

Cognitive and Affective Dimensions of Biodiversity Conservation

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A study that explored the experiences of local community members living in and around Taal Lake (exclusive home of the only freshwater sardine in the world, *tawilis*) revealed cognitive and affective variables that influence the valuing and protection of a threatened endemic species and its habitat. The Grounded Theory approach was used to understand the psychological dimensions of biodiversity conservation in the Philippines. The mental model and conceptual knowledge held by local community members about the lake and the fish, and their proximity to and dependence on the lake were found to shape proenvironmental attitudes towards the *tawilis* and the Taal Lake. Theoretical and practical implications for crafting conservation initiatives are discussed.

The decline in species and habitat has vestiges of human interference. Human behavior has undeniably endangered and devastated the ecological balance (Stern & Oskamp, 1987; Winter, 2000). Our decisions and behavior are shaped by beliefs, attitudes, and other psychological constructs. Thus, the problem of environmental sustainability, including threatened wildlife, is very much a psychological problem. In the spirit of advancing understanding of human experience and behavior in the context of building a sustainable world, this study explores the experience of local communities directly affected by living in areas shared with threatened wildlife.

Conservation activists recognize more and more that laws and legal structures are effective insofar as they percolate to the local communities living nearby or within areas shared with threatened species. Local communities customarily procure resources from the nearby environment, and if they are suddenly prevented from

doing so, they experience frustration and anger from their inability to fulfill their basic needs for survival. Conservation efforts require the support and active involvement of local communities for success; hence, the need to understand the experience of local communities and to study the social psychological dimensions of their relationship with threatened species.

As recently as the late 1980s, Stern and Oskamp (1987) were surprisingly unable to document any psychological literature or research on the extinction of species or the conservation of land and biological resources for the *Handbook of Environmental Psychology*. Discussions on biodiversity conservation can reasonably be situated within the context of environmentalism.

Environmentalism generally refers to “the processes associated with actions intended to lessen the impact of human behavior on the natural environment” (Zelezny & Schultz, 2000, p.367). Environmental issues extend over an incredibly wide range, but for the most part, psychological studies have directed their attention to pollution and litter control (e.g., Cialdini, Reno, & Kallgren, 1990), energy and water conservation (e.g., Geller, 1992; Tyler & Degoey, 1995), and recycling (e.g., Saphores, Nixon, & Ogunseitán, 2006; Meneses & Beerlupalacio, 2005) due in part to a methodological preference for focusing on the individual and individual behaviors as units of study (Stern & Oskamp, 1987).

For more than 30 years, psychologists have been interested in what shapes and influences proenvironmental action. Why do some people act proenvironmentally while others do not? They have also attempted to explain the puzzling lack of correspondence between environmental knowledge and awareness, and proenvironmental behavior. They have documented the influence or lack of influence of psychological factors including environmental knowledge and awareness (e.g., Courtenay-Hall & Rogers, 2002; Kempton, Boster, & Hartley, 1995), values (e.g., Stern, Dietz, & Kalof, 1993; Schultz & Zelezny, 1998), beliefs and worldview (e.g., Dunlap, Van Liere, Mertig, & Jones, 2000), emotional reaction towards nature (e.g., Kals, Schumacher, & Montada, 1999), motivation (e.g., De Young, 2000), and attitudes (e.g., Hines, Hungerford, & Tomera, 1986).

Proenvironmental behavior is multiply determined. Some psychologists have attempted to integrate the different psychological factors to provide a coherent and reasoned explanation of environmentally responsible behavior (e.g., Montada & Kals, 2000).

The variety of environmentally relevant behavior and its causal influences are “dauntingly complex” (Stern, 2000, p. 421). While many studies have been carried out, a single definitive framework that incorporates all variables is yet to be generated.

However, the usefulness and viability of such a model remains questionable. Stern (2000) recommended that the different kinds of environmentally significant behavior be theorized separately. No theories have been developed specifically for biodiversity conservation behavior. Furthermore, the particular phenomenon of local communities living in and around ecosystems with threatened species has not been sufficiently investigated in psychological literature.

This study seeks to answer the following questions: What is the lived experience of members of local communities coexisting in ecosystems shared with threatened species? How do they define and make sense of their situation and who benefits from these definitions? What beliefs, attitudes, and values do members of the local community have about the threatened species? How are these beliefs, attitudes, and values related to their behavior vis-à-vis the threatened species? What are the processes that lead to a community’s valuing and protecting a threatened species?

