Title
Introduction: Primary Food Producers, Climate Change, and Cultural Models of Nature

Journal
World Cultures eJournal, 22(2)

Author
Bennardo, Giovanni

Publication Date
2017

Introduction: Primary Food Producers, Climate Change, and Cultural Models of Nature

Giovanni Bennardo, Northern Illinois University, DeKalb, IL

Introduction

Climate change is one of the most challenging issues we collectively face insofar as it threatens the survival of our species. Before long, extensive action will have to be implemented worldwide to minimize its potential and disastrous effects (such actions have already been initiated in the last two decades). The populations keenly aware of and most at risk from the effects of climate change are obviously those whose livelihood depends on daily contact with the changing physical environment. Primary food producers best represent these populations: farmers, fishermen, herders, and hunter-gatherers. Of course all humans are at risk and we will eventually be obliged to change our behavior to make our presence on the planet sustainable (see Moran, 2006, 2010). However, primary food producers' daily and close contact with the environment makes them most directly affected by climate change. Besides, they will likely be asked to implement whatever new and/or radical remedial policies are proposed. Before carrying out any strategies directly impacting these populations, it would be prudent to understand their Cultural Models (from now on, CMs) of Nature.

All primary food producers hold views—mostly out-of-awareness (Kempton, 2001), as most of our knowledge is (e.g., knowledge about language)—about nature and the environment, particularly in terms of how they are affected by and must adapt to changes in the latter. Such out-of-awareness knowledge structures are typically called cultural models (Holland and Quinn, 1987).

One of the most widely accepted ways of understanding the organization of knowledge in the mind is that of mental models (Johnson-Laird, 1980, 1999). When a mental model comes to be shared within a community, then one calls it a "cultural model" (Holland and Quinn, 1987; D'Andrade, 1989; Shore, 1996; Strauss and Quinn, 1997; Quinn, 2005; Kronenfeld, 2008; Bennardo, 2009; Bennardo and De Munck, 2014). These out-of-awareness mental structures are used to make deductions about the world, to explain relationships in a causal fashion, and to construct and interpret representations from simple perceptual inputs to highly complex information. Importantly, they can also motivate behavior (D'Andrade and Strauss, 1992; Kempton, Boster, and Hartley, 1995; Atran and Medin, 2008), or more precisely, contribute saliently to the generation of behavior. In other words, we use CMs to make sense of the world around us and at the same time they provide the basis out of which we plan our behavior (see also Paolisso, 2002).

A CM of Nature[1] must minimally include a number of relationships (e.g., associative, co-occurring, and mostly causal) between fundamental and constitutive categories such as plants, animals, physical environment, weather, people, and the supernatural. Causal relationships may be intra-categorical (e.g., between people, between animals, etc.) or cross-categorical (e.g., between people and animals, between animals and plants, etc.; see Atran and Medin, 2008). These causal relationships contribute to a large part of what constitute reasoning about Nature.

Even though they are shared, cultural models are not necessarily distributed uniformly within a population/community. Thus, after discovering a model, it becomes imperative to explore its level of sharedness within the communities, i.e., cultures, under investigation and the degree to which it differentially motivates people to act (Kempton and Clark, 2000; Gatewood and Lowe, 2008).

On March 12-14, 2015, at the Biblioteca Frinzi (Frinzi Library) of the University of Verona, Italy, a workshop was held entitled "*Local Knowledge and Climate Change: Fieldwork Experiences.*" The workshop was organized by Giovanni Bennardo (Northern Illinois University) and Anna Paini (University of Verona, Italy) and was sponsored by the National Science Foundation (NSF), and by the Dipartimento TeSIS and the Biblioteca Frinzi, both at University of Verona, Italy. Twelve scholars from American, European, and Chinese institutions participated to the workshop. They reported on extensive (5-10 weeks) fieldwork conducted in communities in twelve countries on five continents (see Figure 1): China, Ecuador, Japan, Kenya, Italy, Lithuania, Namibia, Pakistan, the Philippines, Poland, the Kingdom of Tonga (Polynesia), and the United States.[2] The workshop participants pursued deeper understandings of the CMs of Nature held in these communities and proposed to continue in the near future their attempt to understand the distribution of such models within the targeted communities.

