PRESENTATION GIVEN AT LTC SPRING FORUM ENTITLED:

""INTEGRATING GEOSPATIAL AND FIELD-BASED SCIENCE TO ASSESS BIODIVERSITY CONSERVATION: A SPECIAL FORUM OF WOMEN RESEARCH LEADERS"

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UNIVERSITY OF WISCONSIN, MADISON, WI, USA

HOSTED BY

LAND TENURE SOCIETY

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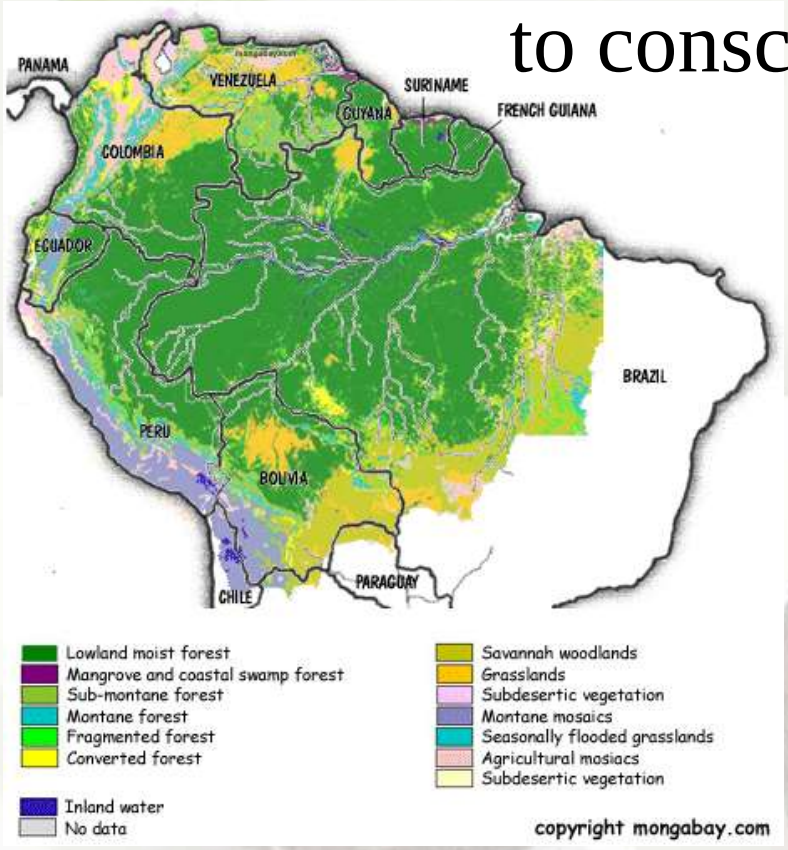
Seeking sustainability in the Amazon

Shifting from Brazil nut exploitation to conscious management



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Seeking sustainability in the Amazon

Shifting from Brazil nut exploitation to conscious management

- Brief historical account of Brazil nut exploitation
- Keystone role in current Amazonian conservation strategies
- Production patterns and ecological resilience
- Current Brazil nut management
- Prospects for more intensive management

Brazil nut (*Bertholletia excelsa*)

- "Forest giants"
  - 50m height
  - up to 3m dbh
- Densities of 1.3-23 trees (> 10 cm dbh) per ha
- Occurs in *terra firme* throughout Amazon basin

- Fruits take 14 mo to mature
- Seeds (nuts) remain inside fruits upon fruitfall
- Main disperser/predator – *Dasyprocta* spp.

Success in international markets

- 1633: First exports from Belém

- mid-1800s: broad economic significance near mouth of Amazon

Rich Wallace

- 1866: exploitation expanded dramatically with opening of Manaus ports

- 1990s: processing and commercialization center shifts from constrictive monopoly in Belém to tri-country region in Western Amazonia

Continued market success over decades

Complementary to rubber tapping

Slow to perish

Easy to transport

Ecological characteristics confer some resilience

Long-lived (seed production over multiple centuries)

- 45 cm dbh; 840 yrs
- 101 cm dbh; 996 yrs
- 129 cm dbh; 668 yrs

Vieira et al. 2005

Hard woody fruit protects seed from predation

Fruit is plant part harvested

Resprouts readily

Ecological characteristics confer some resilience

Has resisted domestication

Solely harvested from intact, mature forest

Keystone species for conservation through sustainable use

1994 IUCN Category VI (Managed Resource Protected Areas)

Still…How sustainable is Brazil nut extraction?