Method

This study explored the complex social psychological processes involved in biodiversity conservation, particularly the perspectives, interpretations, and negotiation of meanings of local community members. It applied the rigors of the full version of the Grounded Theory method. Open-ended and semi-structured in-depth interviews were used to generate data for analysis.

Participants

Selection of respondents was based on their relevance, knowledge, and anticipated level of contribution to the emerging grounded theory. The researcher explicitly sought out participants likely to generate new insights. The basic selection criterion was that the respondents had to be associated with the Taal Lake community for at least 2 continuous years, whether as a resident of one of the lake-side towns, or as one engaged directly or indirectly

in a lake-related business. Sampling and interviewing continued in order to increase the diversity of the sample and explore different properties of the emergent categories until 'theoretical saturation' was reached and no new categories were identified. A total of 21 people were interviewed. They were based in the following places: Manila, Lipa, Tanauan, Talisay, Sta. Teresita, Cuenca, and the Volcano Island. There were 10 females and 11 males, aged 29 to 62 years. Length of association with the lake community ranged from 2 to 62 years.

Measures

In general, the guided interview proceeded with the following kinds of questions (Charmaz, 1990): (1) short face-sheet questions (to obtain necessary demographic information), (2) informational questions (to establish the main events, key characters, degree of participant's awareness and knowledge), (3) reflective and feeling questions (to draw out data about the self and how the participant was affected), and (4) ending questions (to conclude the interview, with an attempt to end in an affirmative note). All four types of questions were asked of each interviewee, but specific questions depended on the interviewee (i.e., dependent on their experiences and their answers to initial questions). The interview was conducted in either Filipino or English, depending on the language preference of the respondents. Additional clarifying questions were asked, but only in line with points mentioned explicitly by the respondent (e.g., "You mentioned that the pens were not environment-friendly. In what way or ways are they not environment-friendly?").

Procedure

Grounded Theory involves overlapping steps. Data collection and data analysis take place virtually simultaneously from the onset of the research. Since the researcher visited the lake community and conducted interviews sporadically throughout the data gathering period, data at hand were immediately processed, coded, and analyzed, with an attempt to draw tentative connections or relationships. In doing so, ideas for people to interview next and additional questions to ask in succeeding interviews were formulated. The bank of analyzed results became more and more developed and refined as new data were added with each additional interview until theoretical saturation was reached.

Data Collection. Interviews were conducted from October to December, 2006. Identified participants were approached with an interview request via email, phone call, or text message, with an explanation that the interview is for a thesis on the Taal Lake community. The interview was conducted at a time and place convenient for the participant, and ranged from 30 minutes to an hour and 45 minutes. Initial interviews were as open-ended and generative as possible (e.g., "Tell me about the *tawilis*. Tell me about the Taal Lake.") in order to prompt the participant to narrate from their own experiences. Later interviews were increasingly focused and specific, updated by the emerging theory. Themes brought up in earlier interviews were probed in later interviews to explore their properties. During the interview, key-words and themes were noted down (with priority given to building rapport with the participant first). All interviews were audio-recorded on tape, with the permission of the participants, and were fully-transcribed afterwards and prepared for coding. After the interview, participants were debriefed about the objectives of the research, and were encouraged to ask questions about the study. All interviewees were presented with a small token of appreciation. They were also asked to refer other people relevant to the lake community for possible interview. Impressions and reflections from the interview were noted and treated as data.

Ethical Procedure. This research was characterized by a substantial degree of involvement, participation, and relationship between the researcher and those in the research context, thus requiring greater attention to ethical concerns. The request to participate in this study was clearly presented as an invitation, which individuals were free to refuse. The invitation included an explanation of what the research was about, why it is being undertaken, how long the interview would take, and how their participation fits in. The topic of the research was kept as general as possible in order to prevent *demand characteristics*. All interviewees gave their informed verbal consent to be interviewed. In several cases where access to the research setting and to research participants was gained through a *gatekeeper* (i.e., referred by other people), the invitation to participate in the research was extended directly to the research participants and their informed consent was directly obtained. Care was taken so that the relationship between the gatekeeper and the research participant was not jeopardized. The use of a tape recorder was explained as for the personal use of the researcher for the sole

purpose of recalling the details of the interview. The researcher respected the wish of some participants to remain unnamed, and the refusal of some participants to answer some questions. At the end of the interview, participants were debriefed. The research questions were shared with the participants. Some respondents requested for the contact information of the researcher and these were duly provided.