Figure 1: Field Sites

The workshop represents a milestone for the project, "Cultural Models of Nature Across Cultures: Space, Causality, and Primary Food Producers." This project started in September 2011 with a first NSF-sponsored 3-day workshop whose results were published as Working Paper of the ESE Institute at NIU and titled *Proceedings of Workshop: Cultural Models of Nature and the Environment: Self, Space, and Causality* (Bennardo,

2012). In June 2013, the resulting research proposal was funded by NSF.[3] During summer 2014,[4] the scholars involved in the project conducted field research at their respective field sites and, once back at their institutions, systematically processed and analyzed the data. These collection of papers contains most (8) of the results of the analyses presented and discussed in the workshop at the University of Verona.

The Research Project

The NSF-sponsored research project entitled "Cultural Models of Nature Across Cultures: Space, Causality, and Primary Food Producers" is investigating CMs of Nature across several cultures held by populations/communities of primary food producers such as farmers, fishermen, herders, and hunter-gatherers. Evidence suggests that CMs of Nature influence environmental actions in ways not necessarily predicted by more traditional ecological models (see Kempton, Boster, and Hartley, 1995; Atran and Medin, 2008). While traditional ecological knowledge typically tends to freeze knowledge in the past, CMs affect attention, observation, reasoning, and understanding and therefore engage with the current situation.

A significant characteristic of this research project is the use of a consistent methodology—for data collection and for data analysis—by all the scholars. The advantage of this strategy is that the results will be comparable across all the communities/cultures investigated.

Data Collection. The research project's twelve scholars and three graduate students have conducted field work and are each experts in the particular cultural area where they collected the data necessary for discovering CMs of Nature. The data were collected using a variety of methods that aimed at obtaining three types of data: ethnographic, linguistic, and experimental. While all researcher have conducted long-term ethnographic work in the community they focused on, in returning to the field, they first engaged in nature walks (for a fishermen it would be a fishing expedition, e.g., a night/day out at sea) and open-ended interviews about changes in the environment, including climate change. These two activities represent a way to start focusing on the language, concepts, and experiences about food producing that might not have been the focus of previous experiences by the researchers.

The linguistic data was collected primarily by semi-structured interviews. The questions to be asked by every researchers were agreed on at the above mentioned Workshop at NIU (Bennardo, 2012: 126). Most of the questions are about daily activities, i.e., food producing, and they intend to require the unconscious activation of the locally held CM of Nature in order to be answered (see Appendix 1). Each researcher slightly adjusted the questions to fit one's field site community cultural norms.

The tripartite methodology includes also the acquisition of experimental data. The first part of these data was acquired by means of free-listing tasks—other experimental tasks will be conducted in the second phase of the research project. The free listing tasks were conducted about the etically-chosen six major components of Nature: plants, animals, physical environment, weather, humans, and the supernatural. Each scholar in the field modified these components to reflect local emic categorization strategies. All the free listing tasks were audio- and/or video-recorded.

The data-collection activities were administered to a sample of each community population. The sample was obtained by keeping in mind parameters such as age, gender, kinship relationships, education, occupation, and religion. Where possible, all the interviews were video-recorded and later transcribed with the help of native speakers.

Data Analyses. The scholars first analyzed the results of the nature walks and open interviews, thus, obtaining a first insight into the focused on CM of Nature. Then, they analyzed the transcriptions of the semi-structured interviews using a combination of the following: gist analysis, key words analysis, semantic role analysis, metaphor analysis (including source/target analysis), reasoning analysis, and causality analysis. A first hypothesis about the local CM of Nature was advanced taking into consideration the results of these linguistic analyses.

The results of the free-listing tasks were analyzed to discover the frequency of each item mentioned in all the lists obtained. The assumption behind any free listing task is that 'first listed' items stand for 'more salient' items. These results will be used in the second phase of the research project to administer sorting tasks and rating tasks and then refine the first hypothesis. In the sorting task, the most salient content of each list[5] would be presented to a sample of the community and each individual would be asked to group the listed items according to (emic) similarity-dissimilarity parameters. For the rating task, list items will be presented and informants will be asked about their relationship/s, e.g., is animal X helping or damaging plant Y? The results of this task should provide insights towards a deeper understanding of the causal structure that holds together the various components of the CM of Nature.

The methodological trajectory will be concluded by the construction and the administration of a questionnaire reflecting the newly hypothesized CM of Nature to possibly discover a consensus about it in the community. Thus, the consensus analysis should obtain a poignant verification of one's hypothesis.