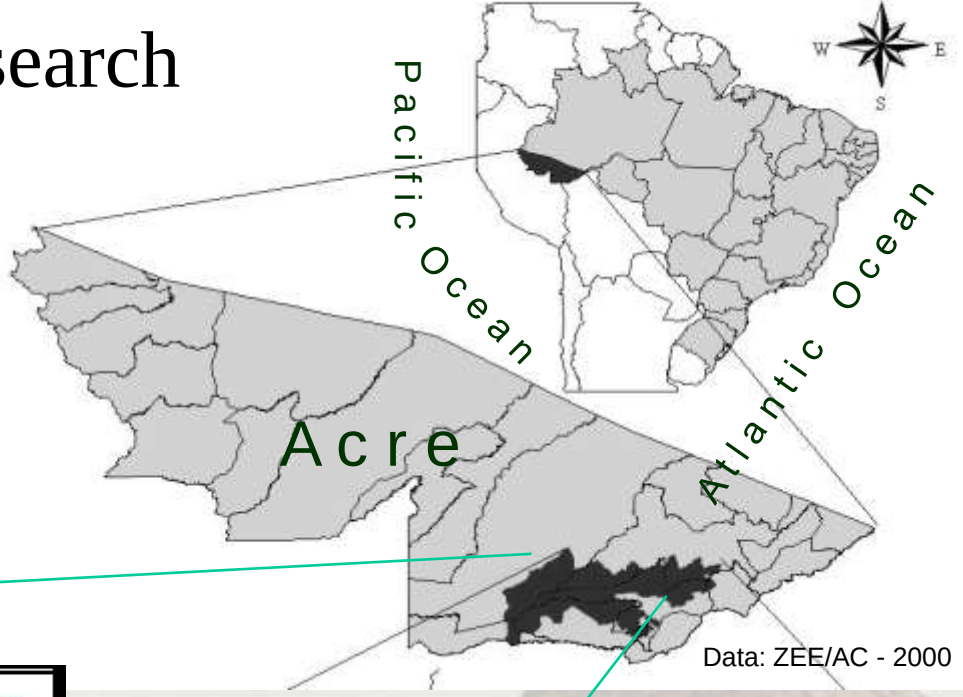
Ecologically…contradictory evidence of sustainable harvest

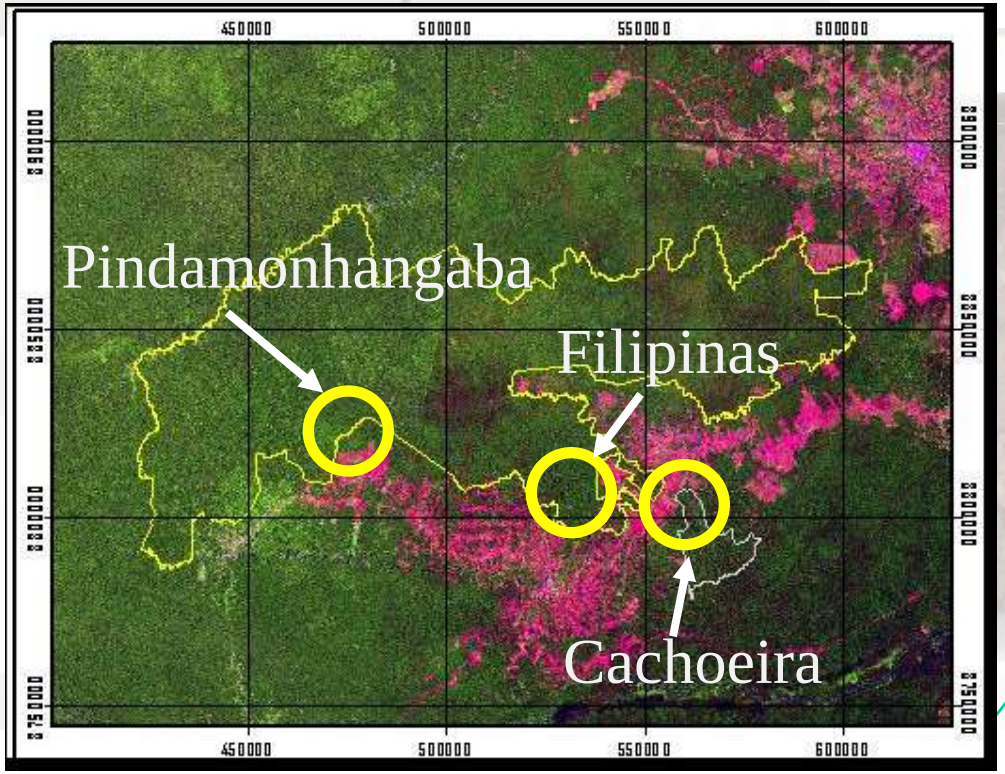
- Zuidema & Boot (2002) report healthy structures with 93% collection rates.