Results

The uniqueness of Grounded Theory compared to other research methods lies in the cyclical blending of the processes of data collection and data analysis, moving easily between deductive and inductive thinking. Coding and memo-writing, while interspersed with data collection, comprise the main analytical processes in the Grounded Theory method. The field notes, archival resources, and transcript of interviews were closely examined in a line by line analysis recommended by Willig (2001). Axial coding and selective coding furthered the analysis. Data collection and data analysis continued until theoretical saturation was reached. This section presents two of the key categories pertinent to the valuing and protection of the *tawilis* and Taal Lake: mental model and conceptual knowledge, and proximity to and dependence on the lake.¹

Mental Model and Conceptual Knowledge

This category was first formed when one of the earlier interview respondents, a fish cage operator, commented that the lake cannot be polluted. As he explained the reasons for the improbability of pollution, he said in particular, "*hindi naookupa ng maduming tubig ang buong lawa.*" ("Polluted water does not occupy the entire lake.") This remark immediately brought forth an image of a huge glob of dark polluted water floating distinctly separate from clean clear water. Could this be how the respondent visualized the lake and the process of pollution? From this incident, attention was then directed to possible clues on how people conceptualized the lake, how such cognitive ideas were formed, and the consequences of such conceptualization on their attitude and behavior.

Respondents noted several distinct characteristics of Taal Lake, one of which is its great depth. Local people who swim underwater reported catching a glimpse of the tower of a church from a

submerged town, implying the great distance downward. Most respondents point to water depth as one of the basic differences between Taal Lake and Laguna de Bay. Fish cages in Taal Lake float on the water, weighed down by molded concrete, while fish pens in the shallow waters of Laguna de Bay touch the lakebed. Some respondents use this particular aspect of their mental model of the lake to argue that Taal Lake will never deteriorate into the ruined condition of Laguna de Bay. With the considerable size and depth of Taal Lake and the great amount of water within, some respondents believe that polluting that much water is simply not plausible.

Respondents' concept of the lake influences their beliefs about the lake's carrying capacity, which to some extent are flawed. While a greater amount of water in general means that the lake can put up with a greater amount of fishes and pollution, the lake's living zone actually consists of only the top 10 meters of the lake, which is also the zone where the most pollution takes place.

In their conceptualization of the lake, some respondents emphasized its free-flowing water. They mentioned that Taal Lake has a continuous source of clean, fresh water as well as an outlet where it drains out (the Pansipit River). Aquaculture in Taal Lake contrasts sharply with fish farming in artificially constructed fishponds. The lake has natural currents, while fishponds require machines to keep the water clean, moving, and oxygenated. The capacity of the lake to renew its waters has been used by some respondents to justify the presence of fish cages in the lake. They pointed out that water polluted from fish cage operation does not exceed the critical amount or pose any serious threat as it gets flushed out and replaced, especially when there are rainstorms. However, the perceived rate of flushing differs from one respondent to another. For instance, one respondent, a fish dealer, referred to the narrowness of the lake's outlet such that during the rainy season, the water in the lake rises noticeably. While this respondent acknowledges the presence of an outlet for the lake, his mental model more prominently features the lake as an enclosed body of water.

Respondents with similar conceptualizations liken the lake to an "aquarium," or "*maliit na dagat*" ("a small sea"), underscoring its being an enclosed space. For the most part, water in the lake remains contained. Consequently, pollution in one part of the lake, no matter how limited the source, affects other parts. One

respondent, a fisherman, described the process of diffusion: “*Parang kumalat na yung—kung sa sakit, naghawa-hawa na... Dati ay doon lang kami nakakaranas ng gayong dumi. Ngayon, dumating na.*” (“[The pollution] has spread, like a disease, contaminating everything. In the past, we only experienced such effluence in that area. Now, it has reached us.”) Garbage thrown into the lake has been observed to stay and accumulate, and in some cases, return to where it was first discarded. Endorsing the concept of an enclosed lake impacts people’s ideas about the carrying capacity of the lake. If all available areas of the lake were crammed with fish cages, then it would have no way of coping with the sheer amount of pollution that will be generated, despite having an outlet.