Relevance of the Findings. The preliminary findings of the research project reported here provide insights in three major areas:

1. The various CMs of Nature suggested should enrich the already conspicuous literature about cultural models (e.g., Holland and Quinn, 1987; Kempton, Boster, and Hartley, 1995; Shore, 1996; Strauss and Quinn, 1997; Quinn, 2005; Gatewood and Cameron, 2009; Bennardo, 2009; Bennardo and de Munck, 2014);
2. The tripartite methodological trajectory implemented by the researchers reflects the suggestion by Bennardo and De Munck (2014: 286) about it being the necessary procedure to discover CMs (see Figure 2). The quality of the results of the various projects should support that suggestion.

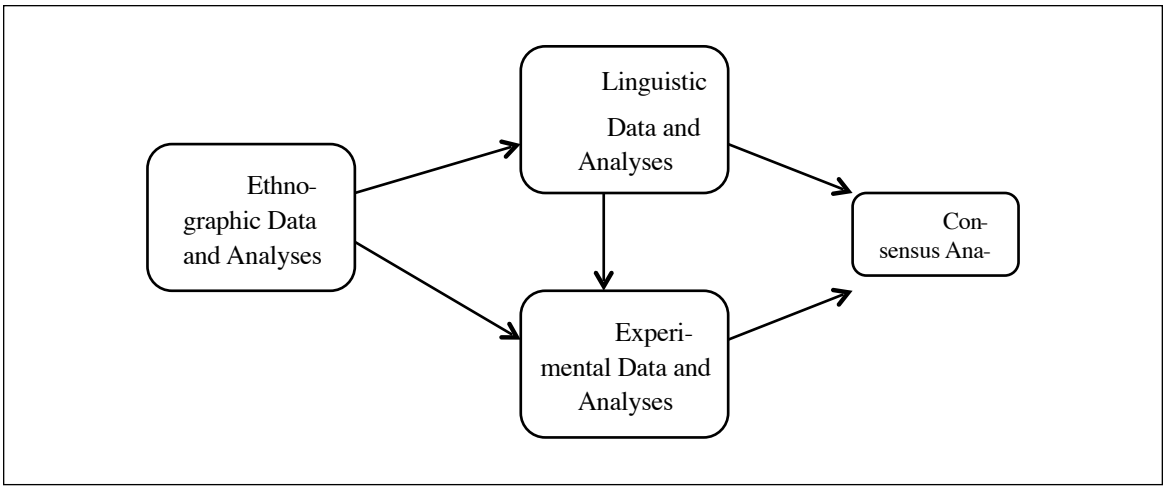

Figure 2: Methodological Trajectory (from Bennardo and de Munck, 2014: 286)

3. Policy makers, that is, major actors in finding solutions to climate change-induced problems, should benefit from the information on indigenous/local CMs of Nature. This information should assist them in their decision-making (see Kempton, 2001; Lauer and Aswani, 2009). In fact, we are convinced that CMs of Nature contribute to the generation of a variety of behaviors in response to environmental changes in food-production communities worldwide. Taking this knowledge into consideration is essential for the planning and implementation of any successful intervention projects in climate change-affected areas.

Causal Models and CMs of Nature

The authors in this Special Issue hypothesize a variety of CMs of Nature found in the communities investigated. These CMs represent specific organizations of the etically suggested constitutive categories underlying the concept of Nature, that is, plants, animals, physical environment, weather, humans, and the supernatural. Causal relationships are one of the major forces weaving together these categories. When presenting hypotheses about a CM of Nature in the communities investigated, many scholars make reference to and at times refines one or more of the three causal models suggested by Bennardo (2014) as possibly characterizing the internal causal structure of CMs of Nature (see also Sloman, 2009; Rips, 2014).

The three causal models suggested in Bennardo (2014) are the holistic model (see Figure 3), the God-centered model (see Figure 4), and the human-centered model (see Figure 5).

The holistic causal model in Figure 3 is based on "The Probability Distribution" of the various components of the "World." The model is graphically represented by the box labeled "The Graph," i.e., the concept of Nature, that includes all these components, insofar as no clear separation among them is conceived as probable.

