by 8631Q per year.

Variable (N = 475)	Result
Member	4771.227*
Born Petén	-778.213
Women	899.198
Spouse education	568.567*
Own land	4246.698
Married	-636.210
Head male	5666.262
Age	115.206
Head education	2705.554***
Depend forest	866.368
Loan	-10171.310***
Under 12	-682.579
Non-resident communities	8631.131**
Recently-inhabited communities	-360.954

The impact on non-resident concessions

Variable (N=286)	Result
Member	8208.662**
Born Petén	1759.976
Women	1593.403
Spouse education	465.452*
Own land	4172.697
Married	-549.727
Head male	8554.533*
Age	150.491
Head education	3050.396***
Depend forest	715.779
Loan	-12026.190***
Under 12	-1633.815

- The results show that being a concession member increases income by 8,208Q per year for non-resident concessions
- Taking out a loan reduces income
- More education increases income

The impact on recently-inhabited concessions

Variable (N=128)	Result
Member	-5790.421
Born Petén	9052.279*
Women	-2944.914
Spouse education	3058.436**
Own land	4141.185
Married	2179.694
Head male	-250.822
Age	290.148*
Head education	1180.002
Depend forest	3273.068*
Loan	-10617.190*
Under 12	3758.166

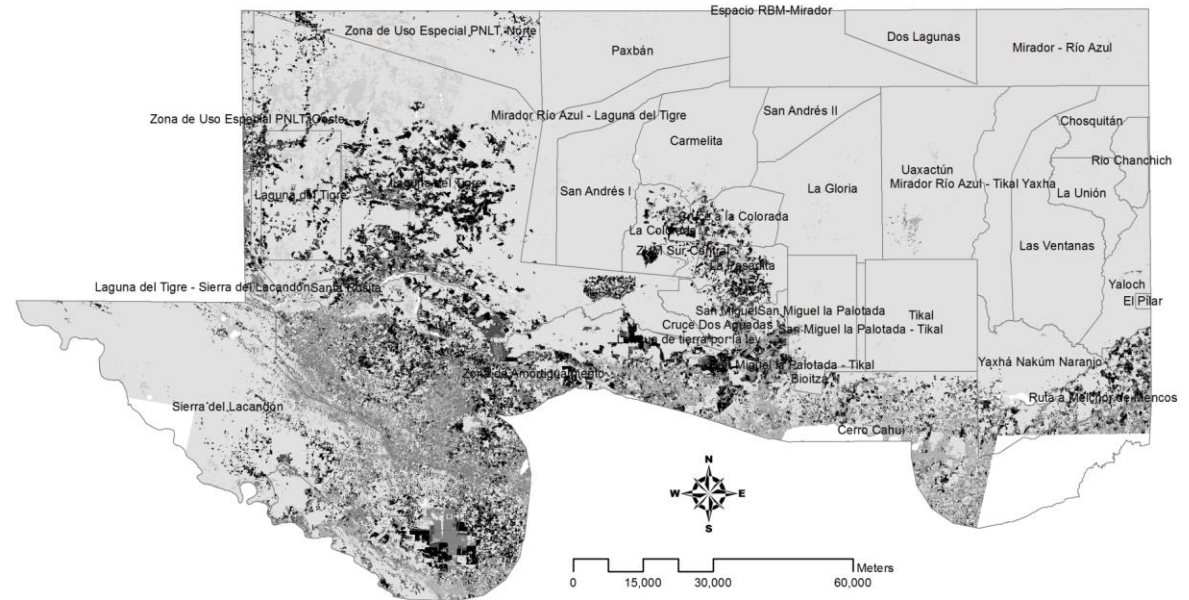
- The results show that being a member of a concession has a negative effect, but it is not significant
- Taking out a loan reduces income
- Age and being born in the Petén increase income