Some respondents speculated that Taal Lake has a canal at the bottom connecting the freshwater to the saltwater. Since the canal is believed to be a passageway for fishes, the model explains the strong similarity between the aquatic life in Taal Lake to the marine life in the nearby seas. Some respondents use this model to account for the deterioration in the size and taste of the *tawilis*. Apparently, the *tawilis* has cross-bred with a similar but inferior saltwater fish, the *saliñasi*, and as such, has lost its original breed. This notion was later disconfirmed by a biologist – there are no other species of the genus *Sardinella* in Taal Lake and unless two species are closely related, they cannot interbreed or produce viable offspring. The *tawilis* in the lake has remained genetically the same over the years.

Conceptual knowledge of pollution and pollutants emerged from the interview data. For example, one respondent, a fish cage operator, believes the fish feeds to be harmless because they are organic: “*Kasi yun namang feeds ay pupuwedeng maging pataba dahil iyan naman ay galing din sa isda. Fish meat din iyan eh... Kaya pataba pa rin iyan eh kung tutuusin.*” (“Those feeds can become fertilizers because they are derived from fishes. Those are fish meat... Those are actually fertilizers.”). He further denied the remote possibility that the fish feeds were causally related to fish kills. People seen throwing dead fish, fish guts, and other animal entrails into the lake reasoned that these were “*nabubulok*” (garbage category “biodegradable”) and were therefore not damaging to the environment. In some cases, respondents have specific ideas about the processes involving the pollutant. For instance, one respondent, a *tilapia* vendor, conceived of the extra fish feeds as being carried away by the circulating water and consumed by other fishes,

therefore eliminating any threat of build-up. Another respondent, a sailor in the lake, shared how some fish cage caretakers expel human wastes into the lake. These caretakers explained to her that their wastes would not spread to the fishes since the fish cages serve as barriers. It seems that for them, any barrier, regardless of the holes in it, is still a barrier that prevents the transfer of effluents. Still another respondent, a local government official, shared her frustration with some local people who thought that burning plastic bags eliminates the problem of accumulating garbage. The heat simply melts the plastic and makes it smaller, but the plastic essentially remains.

The mental model or conceptual knowledge of the lake seems to be shaped in part by collective stories and local folklore. Local people believe Taal Lake to be enchanted. Respondents recounted stories of peculiar occurrences in the lake, such as hearing festive music coming from the lake in the middle of the night, sightings of a giant fish with a head as big as an owner-type jeep, and fixed-type nets that teemed with a seemingly endless supply of fishes. They spoke of the drowning and death of outsiders in the lake as "*pagbubuwis ng buhay*" ("sacrificing life") or "*kinukuha ng lawa*" ("taken by the lake"). Local people likened the lake to a maiden, with her secrets and mood swings (volcanic activity). Personification also extends to the Taal Volcano, which sometimes "makes itself felt" ("*nagpaparamdam*"). They believe that the lake is cared for by some supernatural being, a female deity. The fishermen interviewed for this study call her "Mamay Nanay." Before they let down their nets, they say, "*Mamay Nanay, puwede bigyan niyo ho kami ng maraming huli ng isda*" ("Mamay Nanay, please give us a bountiful catch"). After a good catch, they buy some sweet sticky rice cakes and offer them to her saying, "*Nanay, yari ho aming regalo sa inyo.*" ("Nanay, here is our gift for you."). Before they eat their meal, they share their food with her first. Some respondents shared stories about a beautiful lady luring men towards the lake. Some of the major events in the lake were attributed to the workings of these supernatural beings. For example, the fishermen from Cuenca remembered a time when the *tawilis* disappeared completely for seven straight years and many of the villagers left to look for work elsewhere. The story goes that a spirit in the form of an old beggar was refused food. The beggar then punished the people by putting a curse on the lake. Fish kills are also considered a manifestation of the anger of Taal Volcano towards the fish cages that pollute the waters of the lake. Almost all local people

interviewed regard Taal Volcano with fearful respect. They consider the volcano's possible eruption as a powerful expression of anger, capable of destroying everything when unleashed. Thus, the volcano almost serves as a guardian, averting the ruin suffered by other lakes. Local people know that the volcano is long overdue as it has not erupted in a very long time. Asked about the future of Taal Lake, one respondent, a conservationist, said, "*Mystery talaga sa akin iyan. Siya magde-decide. Isang putok lang niyan, wala na lahat ng pinag-uusapan na ito...*" ("That's a mystery to me. She will decide [her fate]. With just one eruption, everything we speak of can disappear."). She added that that's the time you feel that "you have no control over it. You have no power over it." However, some respondents feel that the supernatural beings of Taal Lake are terrified and powerless in the face of the proliferation of fish cages and pollution.

