

Mapping and Modeling Land-use Change in the Andes: Integrating Global and Local Visions

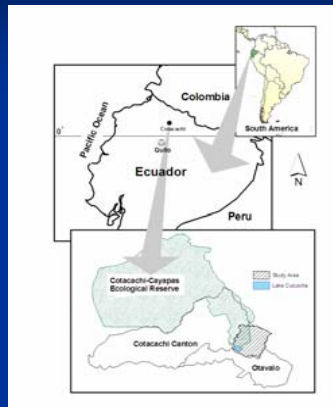
Robert Rhoades
University of Georgia

2005

Question

Land-use change (LUC) analysis is powerful scientific tool for natural resource management. **However**, can LUC results have meaning for local people within their spatial-cultural lives?

SANREM Andes Research Area



SANREM Andes Research Framework

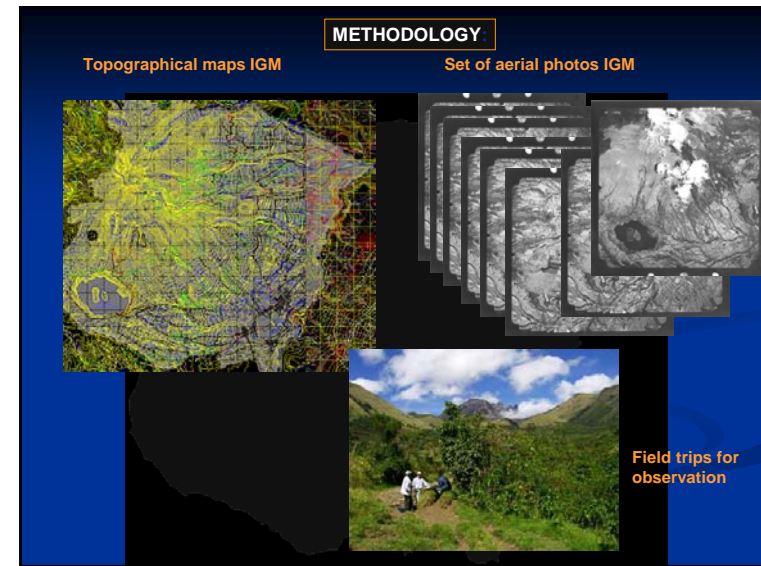
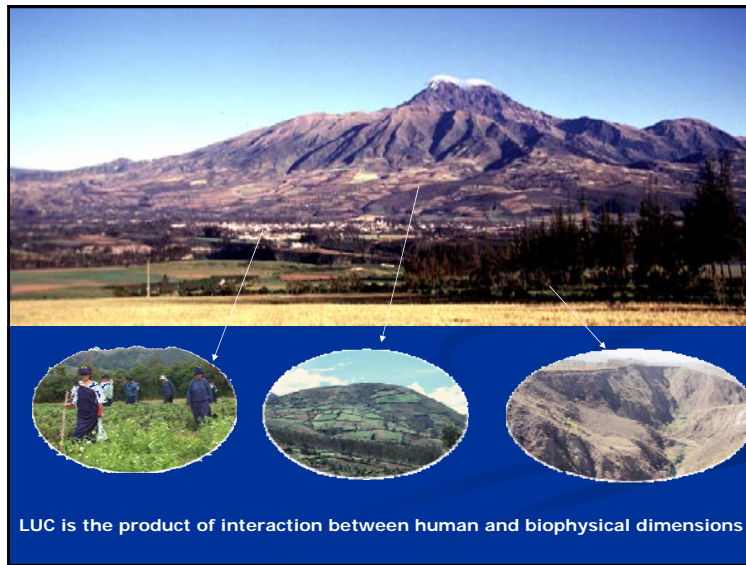