- Peres et al. (2003) suggest demographic collapse where more intensively harvested.

Ecology & management research

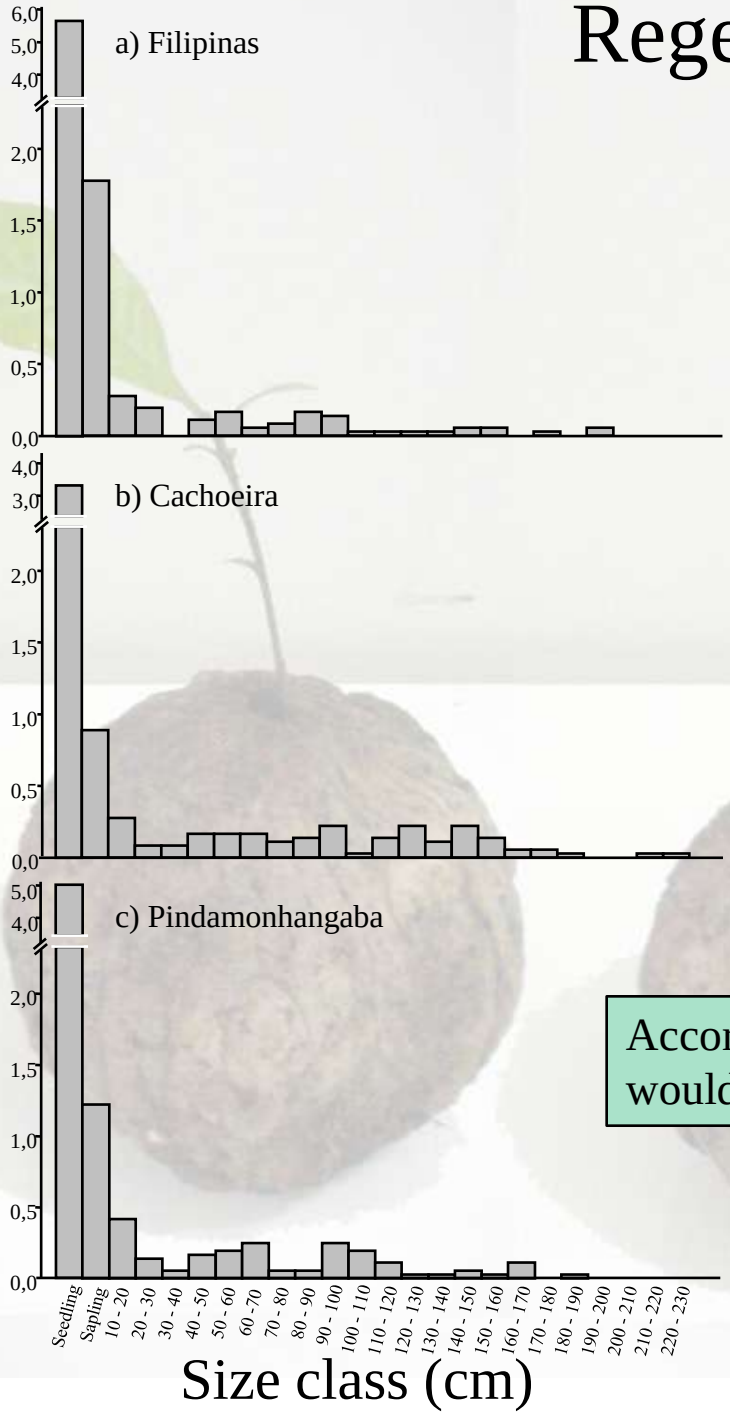
- Regeneration
- Fruit production
- Growth
- Strategies for intensified mgmt
  - enrichment planting
  - liana cutting
  - tending new recruits