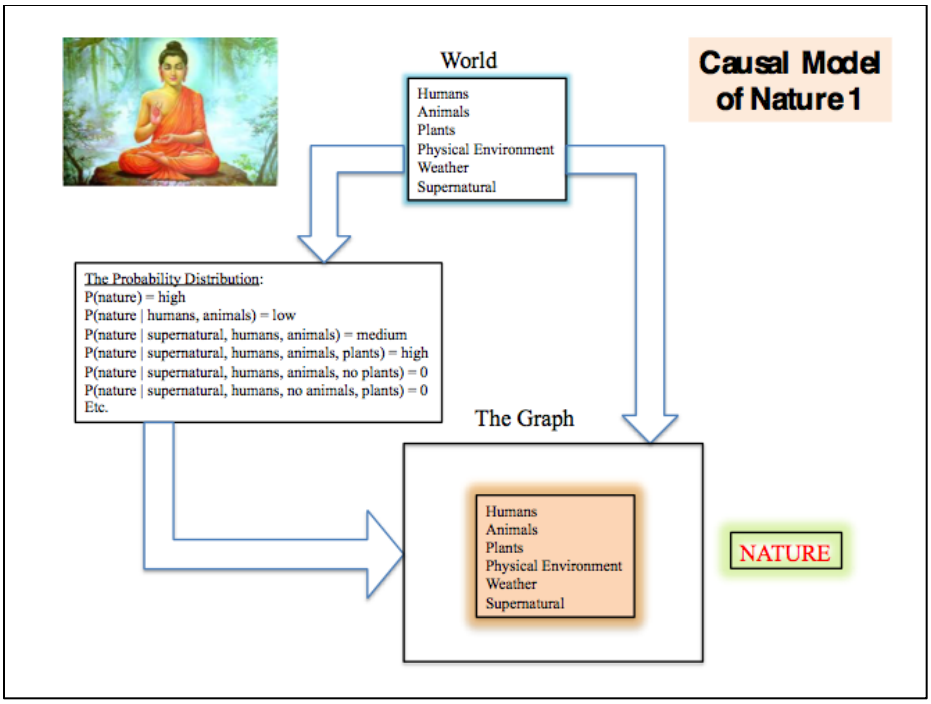

Figure 3: Holistic CM of Nature (1) (from Bennardo, 2014)

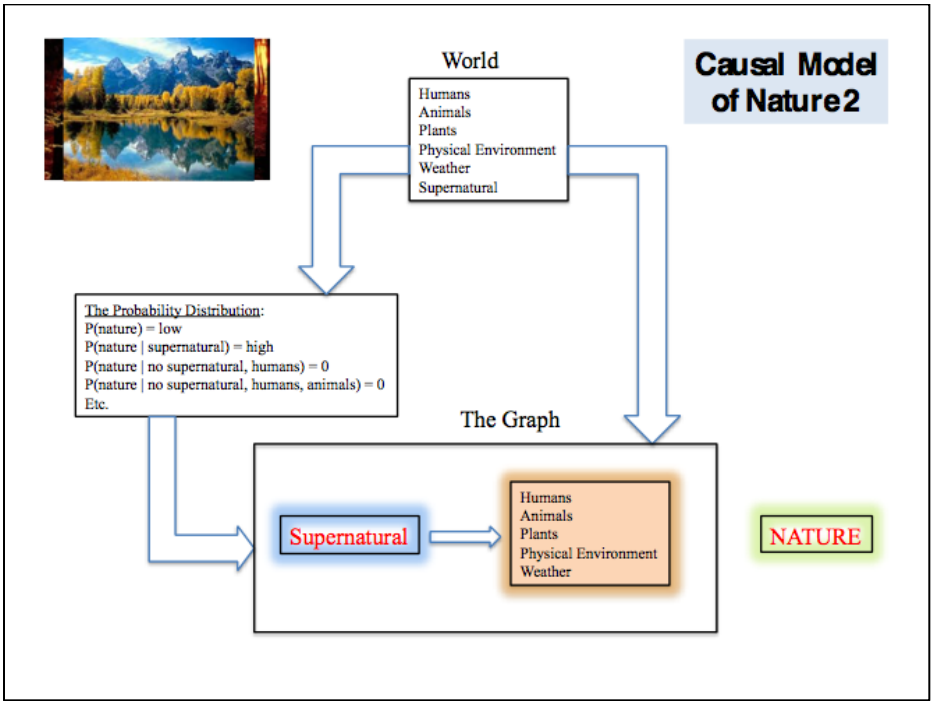

Figure 4: God-Centered CM of Nature (2) (from Bennardo, 2014)

The God-centered causal model (see Figure 4) is based on a different probability distribution. The graphic representation makes clear that the "Supernatural" component of the "World" is separate from the other components when the concept of Nature is constructed.