Proximity to and Dependence on the Lake

In the process of analysis, a clear distinction emerged in the quality of respondents' answers as a function of their proximity to and dependence on the lake. Those who live closer to the lake and rely more heavily on it for their livelihood tend to speak about Taal Lake and the *tawilis* at length since they have more associations. They feel more strongly and have a greater degree of attachment to the lake.

Furthermore, they feel more alarmed about the changes in the *tawilis* and the lake and express greater concern for the protection and conservation of both. There is an evident disparity between the experiences of local respondents and outsiders.

It appears that the respondents' proximity to and dependence on the lake contribute to their mental models and conceptual knowledge stores of the *tawilis* and the lake. Expectedly, respondents who live nearer to and depend more on the lake shared more detailed information and experiences connected to the *tawilis* and Taal Lake. Moreover, nonlocal respondents point to their local counterparts and contacts as the source of some of the stories that they know. Amongst the local respondents, it is interesting to note how some of the reported narratives have very similar details (e.g., description of the fatty *tawilis*), even though the respondents do not know each other and come from different towns.

Fish cage financiers from outside Batangas are often transient and have a high level of mobility. These financiers “come and go,” depending on the success of their investment. They usually discontinue in the business if their cages are destroyed by typhoons, their fishes are wiped out by a fish kill, or if their caretakers cheat and steal from them. All the financiers from Manila interviewed for this study have more than one source of income (e.g., one financier has an import-export business, another has an aquarium business, and another is an employee of a pharmaceutical company). The fish cages are simply another business opportunity providing additional revenue. They admit that they can just “pack up and leave” anytime. Some local respondents made the same observation of foreign investors, “*pag hindi nila napakinabangan ang lawa, basta na lang iyan aalis.*” (“When they are unable to take advantage of the lake, they simply leave.”)

Basically, the financier provides the capital to start and maintain the fish cage business. The caretaker (usually a local person) takes charge of the paperwork (e.g., applying for permits) and the labor for the day-to-day operations of the fish cage. Financiers and caretakers split the profits equally. This setup permits financiers to remain distant and disconnected from the business. One financier from Manila explained that since he is a businessman, he does not do hands-on work and instead lets his money earn and work for him. Many fish cage financiers do not even visit their fish cages regularly. Another financier confessed that she has only been to Taal Lake twice in the five years that she has had the fish cage business. Instead, her caretaker comes to Manila to report to her, declare the state of finances, and deliver the money. This does not apply to local financiers who are also the caretakers of their own fish cages and are more directly involved with their business (two such people were interviewed for this study).

Local respondents living near the lake do not enjoy a similar mobility. The limited mobility of the local people can be related to the general rural experience. One respondent from Manila observed that rural folks practically live there all their lives, and everyone knows everyone else and their families. This observation was substantiated by a local respondent, a housewife, who said, “*Bale üsa lamang ang mga tao dito e. Walang narating na ibang tao.*” (“The people here have essentially remained one and the same. No other people have settled.”). While local people sometimes found work in

the towns and cities (*“sa kati”*) and some even had the opportunity to work abroad (e.g., three local respondents worked in Saudi and Japan), they always went back to their home near the lake.