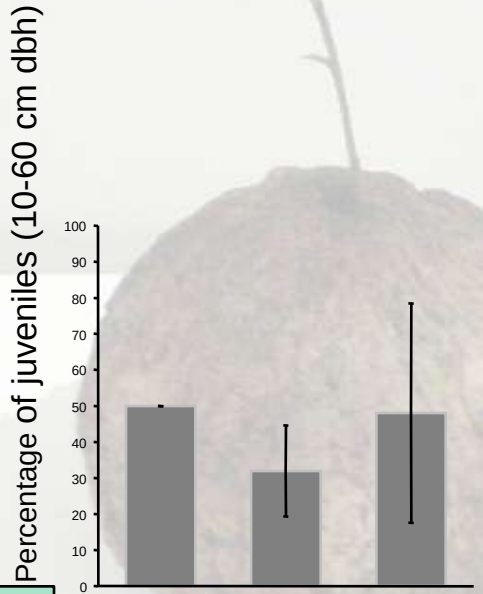




Regeneration

We found no evidence of an imminent demographic collapse in our sites.





According to Peres et al. (2003), would be considered:

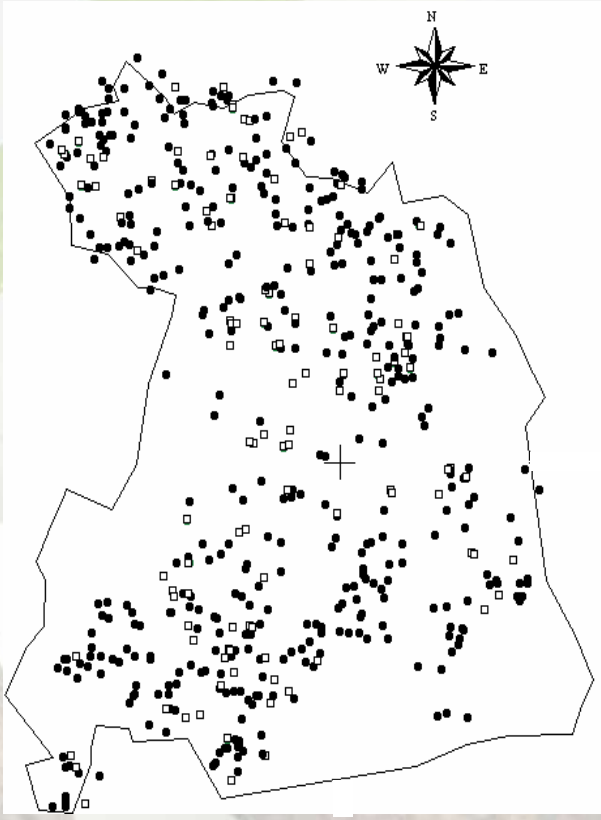
Unharvested

Lightly harvested

Wadt et al. 2008

How variable is fruit production?

At the population level?



140 trees > 50 cm dbh
over 420 ha

At the individual level?