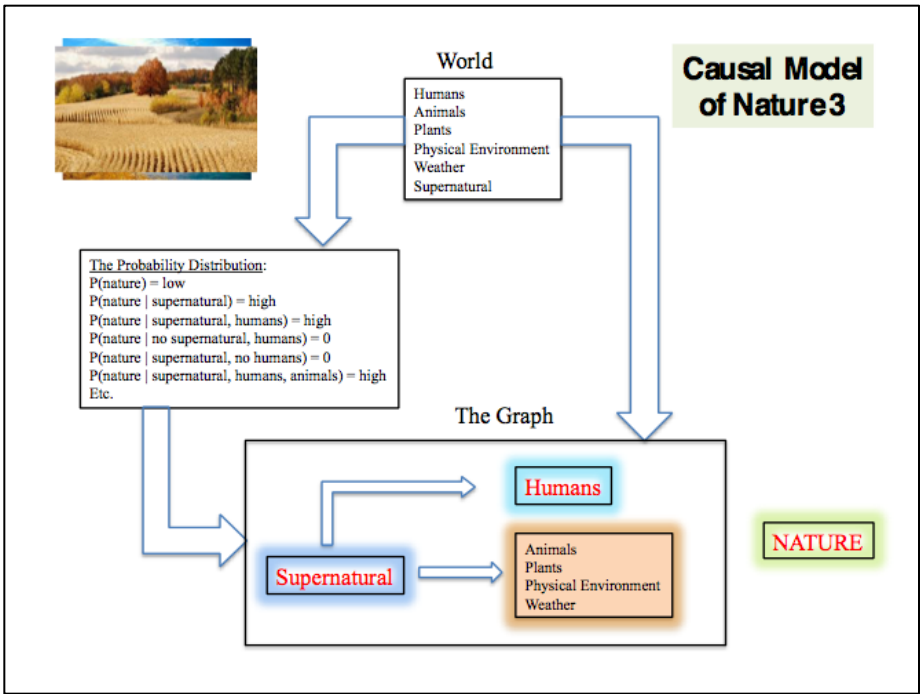

Figure 5: God and Human-Centered CM of Nature (3) (from Bennardo, 2014)

The God and human-centered causal model (see Figure 5) is based on a third type of probability distribution. This time, the graphic representation makes clear that not only the "Supernatural" but also the "Humans" component of the "World" is separate from the other ones when the concept of Nature is constructed.

The Articles and the Hypothesized Cultural Models of Nature.

The articles in this Special Issue are presented in alphabetical order by author. Each researcher introduces first the field site, i.e., the community within which the collection of the data was conducted. Then, the methodology used is introduced in detail. Later, the results of the analyses on the data collected are introduced and discussed. Finally, the authors conclude their piece by advancing a hypothesis about the CM of Nature discovered within the community investigated.

Before introducing a list of the various CM of Nature hypothesized by the authors in their articles, I want to point out that a number of commonalities emerged among the findings. First, members of all the community investigated perceived changes in their climate change-affected environment. Second, these changes were typically explained 'locally' and rarely related to 'global' causes. And third, many of the CMs of Nature contained internal contradictions and often the researchers indicate the presence of two or more CMs used within individuals or across individuals in any specific community.

Bennardo hypothesizes the following content of the CM of Nature for Tongans: 1) *Physical environment, weather, plants, humans, and animals belong together*; 2) *humans belong with the above, but they may act on it and change;* 3) *Supernatural/God is not separated from nature, it is everywhere and also Supernatural/God is separated from nature, it masters nature*.

This preliminary hypothesis contains some issues that need to be pointed out. First, the internal relationships among the elements making up nature—excluding humans and the supernatural—need to be investigated further. The role of animals, i.e., mammals, has been talked about very little, except for that of pigs. Similarly, the relationship between fish, birds, and mammals with plants, weather, and physical environment has been under addressed and thus requires more attention in the future.