The lives of local community members are directly and closely tied to the lake. Their livelihood revolves almost entirely around the lake and its resources (i.e., tourism, fish cages, small-scale fishing, buy-and-sell fish business, etc.), in contrast to non-local investors whose income from the lake is merely supplementary or just *“nakakatulong”* (“helpful”). One respondent, a former fisherman and suro boat operator and now proprietor of a huge fish cage business, said, *“nandidito lang kami, ano ang aming gagawin?”* (“This is where we live, what else is there for us to do?”) The economic value of Taal Lake bears more weight for the local community living around it. They articulated, in many different ways, the great importance of the lake and its resources. *“Malaki ang papel ng lawa sa buhay namin. Iyan ang bumubuhay sa amin”* (“The lake plays a big role in our lives. It sustains us”), said a *tawilis* fish vendor at the Talisay market. *“Diyari kami nabubuhay”* (“We live on the lake”), said a fisherman from Sta. Teresita. Many of the local respondents related how the lake provides for the everyday viand of their families and for all their living expenses. It was the lake that sent them and their children through school. They also see their children and grandchildren benefiting from the lake in the future. Many respondents said that they would be at a loss if the lake was ruined and the fishes were gone.

Local and non-local respondents differed in the way they talked about the *tawilis*. While all respondents automatically made references to the *tawilis* as food, local respondents were visibly more excited (i.e., their voices were louder and they talked faster) when they described the *tawilis*. They spoke fervently about a particular way of slow cooking the *tawilis*, *“sinainag na may kamias na tuyo”*, which was very tedious and long (cooking time: approximately 8 hours by charcoal) but resulted in an extremely delicious fare that was their native delicacy. Local respondents had many more things to say about the *tawilis* than non-local respondents. In one field visit, a group of women gathered around the neighborhood convenience store started chattering simultaneously when the researcher brought up the subject of *tawilis*. They had many stories connected to the fish and they insisted that the researcher should stay the night to be able to taste fresh *tawilis* early the next morning. Another local respondent

who works in the local government described the *tawilis* as such, “*Masarap talaga, parang may vetsin na siya.*” (“It’s really delicious, almost as if it already has MSG in it.”) Still two other local respondents feel nostalgic about the *tawilis* as they associate it with happy memories with family and friends. Where nonlocal respondents seem almost unmoved about the *tawilis*, local respondents expressed their love and pride for the fish. But love and pride were strongest in the fisher folks who depend on the *tawilis* for their living. One fisherman considered the *tawilis* as tightly connected to their lives (“*karugtong na ng aming buhay dito*”). The *tawilis* is a staple of their diet. All the small-scale fisher folks own nets just for the *tawilis*. While most people consider the *tawilis* as simply another viand, the fishermen consider it their life (“*ulam lang sa kanila, sa amin, pati bituka*”).

Local people who live close to the lake experience firsthand the changes in the *tawilis* and the lake. They suffer from the pollution brought about by garbage disposed in dry creeks far from the lake or tossed into the lake by tourists. They recognize the need to eliminate illegal fishing because they see for themselves how much their own catch has diminished. They understand the need to limit the number of fish cages because they see and feel its concrete effects on the water quality (i.e., some local people get their water supply from the lake itself). In this sense, local respondents, especially the small-scale fisher folk who depend more heavily on the lake, held more accurate mental models and conceptual ideas of the *tawilis* and Taal Lake. The local respondents were more alarmed by the pollution and cited it as one of the main problems of the lake. Their concern (“*pagmamalasakit sa lawa*”) reveals how much they value the lake especially since it is their home and the place where they derive their livelihood.

One of the interview questions was “*Ano ang papel mo sa buhay ng lawa?*” (“What is your role in the life of the lake?”), which came after the question about the role of the lake in their lives. Responses revealed the level of connection with the lake. Many of the respondents were surprised by this question and unable to answer immediately. Answers from nonlocal respondents ranged from zero contribution to the lake to tangential contribution (e.g., spurring the lakeside economy in order to provide jobs to the local community). Local respondents who were not dependent on the lake for their livelihood hinted at a more passive kind of contribution (e.g., they do not pollute the lake). Local respondents

whose lives are more closely linked to the lake had more meaningful contributions which were expressed with more certainty. They see themselves as the staunch defenders and protectors of the lake, guarding her against exploitation.