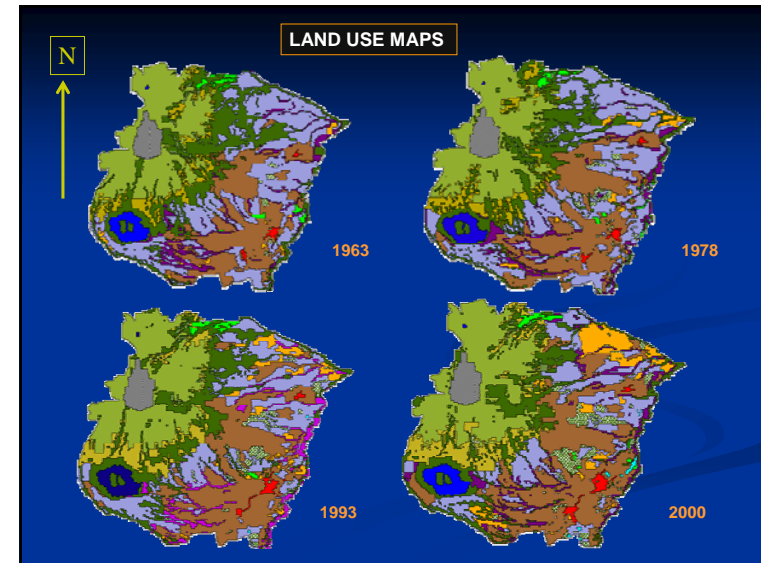
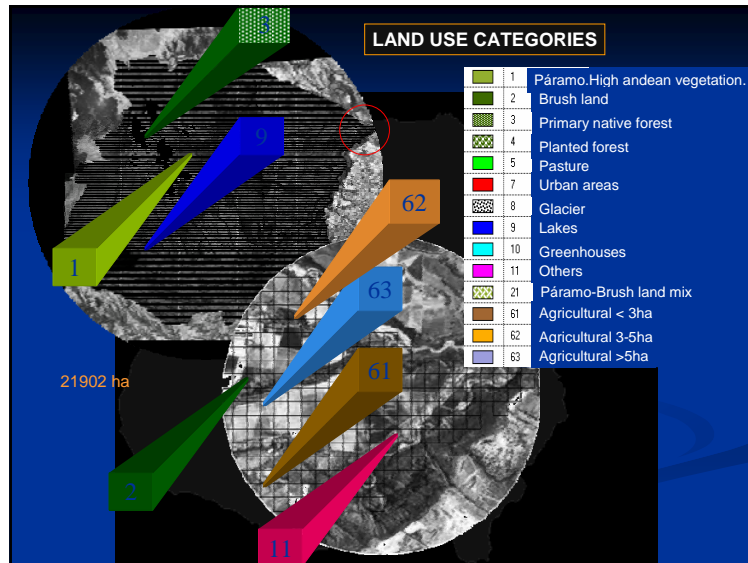
Future Visioning Methodology

- Model Scientific View of LUC (1963-2030)
- Elicit Indigenous View of LUC
- Contrast Scientific and Local “visions” and “futures”
- Dialogue and debate for planning

Land-use Change Analysis

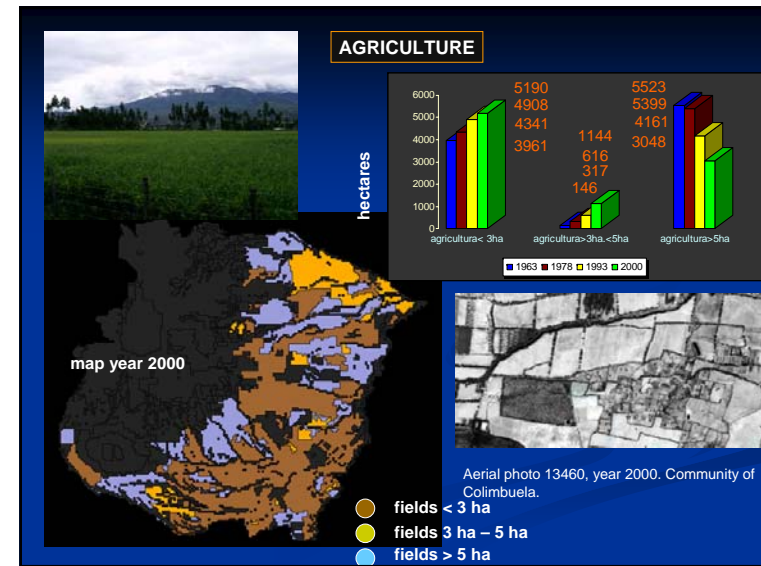
- **Uses** spatio-temporal techniques (GIS, mapping/ modeling, remote sensing, aerial photo interpretation)
- **Measures** changes in human use/impact on land categories
- **Interprets** past and future changes in LU and their “human drivers”
- **Develops** policy interventions