Second, there is a contradiction in the model regarding the relationship between God and all the other components of Nature and it needs to be clarified. The immanence of the supernatural is contrasted to its 'separation' that allows 'causing' within the expressed 'commanding.' At the same time, humans too appears to be treated as 'separate' from the other components and thus thought of as capable of acting on and changing them (excluding the supernatural).

Third, in pursuing a resolution to the above stated issues, it would be useful to keep in mind the Polynesian (and Tongan) traditional concept of *mana* or 'vital force.' This concept was and is deeply related to a conceptualization of all the components of Nature as holistically related. The persistence of such way of thinking in Tonga has been widely documented in spite of 150 years of Christianity (see Bennardo, 2009, p. 188-89)

De Munck's analytical emphasis—while using the same methods as others—has been on free list and interview data. From the results of his analyses it is feasible to posit that the basic cultural model of nature by Lithuanian farmers is that:

> *Nature it is a force that is often unpredictable, it is changing, it can give what the subject (the farmer) wants if it is (a) not too unpredictable, and (b) the farmer has adequate experience and knowledge to make good decisions; and (c) the bureaucracy does not sink the farmer under paperwork and regulations. The farmer does not consciously respect or worship nature; she considers how s/he will plan, prepare and work on or with nature in order to obtain a good yield (of milk, meat, grain, vegetables, fruits).*

What is important about the cultural model of nature as described above is that it is a powerful whimsical force that gives health, food—in other words, life—to people. Humans are all in a permanent relationship with nature; farmers are in a more complex relationship because they are agents contesting nature which is also agented and more powerful than they are. Only through continual effortful work, knowledge, experience, and adapting to changes can the farmer obtain what s/he wants from nature. Nature does not obtain anything from humans, but humans can damage nature through pollution, chemicals, trash, and destructive actions. The farmer's concern with nature is largely functional and relational and this perspective guided my own analysis

Jones reports that during the 2014 field season, in discussing changes in agricultural practices in eastern Cotacachi county (Ecuador), the dominant theme was that the soil no longer produces like it used to, specifically due to: a greater lack of water, more extreme weather (e.g., heat, cold, rain and wind), an increase in microbial and insect pests, and shifts in the timing of the weather. Nearly all informants stated these changes were due to human behaviors—such as pollution from factories and cities, use of agrochemicals, waste disposal, and generally not treating Mother Nature well—and/or recent deficiencies in human morality like laziness, egotism, poor teaching of children, and poor relationships with others. Urbanites and the Christian God are conceived by many as outside of nature, while plants, animals, most spirits, environmental features, rural dwellers and climate are part of nature. Mother Nature is a distinct component or part of nature but sometimes is one-and-the-same with any of the other components. Two questions emerge from this CM. First, how fluid is the switching of humans, God and some spirits from outside of nature to inside of nature or vice versa? This fluidity may allow flexibility for people to maintain traditions while adapting to contemporary demands for continuity in family and even community. This may also result in cognitive dissonance. Second, to what degree are there bi-directional relationships and causality among these components of nature in this CM. The thematic analysis resulted typically in unidirectionality between related components, but is this the way this group of people tends to think? How much bidirectional causality is there in this CM of Nature and the CMs of Nature of other primary producers around the world?

Lyon and Mughal suggest that from preliminary analysis the most widespread model of the natural world for farmers in Attock District, Punjab involves a powerful supernatural domain, which includes Allah, as a sole God, plus, various non-human spirits or *jinn*, who can be both benign and malicious, and a bewildering array of spiritually powerful saints to whom individuals can pray and seek some form of intervention. Results indicate possible biases towards practical knowledge required for successful food production. Local causal models of climate change, while in some ways at odds with global scientific explanations, nevertheless invoke human causation but incorporate both technical and moral explanations. For local farmers, the mechanism for disrupting rains, in particular, is rooted in the omnipotent Allah who has the power, and authority, to deprive humans of rain or flood them with excessive rain at will. He does this because he is angry about the behavior of humans. The dominant reason given for Allah's anger is urban immorality being adopted by rural people.

Paini, with the collaboration of **Bennardo**, suggests the following initial components of a CM of Nature for the Dolomitic community they investigated: 1) A reciprocal relationship between humans and woodland, this latter being a mixture of physical environment and plants—if humans take care of woodland, woodland gives back to humans; 2) A reciprocal relationship between woodland and wild animals—increased woodland fosters the presence of more wild animals; 3) A unilateral relationship between weather and agricultural produce (plants) and human activities, that is, weather affects these latter, but these latter do not affect weather.