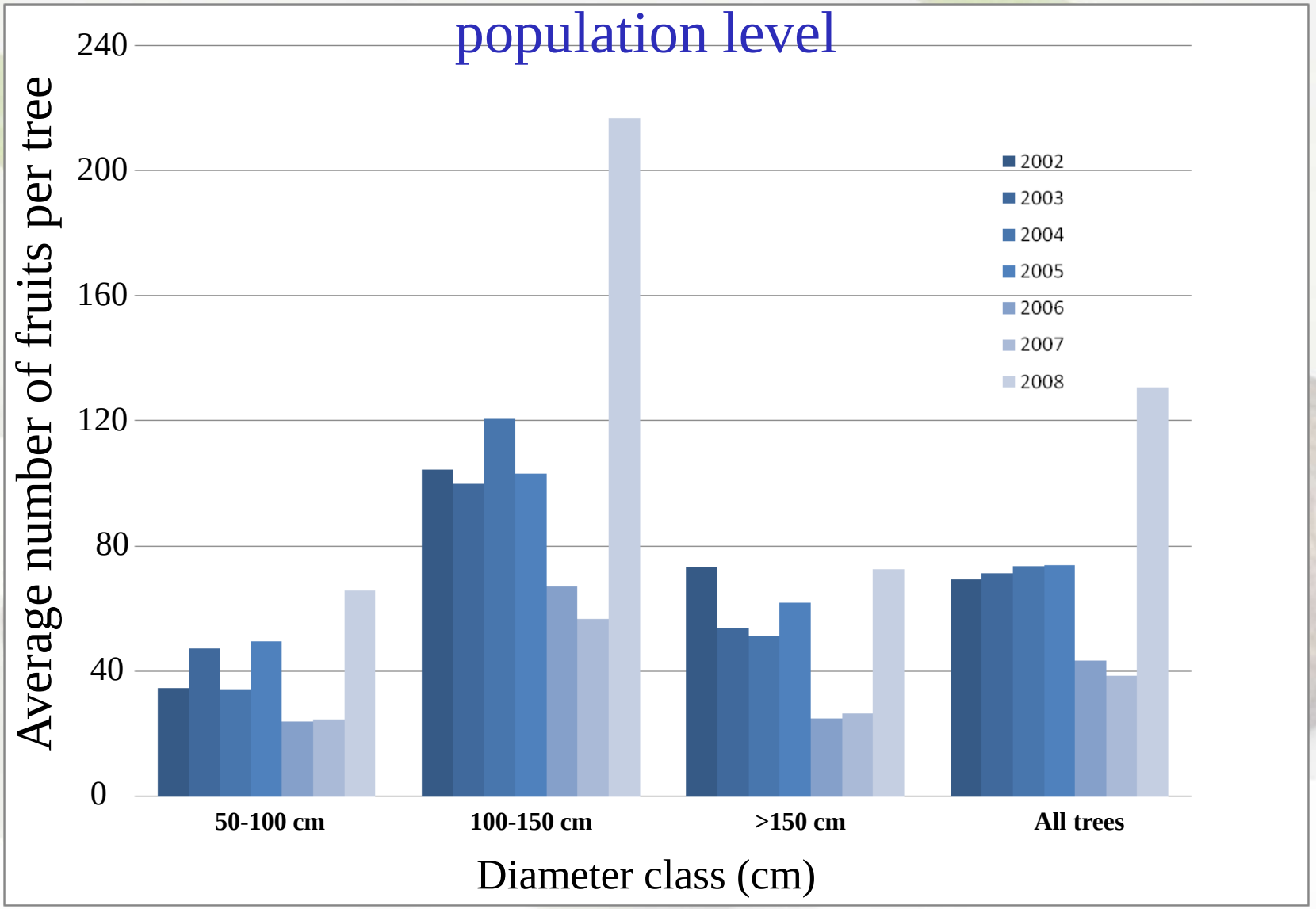
Fruit production annual variation

individual level

- Large individual variation
  - 140 fruits 1 yr, and 801 fruits the next
  - 11 trees always best producers
- Of 140 trees studied over 5 yrs:
  - 5 never produced
  - 19 didn’t produce in 3 of those 5 years
- Weak correlation between years → bi-annual