Select Land Use Change

- Fields >5ha decreased: 5523ha to 3048ha
- fields 3-5 increased: 146ha to 1144ha
- Fields <3ha increased: 3961 to 5190ha
- Planted forests increased: 106ha to 906ha
- Urban zone increased: 83ha to 191ha
- Green houses increased: 0ha to 68ha





LAND USE CHANGE

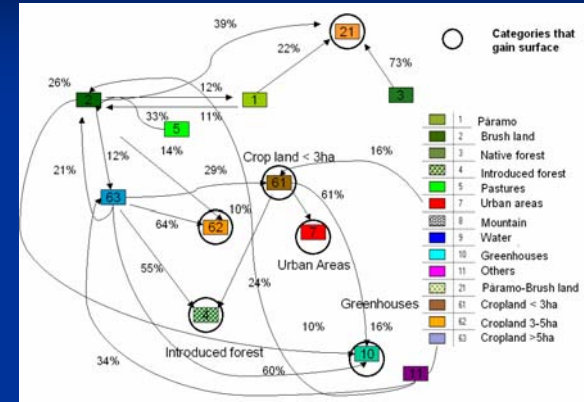
Hacienda Ocampo (photo 13460 year 2000)
Covered by eucaliptus trees.



Increased in
plantation forest

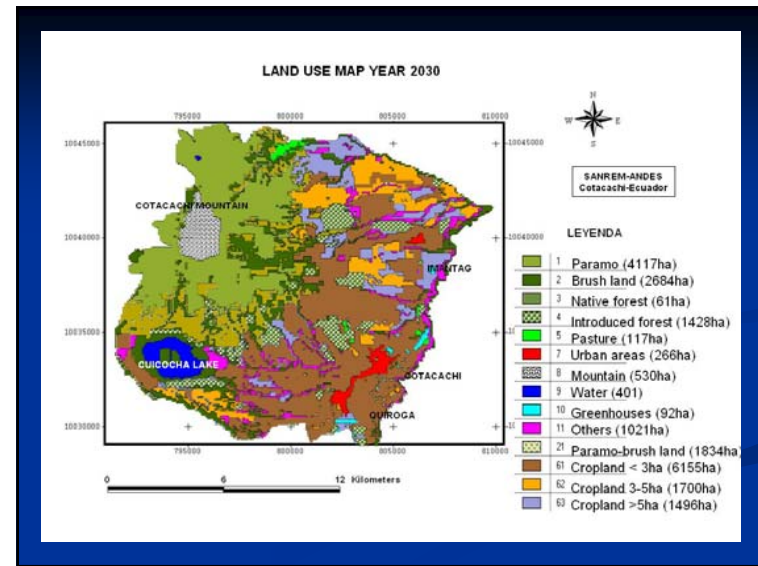
Hacienda Ocampo (photo 7723 year 1963)
Used for cultivation.

Dominant Land-use Change Trends in Cotacachi



Dominant Land-use Change Trends in Cotacachi

COD	CATEGORIES	1963 (ha)	2030 (ha)	% increase (+) or decrease (-)
1	Paramo	4096	4117	1
2	Brush land	4677	2684	-43
3	Native forest	137	61	-55
4	Introduced forest	106	1428	1247
5	Pastures	190	117	-38
7	Urban Areas	83	266	220
8	Mountain	530	530	0
9	Water	401	401	0
10	Greenhouses	0	92	0
11	Others	1093	1021	-7
21	Paramo-brush land	959	1834	91
61	Cropland < 3ha	3961	6155	55
62	Cropland 3-5 ha	146	1700	1064
63	Cropland > 5ha	5523	1496	-73
	TOTAL	21902	21902	