Shimizu starts by stating that the Japanese word for nature, *shizen* (自然), has two basic meanings: to be "natural," i.e., to be "spontaneously or naturally so" (Tucker, 2003, p. 161); and that which pertains to the natural world, i.e., the environment and creatures in it (Tucker, 2003; Shimizu, 2012). Accordingly, he generates a hypothesis about what constitutes "natural" (meaning 1) ways to produce foods via "nature" (meaning 2). Using both meanings, he proposes a CM in which he states that "nature" is not "natural" until it is "humanized." An analogy here may be that of creating a *bonsai* tree, the art of producing miniature trees that "mimic" the way they "naturally" grow. This view contrasts with the two other alternative views, that nature is "below" human to be used as *the means to* achieve utilitarian gain, or "above" them in that it is too powerful and beyond human control (e.g., natural disasters).

Widlok reports that the Namibian case study shows a remarkable stability in its CM of Nature despite ongoing ecological and economic changes. Undomesticated animals and plants are still named as prototypical examples for these categories even though many animal species that used to be hunted have disappeared and many undomesticated plants are no longer used as intensively as they once were. Other continuities include the absence of a rigid boundary between a separate sphere of 'nature.' The =Akhoe Hai//om notion of "environment" prototypically includes elements of the man-made environment that seamlessly merge with elements that in the West are considered to be part of the natural environment.

Wiegele's preliminary analyses reveal several features of a local CM of Nature: Humans, animals, weather, climate, and the earth may be linked by shared human-like characteristics. The earth, like a human, has a natural life cycle and is now entering the end of the cycle. Alternatively, the earth is returning to a previous phase in a continuous cycle. In both cases, humans can do nothing about changes in weather patterns and climate; they can only adjust to them. There will come a time when the environment is "broken" beyond repair and humans won't be able to adjust. Human activities in the immediate vicinity are responsible for the rise in sea level, local environmental degradation, and the decrease in fish supply. These changes are mostly inevitable. The notion of a human steward role was expressed primarily by those few who had been exposed to conservation education.

Relevance of the Special Issue.

Scholars, policy makers, and lay individuals who actively conduct research on and pursue solutions to climate change, a challenging species-survival issue, should benefit from the articles included in this Special Issue. The research results can foster sound policies not only based on de-contextualized scientific notions, but grounded in the local knowledge of the people directly responsible for adopting changes and possibly helping to create solutions.

References

Atran, S., and D. L. Medin. (2008). *The Native Mind and the Cultural Construction of Nature.* Boston: MIT Press.

Bennardo, G. (2009). *Language, Space, and Social Relationships: A Foundational Cultural Model in Polynesia.* Cambridge: Cambridge University Press.

Bennardo, G. (Ed.). (2012). Proceedings of Workshop: Cultural Models of Nature and the Environment: Self, Space, and Causality. Working Paper #1. DeKalb, IL.: ESE, NIU

Bennardo, G. (2014). The Fundamental Role of Causal Models in Cultural Models of Nature. *Frontiers in Psychology*, 10 October, 2014, http://dx.doi.org/10.3389/fpsyg.2014.01140

Bennardo, G. and V. C. De Munck. (2014). *Cultural Models: Genesis, Methods, and Experiences*. Oxford, Oxford University Press.

D'Andrade, Roy G. (1989). Cultural Cognition. In M. I. Posner (Ed.) *Foundations of Cognitive Science*, pp. 795-830. Cambridge, MA.: MIT Press

D'Andrade, Roy and Claudia Strauss. (1992*). Human Motives and Cultural Models*. Cambridge: CUP.

Gatewood, J.B., and Cameron, C. M. (2009). *Belonger Perceptions of Tourism and Its Impact in the Turks and Caicos Islands.* Final Report to the Ministry of Tourism, Turks and Caicos Islands.

Gattis, M. (2001). *Spatial Schemas and Abstract Thought*. Cambridge, MA.: The MIT Press.

Holland, D. and Naomi Quinn. (Eds.). (1987). Culture and Cognition. In Holland, Dorothy and Naomi, Quinn (Eds.). Cultural Models in Language and Thought, pp. 3-40. Cambridge: Cambridge University Press.