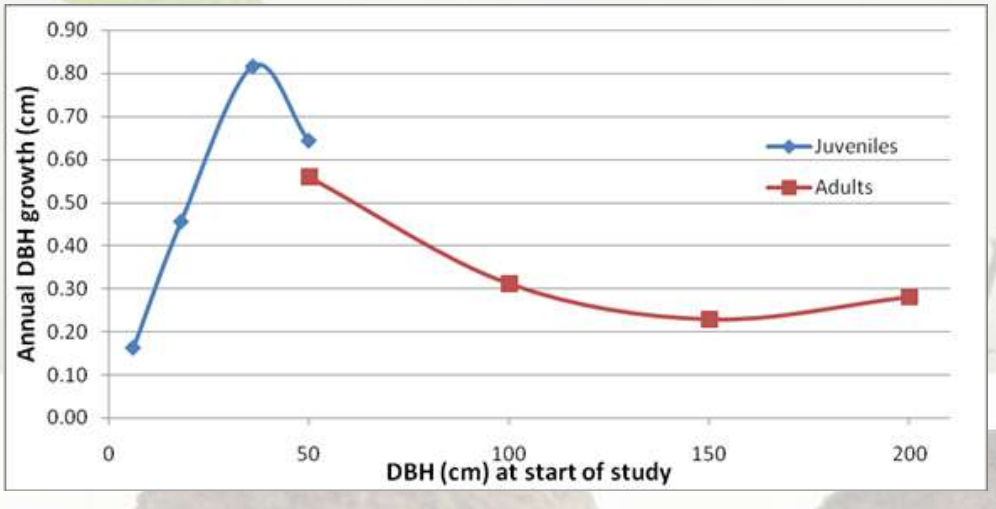
Kainer et al. 2007

Fruit production annual variation

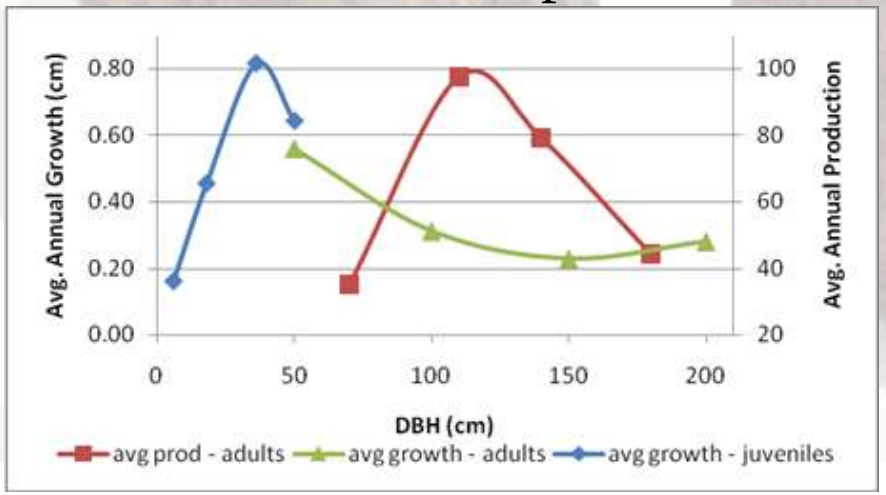


Diameter growth

Over life cycle



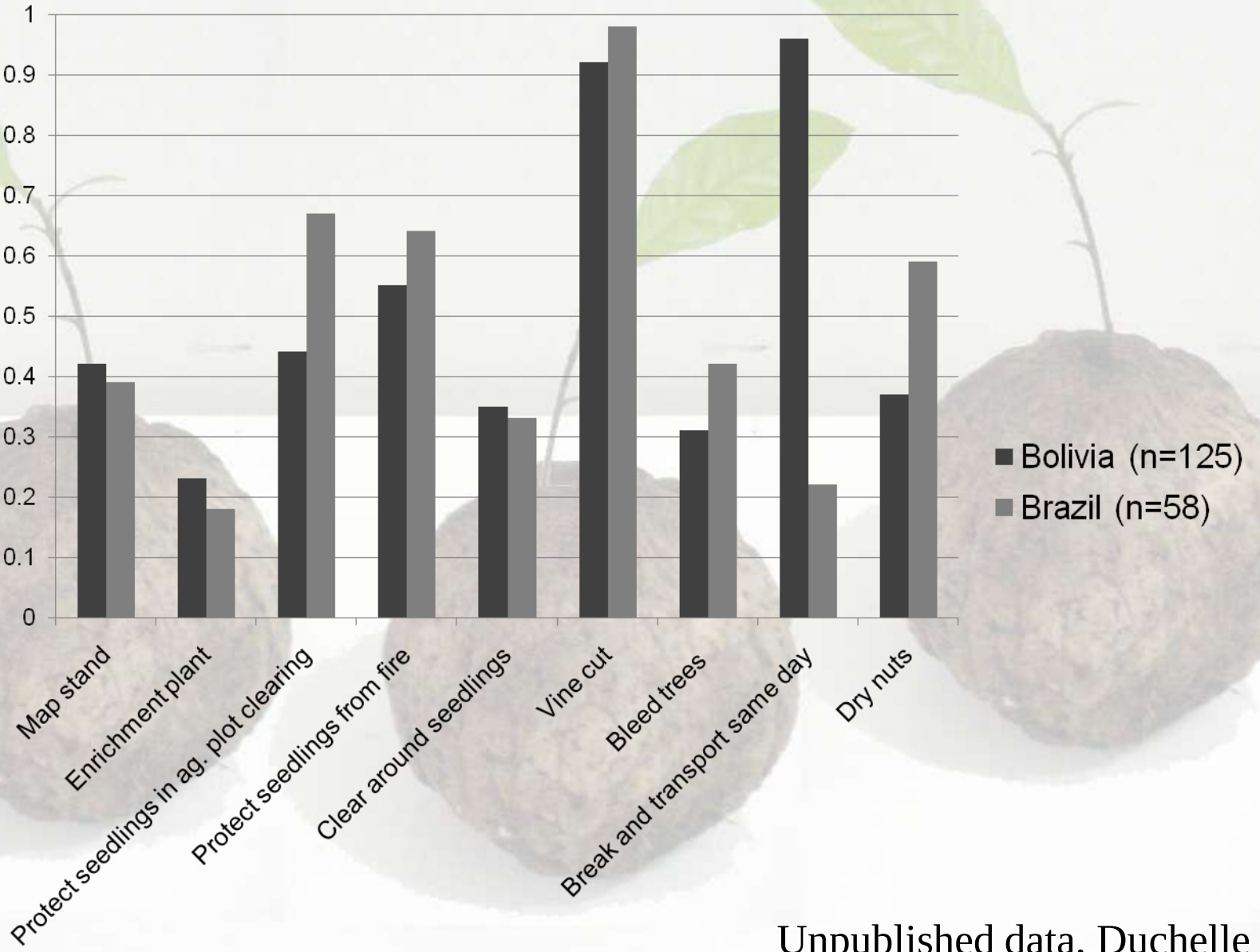
In relation to fruit production



Best producers in 100-150 cm dbh class were also best growers in that class.