One can also tell the local and non-local respondents apart from the feelings they have for the lake. Financiers from outside Batangas said that they felt excitement at having their “own little stake in that lake,” and relaxed “while earning money”. Temporary visitors said they felt “peaceful.” Local respondents, on the other hand, communicated a fearful respect and reverence for the lake that is also expressed in their local beliefs and folklore about the lake. The most emotional sentiments, however, came from the fisher folks. The first fisherman interviewed manifested a deep affinity and an immense love for the lake that was inexpressible in words, “*parang gusto ko dini sa lawa, yun na ngayon ako. Malaki ang koneksyon. Wala, hindi ko maipaliwanag...*” (“I seem to like it here in the lake, that’s how it is for me now. There’s a huge connection. I don’t know how to explain it.”). Another fisherman said he felt pained (“*nasasaktan,*” “*nanghihina*”) when he saw what people were doing to the lake. One respondent was moved to tears as she spoke about her feelings for the lake, “*Talagang mahal na mahal ko iyan. Hindi ko na kailangan sabihin. Ang buhay ko ay para sa lawa, ipagtanggol siya, mahal in at alagaan habang ako’y nabubuhay...*” (“I love the lake very much. I don’t need to say it. My life is for the lake, to defend her, love and care for her as long as I’m alive...”).

Discussion

Biodiversity is inextricably linked to life, and its importance to people is considerable. Biological conservation emerged with the recognition of the immense value of the living world and the need to address the startling loss of biodiversity worldwide. Any significant contribution to conservation efforts requires “a better understanding of one species: our own” (Saunders, Brook, & Myers, 2006, p. 702).

Earlier, we noted the dearth of psychological literature or research on the extinction of species or the conservation of land and biological resources in the *Handbook of Environmental Psychology* (Stern & Oskamp, 1987). Furthermore, Stern and

Oskamp observed that many of the past psychological researches approached environment relevant issues with the objective of developing, extending, or testing psychological theories and principles. Environmental problems were of secondary importance, merely providing the content for the field applications of these theories and principles. Studies have also been limited to behaviors that are neatly measurable or conveniently quantifiable. Consequently, these studies provided an inadequate and unsatisfactory account of the psychological dimension of environmental issues. The state of psychological research clearly does not correspond with the expressed need for more analytic studies that would elucidate understanding about environmentally relevant motivational processes and the contexts that shape them. Psychology has the great capacity to provide a “(d)eeper understanding of human emotions, identities, attitudes, and values related to the natural world” (Saunders et al., 2006, p. 704).

Mental Models: Navigating the Way to Conservation

The findings from this study bared assumptions, experiences, subjective beliefs, and perceptions of lake stakeholders that are relevant to their conceptualization of the Taal Lake. The valuable information gained from data collection and analysis pointed to some constructive ideas as well as problematic cognitions about the lake. Because these conceptualizations can have consequences on people’s attitudes and behavior, looking into mental models can potentially help shed light on conservation issues that need to be addressed at the cognitive level.

Mental models are described to be higher-order psychological representations and dynamic mental structures of real or imaginary situations constructed and elaborated upon to make sense of and explain experiences (Johnson-Laird, 1983). More recent studies on mental models underscore the practical usefulness of illustrating people’s perception and comprehension of various objects, events, and other physical realities. For example, Zaksek and Arvai (2004) used mental model analysis to be more familiar with the information and decision-making needs of stakeholders regarding wildland fires. In the process, some misconceptions and knowledge gaps surfaced.

People draw on their mental model of Taal Lake and the processes that take place within to articulate their beliefs about the carrying capacity of the lake, the status of aquatic life, and the consequences and non-consequences of pollution. Their conceptual map of ideas also influences their perceptions about the amount of disturbance that the lake can tolerate before collapsing and the risks of permanently ruining the lake. Some of these beliefs and perceptions have been proven erroneous by experts.

Why do people maintain flawed conceptual knowledge stores and why do these seem resistant to change? Mental models, like other simpler forms of mental representations, are generally used to answer questions, reason out, solve problems, rationalize, and guide behavior. One of the core assumptions of cognitive psychology is that humans are intelligent and goal-driven beings. Faced with significant information-processing limitations, the human mind compensates through cognitive efficiency. As such, people can be selective about which underlying conceptual structures best serve their purposes, filtering out aspects of a mental model that do not conveniently further their goals. Predictably, fish cage operators and caretakers subscribe to mental models (regardless of their being scientifically unsound) which minimize the effects of pollution brought about by the operations of their fish cages. To illustrate this point, by supporting the conceptual idea of fish feeds as organic and harmless, fish cage stakeholders can justify their actions of keeping their fish cage operations. Also, by attributing changes in the *tawilis* to its cross-breeding with more inferior fishes, they do away with other explanations that make them responsible. On the other hand, small-scale fisher folk, who have more at stake and whose livelihoods are easily jeopardized by changes in the lake, pay closer attention to the deterioration of the water quality and its effect on the fishes. They support mental models that depict a more accurate picture of the state of the lake.