Kempton, W. (2001). Cognitive Anthropology and the Environment. In Carole L. Crumley. (Ed.). *New Directions in Anthropology and Environment*, pp. 49-71. Walnut Creek: AltaMira Press.

Kempton, W., S. J. Boster, and J. A. Hartley. (1995). *Environmental Values in American Culture*. Cambridge, MA.: The MIT Press.

Kempton, W. and J. Clark. (2000). Cultural Models of *Pfiesteria*: Toward Cultivating more Appropriate Risk Perceptions. *Coastal Management*, 28: 273-285.

Kronenfel, D. (2008). *Culture, Society, and Cognition: Collective Goals, Values, Action, and Knowledge.* Berlin: Mouton de Gruyter.

Mandler, J. M. (2008). The Spatial Foundations of the Conceptual System. *Language and Cognition*, 2, 21-44

Moran, Emilio F. (2006). *Environmental Social Science: An Introduction to Human Ecological Relations*. Oxford: Blackwell.

Moran, Emilio F. (2010). *People and Nature: Human-Environment Interactions and Sustainability*. Oxford: Wiley-Blackwell.

Lauer, M. and S. Aswani. (2009). Indigenous Ecological Knowledge as Situated Practices: Understanding Fishers' Knowledge in the Western Solomon Islands. *American Anthropologist*, 111 (3): 327-329.

Paolisso, M. (2002). Blue Crabs and Controversy on the Chesapeake Bay: A Cultural Model for Understanding Watermen's Reasoning about Blue Crab Management. Human Organization, 61, 3: 226-239.

Quinn, Naomi. (2005). *Finding Culture in Talk: A Collections of Methods*. New York: Palgrave Macmillan.

Rips, L. J. (2011). *Lines of Thought: Central Concepts in Cognitive Psychology*. Oxford: Oxford University Press.

Shore, Bradd. (1996*). Culture in Mind: Cognition, Culture, and the Problem of Meaning*, Oxford: Oxford University Press.

Sloman, S. A. (2009). *Causal Models: How People Think About the World and its Alternatives*. Oxford: Oxford University Press.

Strauss, Claudia, and Naomi Quinn. (1997). *A Cognitive Theory of Cultural Meaning*. Cambridge: CUP.

APPENDIX 1
SEMI-STRUCTURED INTERVIEW

Questions About Daily Activities

1. Personal Questions Precede the Following Ones:

2. Describe your work/job (which relates to primary food production).
3. What is your typical work/work-day?
4. What is the rhythm of work in this area... Or actual activities?

5. What are some of the essential knowledge, skills, experience you need to be a successful food producer?
6. What are considered 'productive activities'?
7. Which fields/sea areas/etc. are productive?
8. What affects productivity? What forces have an influence on production success?

9. What is meant by growth, why do plants grow?
10. What are the key decisions __x__must make to be successful?
11. What information do you need to make decisions?
12. How do you choose what crops to grow, what to fish, what to go after?

13. What are some of the constraints/problems you face as a food producer?
14. Who or what affects your environment (fields, forest, sea, etc) the most?
15. What is worst/best thing humans can do in fishing/farming/etc.?

16. What do you like/not like about what you're doing (satisfaction)?

Questions About Climate Change

17. What changes have occurred in your work/environment?
18. Why are there these changes/variations?
19. Weather change, how?
20. What can humans do about it?
21. Can humans/human activity affect nature/weather/wind/currents?

Notes

1 I capitalize Nature when the word defines a CM. I also want to draw attention to the fact that capitalized 'Nature' and lower case 'nature' have two distinct meanings. The latter is typically intended to mean a specific part and type of the environment (e.g., woods, trees, rivers, etc.) or some biologically-given aspect of existence (i.e., instinct), while the former may include all that exists. Capitalized Nature then is a concept close to what was traditional called 'cosmology.'

2 A 13th site (Amazon, Brazil) has been added soon after the workshop date, a 14th site (Ethiopia) was added in late spring 2016, and a 15th site (Zambia) will be added in spring 2017.

3 NSF Grant #BCS 1330637.

4 No field work could be conducted in summer 2013 because the NSF funds became available only in September.

5 For example, the most salient plants or animals would be presented in laminated photos. Many scholars have already collected photos of most of the list items elicited.