Unpublished data, Wadt, Kainer & Staudhammer

How is Brazil nut currently managed?



Unpublished data, Duchelle

Can production be augmented?

Through enrichment plantings?

Through liana cutting?

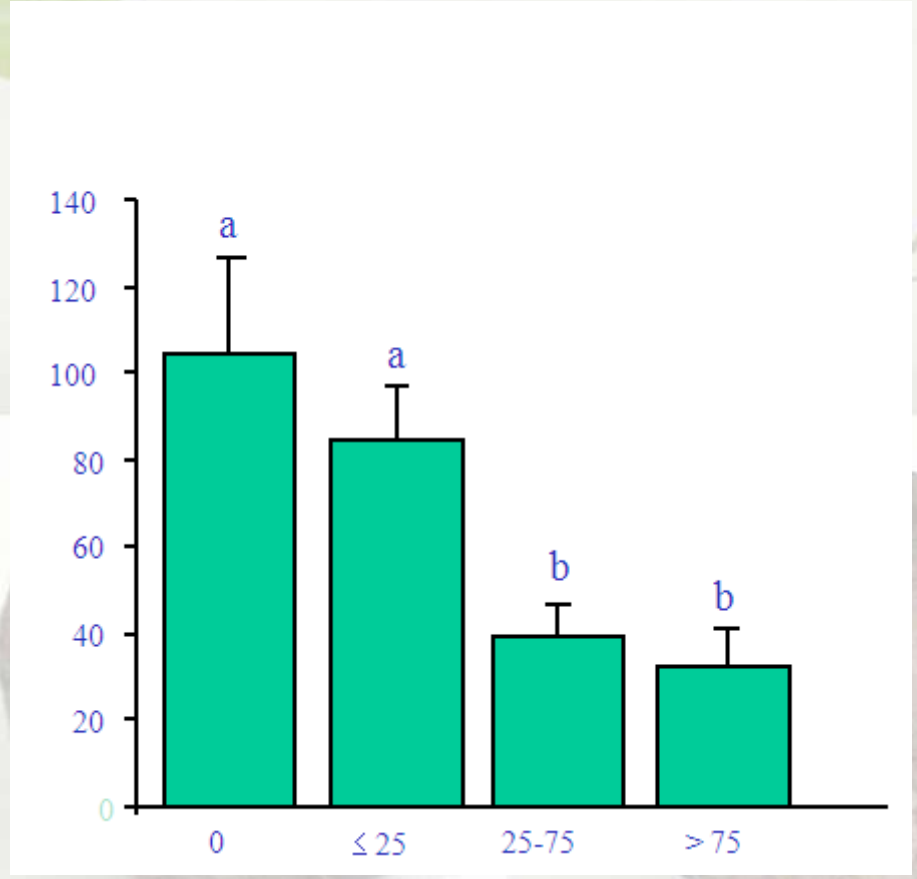
By tending regeneration?