“It will soon be apparent that even through we gather together and look in the same direction at the same instant, we will not—we cannot—see the same landscape. Thus we confront the central problem: any landscape is compromised not only of what lies before our eyes but what lies inside our heads”

D.W. Meinig 1979



Different Concept of Time

“...In the Andean vision of the past, history is in front of observer and moves backwards toward the observer”

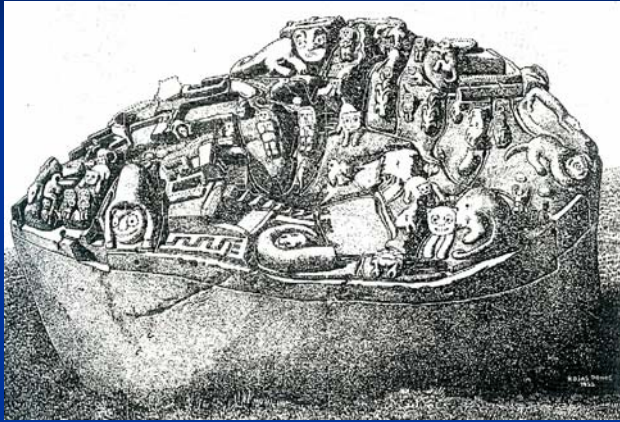
Rappaport NS: 721

In scientific LUC modeling, time is assumed to be linear and in front of us

Local Understanding of Images

- | | |
|------------------------------------|-----------|
| 1. LUC maps | Low |
| 2. Topographic Maps | Low |
| 3. Remote Sensing | Low |
| 4. DEM | Low |
| 5. Soils Map | Low |
| 6. Informant Maps | Moderate |
| 7. Aerial Photograph | Moderate |
| 8. 3-D Physical Model
“Maqueta” | High |
| 9. Panorama (photo) | Very High |

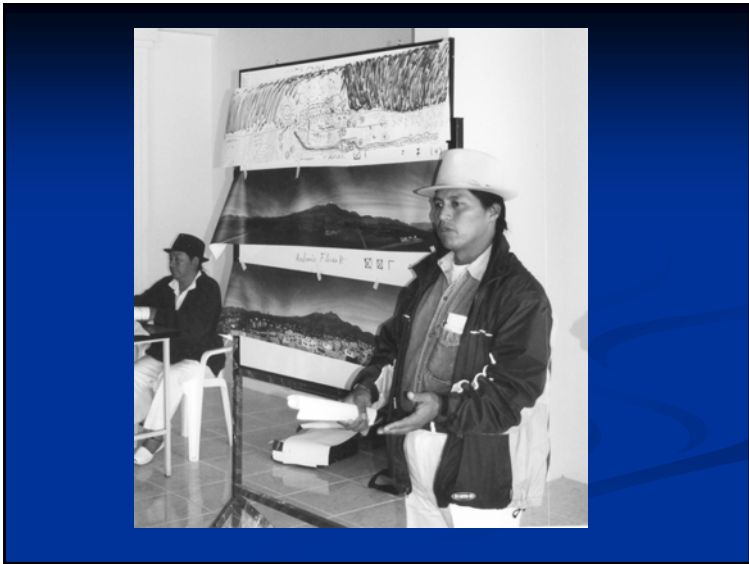
Sayhuite Carved Stone



Panoramic Scenarios

- 180 degree panoramic photo of current landscape
- Plausible scientific scenarios of past and future (1963 and 2030)
- People's own scenarios of past and future (1963 and 2030)





- ## Indigenous Landscape
- Cultural overlay (community, sacred places)
 - Vertical thinking
 - Holism
 - Contested areas
 - Andean time
 - Conserving traditions

Implications for Engaged Research

- Rethink cartesian science
- “The map is not the territory” (Gregory Bateson)
- Use local values for environmental decision making
- Recognize multiple “takes” among local people
- Design better methods for linking folk and scientific knowledge.