



# Use of Principal Components Analysis to Assess Cultural Models of Land Conservation



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## INTRODUCTION

Common pool resource users need to perceive rules as legitimate, not merely mandated from afar (Ostrom 2008).

Land conservation practitioners inevitably encounter a wide diversity of worldviews among their clients (Merenlender et al. 2004).

How do stakeholders make sense of diverse approaches to conservation of working lands?

## METHODS

Cognitive cultural model approach (Paolisso 2002)

- knowledge individuals have in their minds; assists in understanding their worlds (social and environmental)
- distribution of that knowledge among groups
  - Agreement: => “consensus-maker” category: knowledge shared within a cultural group
  - Disagreement: => “deal-breaker” category: differences between subgroups within the cultural system

Grounded in two diverse study sites

- Eastern: Eastern Shore of Chesapeake Bay, Maryland
- Western: Big Thicket Region, Texas

Qualitative in-depth Interviews

- to identify the range of cultural beliefs and values that stakeholders express (n = 100)
- diverse topics, i.e. land conservation, development, rural livelihoods, rural heritage, nature and community

Quantitative Survey

- Based on qualitative data, survey instrument designed to measure validity of cultural schemas associated with the words “land conservation.”
- principal components analysis of survey data (n = 746)
  - Rotated oblique components (40% of variation)
  - Structure matrix used to examine correlations of survey items with components

## RESULTS

Interpretation based on correlations

- **Component 1:** Land conservation is important and a moral imperative because it maintains the quality of life by protecting esthetically valuable sites from irreversible damage.
- **Component 2:** Land conservation is best accomplished through voluntary actions by landowners who are engaged in profitable production of natural resources (food, fiber, timber), thereby protecting economic assets for their families and communities, now and in the future.
- **Component 3:** A balance of humans' and nature's needs should guide land conservation such that it is integrated into community growth, by using adequate planning and appropriate technology to allow communities to meet economic and housing needs through active inclusion of all interested stakeholder groups in the decision making process.

Consensus-maker category

Survey Item	Component		
	1	2	3
1. People should use the land to meet their livelihood needs as long as it does not adversely affect the environment.	0.34		
2. We should conserve lands that most people would agree are beautiful, uplifting, or unique.	0.70		
3. It is important to conserve lands for recreation.	0.57		
4. Conserving land helps to maintain healthy ecosystems.	0.74		
5. Land conservation helps to preserve rural identity and character.	0.75		
6. Land conservation helps to sustain native plants and local wildlife.	0.74		
7. Land conservation provides environmental benefits such as clean air & water.	0.78		
8. Land conservation can preserve a landowner's equity and open spaces for environmental purposes.	0.77		
9. Development should occur in areas designated for growth.	0.55		
10. Local governments are integral to the success of land conservation efforts.	0.58		
11. Land conservation helps preserve the continuity of local communities.	0.78		
12. Land conservation is important to maintain quality of life.	0.80		
13. The purpose of conserving some lands is to provide income from food, fiber, and timber production.	0.38	0.41	
14. Land conservation can stem unwanted growth.	0.47		
15. Land conservation is about using resources wisely so they will be available to meet the varying future needs of diverse landowners & communities.	0.62		0.38
16. Some land needs to be conserved where nature can be allowed to flourish with little or no contact from humans.	0.61	-0.42	
17. Land is a source of income in times of family crisis.		0.47	0.36
18. Land is a resource to allow communities to grow to meet economic and housing needs.			0.68
19. Land conservation should preserve working lands (i.e., lands used to produce grain, livestock, timber, etc.) and open spaces.	0.52		
20. Land conservation helps preserve a "sense of place."	0.72		
21. Land conservation could be integrated into growth and development if political, social, and economic systems worked the way they were supposed to.	0.42		0.59
22. Successful land conservation efforts start with building trust and good working relationships among stakeholder groups.	0.50		0.51
23. Successful land conservation efforts cannot be accomplished unless all interested stakeholder groups are able to play an active role and participate in the decision-making process.			0.54
24. It is a moral imperative to conserve land.	0.70		
25. Land conservation should be integrated into growth and development.	0.45		0.53

Deal-breaker category

Survey Item	Component		
	1	2	3
26. Land conservation efforts should prioritize activities that help people make a living off of the land.		0.53	0.36
27. Land conservation efforts should prioritize activities that conserve ecologically unique or special areas.	0.63	-0.36	
28. Land conservation efforts should prioritize land that is threatened by development.	0.68		
29. Conservation is managing land for its highest and best use and that can change according to economic and social needs.		0.44	0.56
30. Wise use of land requires us to balance human needs and nature's needs.			0.57
31. If land conservation efforts are to be successful, voluntary approaches should be pursued over regulatory ones.		0.61	
32. More land could be conserved if land conservation programs did not require land to be preserved in perpetuity.		0.56	
33. The purpose of land conservation is to maintain the land's ability to provide a secure livelihood for communities now and in the future.		0.59	
34. Development can be a net positive for the environment, if planning is adequate and appropriate technologies are used.			0.60
35. Conservation at all costs is unreasonable. Some costs cannot be tolerated.	-0.36	0.44	0.36
36. Humans are the dominant species and meeting our needs should be a priority.	-0.38	0.64	
38. The profitable production of natural resources (food, fiber, timber) is the best way to conserve land.		0.76	
39. Natural resource producers of food, fiber, and timber are the best land conservationists.		0.77	
40. Land is finite and damage to it can be irreversible, therefore we must protect it from over-use and abuse.	0.65	-0.32	
41. Mother Nature is pretty tough and if we let her alone, she will come back even after disturbances such as clear cutting, over grazing, or hurricanes.		0.36	
42. We do not have the right to negatively impact other species.	0.48	-0.39	
43. Preserving environmental resources is more important than preserving working lands (i.e., lands used to produce grain, livestock, timber, etc.).	0.34	-0.53	
44. More land would be preserved through profitable farming than through the purchase and donation of land conservation easements.		0.62	
45. It is unfair to take away a landowner's development rights without adequate compensation.		0.77	
46. Land use decisions should be primarily governed by landowners.	-0.35	0.52	
47. Land is an economic resource, like other financial assets, that can be used to meet the short- and long-term financial needs of its owners.		0.66	
48. Land conservation limits land values.	-0.38	0.47	
49. Land conservation may limit a landowner's ability to use his/her land in a way that is necessary to meet his/her short- and long-term needs.	-0.33	0.35	

## DISCUSSION

To better manage biodiversity within working landscapes, we need a deeper understanding of the landowners who donate or sell easements to land trusts. This cultural model approach suggests the need for a fuller understanding of the meaning of conservation lands within a broader context, including those who do not consider land easements as an appropriate conservation tool.

Our quantitative results suggest that the cognitive representation of “land conservation” is not homogenous. Diverse stakeholders make sense of land conservation in at least three dimensions that are correlated and not mutually exclusive.

## CONCLUSION

We show how integration of quantitative and qualitative data can help unpack the complexities inherent in how people reconcile “using” and “protecting” land, especially when land is valued as property by some and by others as a basis for ecological services that benefit a broader public.

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