Potential enrichment sites

Factors			
Environmental			
Light	limited	available	available
Water	limited	available	available
Nutrients	limited	available	abundant
Growth	limited	good	best
Socio-economic			
Additional labor needed	minimal	a lot	some
Compatibility	high	low	intermediate

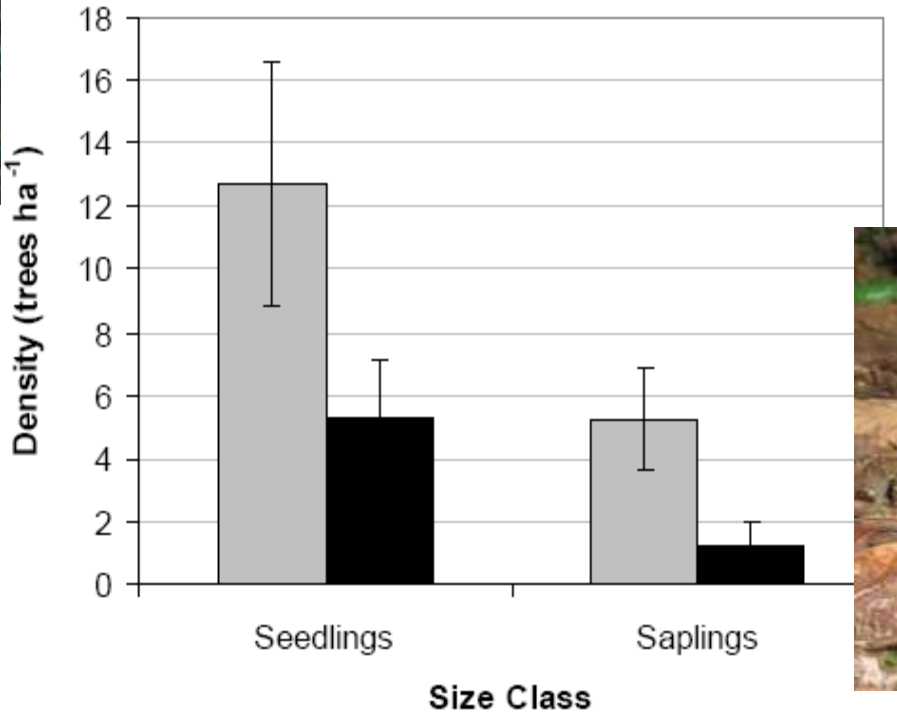
Kainer et al. 1998

Lianas affect fruit production



Kainer et al. 2006

Brazil nut regenerates better in fallow fields following shifting cultivation



Cotta et al. 2008

In our opinion, key constraints are not ecological, but socioeconomic

Best management practices (liana cutting, improved nut storage)…

…across tri-country region: Brazil, Bolivia, & Peru

Green, fair-trade & organic certification have emerged

Better prices for harvesters who practice better management