Summary of the impacts

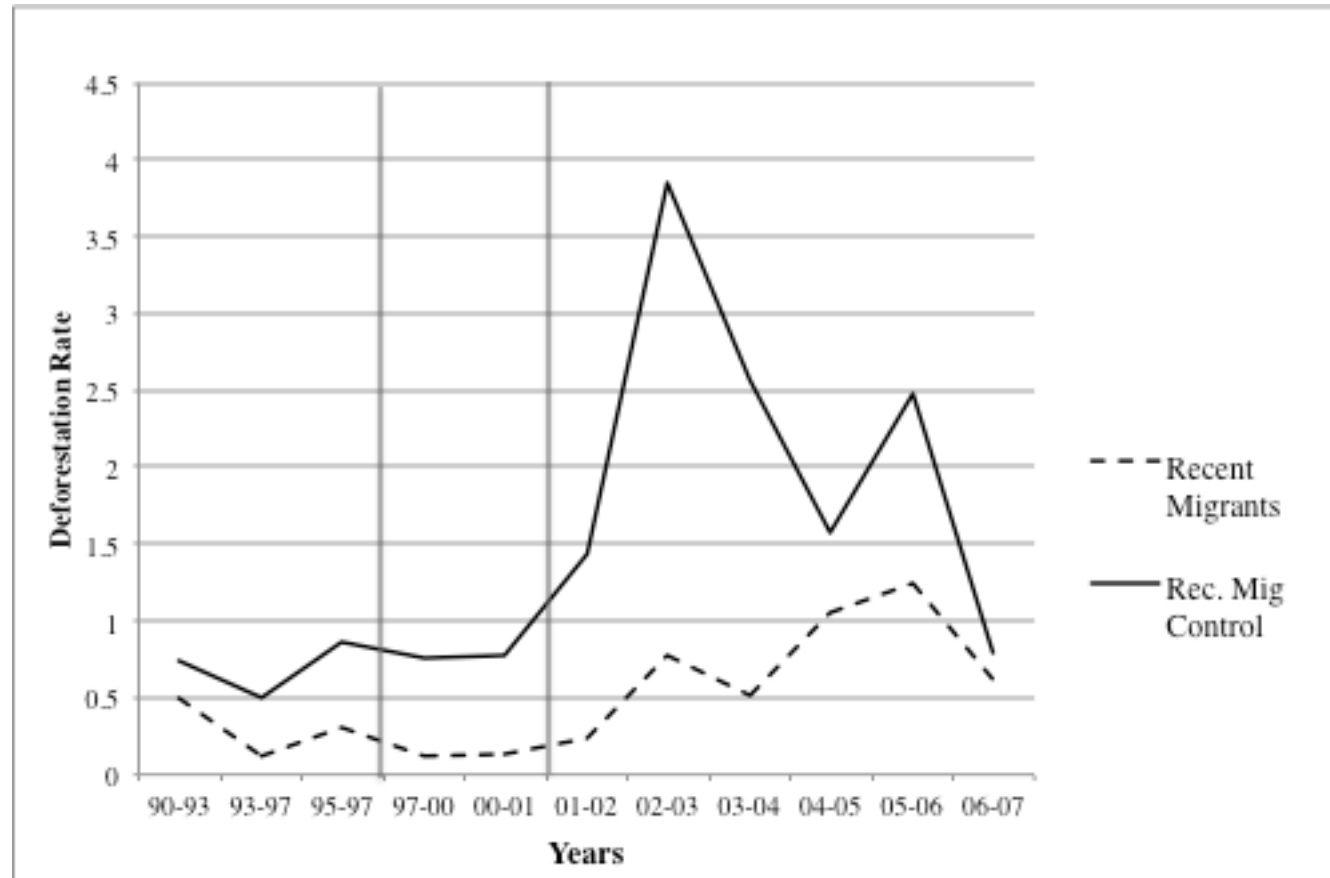
- Things that did not affect income
 - Age
 - Possession of land
 - Married
 - Number of women
 - Number of children under 12
- Things that do affect income and level
 - Concession membership +4800Q
 - Buffer zone: +8800Q
 - Education of head of household: + 2700Q

Effects of concessions on deforestation rates

- Use data on deforestation from CONAP from 1990 to 2007 to determine whether the concession policy reduced deforestation rates
- Break estimates into three groups
 - Long inhabited
 - Recently inhabited
 - Non resident



Can we detect a difference in trends in deforestation?



Results (effects from 2001-2007)

- On average, being in a concession reduced deforestation rates by 4.2%
 - Recently inhabited => Reduced deforestation by 7.8%, or 6,678 ha
 - Long Inhabited => Reduced deforestation by 5.0%, or 6,407 ha
 - Non inhabited -> Reduced deforestation by 3.3%, or 5,020 ha
- There is leakage, so when people are prevented from deforesting land in concessions, they do it elsewhere.
 - Leakage only occurred near recently inhabited concessions and in a 2 km buffer around the concessions.
 - Leakage reduced the gross effect in recently inhabited concessions by 1,722 ha
 - Net reduction in deforestation in recently inhabited concessions was 3,298 ha

Value of avoided deforestation for carbon sequestration (over a 30 year period)

CO2 Price = \$15/t CO2	Deforestation Rate equal to other National Parks	Deforestation Rate equal to Overall Maya Biosphere Reserve	Deforestation Rate equal to Concessions
CO₂ Loss (Mill tons)	15.82	15.94	3.99
Value of Loss (Mill \$)	\$121.61	\$122.50	\$30.65
\$ per ha per year	\$67.32	\$67.81	\$16.97

Proposed future work

- Conduct another survey
 - Assess role of migration on household income and success of concessions.
 - Assess whether incomes have changed over time in concessions and outside of concessions.
 - Learn more about forest product prices in the region, particularly domestic prices and export prices.
- Estimate land rents.
- Use updated data to model land use change to further assess concession benefits on carbon and biodiversity outcomes.