Admittedly, a shift in mental model may be a gradual process especially since it is difficult to let go of misconceptions. But because mental models have an effect on people's attitudes and behaviors, erroneous conceptual knowledge can be costly to the environment. Hence, community-based conservation strategies must invest in awareness and education initiatives that address fallacies at the cognitive level and attempt to modify people's mental models of the lake. An example of one such inaccurate notion concerns people's ideas about the relationship between the depth

and the carrying capacity of the lake. This can easily be corrected through dissemination of proper information from qualified sources to all members of the lake community. However, some false ideas are best altered through experiential methods. Findings from mental model research conducted by McCloskey, Washburn, and Felch (1983) substantiated the "seeing is believing" premise. People tend to be convinced by what they see and experience. Something like conceptual knowledge about the nonconsequences of pollution can be transformed by giving people learning opportunities to empirically see the effects of pollutants on the water (e.g., using laboratory method to demonstrate the presence of effluents hazardous to people's health). The challenge is to make protracted processes more immediately tangible.

Another aspect that emerged under mental model is the local belief system. Local people acknowledge the presence and eminence of supernatural beings, and consider Taal Lake as sacred. Much folklore is associated with the lake and the volcano – there are many mysterious and peculiar occurrences in the lake area, thereby engendering a feeling of respectful fear in the local people. Local traditional knowledge consists of values and wisdom from collective interactions with the natural world that have been learned and passed on through the years. These lend support to the idea that human-nature relation is a two-way process, and that cognitions about species and natural environments are reciprocally shaped by inherent characteristics of the species and natural environments themselves (Croll & Parkin, 1992). For instance, in the case of Taal, the unique presence of a volcano within the lake inspires folklore of a supernatural being that guards the lake, whose anger arouses fear in locals. Based on experiences and interactions with the natural world, people attribute nature with certain agencies that in turn shape the way they negotiate with and act on it (Croll & Parkin, 1992). Such traditional values or wisdom do not automatically harmonize or contradict with conservation goals. Neither outsiders nor locals can claim exclusive know-how in the formulation of conservation policies. Therefore, it is best to enter and engage local belief systems to benefit sustainability objectives.

The findings obtained in this study establish the importance of exploring and understanding how people conceptualize the lake ecosystem and the elements within before investing in designing conservation programs. Identifying knowledge gaps can help in

developing the most efficient and effective way to communicate conservation.

People and Places: The Functional and Emotional Ties that Bind

The results of this study ascertained the significant role of people's affective bonds to places on the conservation and the protection of the lake. Results showed that the quality of respondents' answers were a function of their proximity to and dependence on the lake. In this context, it might be useful to bring in the concept of place attachment. According to Tuan (1980), what starts off as undifferentiated *space* gets transformed into *place* when we ascribe value and meaning to it. Accordingly, place attachment develops through the accrual of experiences, interactions, sentiments, and socialization processes with the setting. This sense of being rooted to a place differs from one person to another. For instance, some respondents think that Taal Lake represents great prospects in terms of business opportunities, while others regard the lake as a sacred body of water, and still others feel relatively indifferent towards the lake.

There are two related dimensions to place attachment: functional attachment and emotional attachment (Payton, Fulton, & Anderson, 2005; Vaske & Kobrin, 2001). Both dimensions emphasize how the physical aspects of the natural environment determine the quality of relationship that people have with it. As a result, people regard the natural environment and themselves with varying levels of inseparability (Croll & Parkin, 1992).

Functional attachment, also called place dependence, indicates the capacity of the place to meet a person's needs. The physical features of a place contribute to its functional attachment. For this reason, people often develop continuing relationships to local natural landscapes or areas, where resources are easily obtained. In this study, all the respondents have some measure of functional attachment to Taal Lake – whether as a recreational venue with aesthetic properties, a good place for aquaculture, or a source of fishes for personal consumption and additional income. Compared to other lakes like nearby Laguna de Bay, Taal Lake fares considerably better in many respects, and this adds to its functional value for the local community members.

On the other hand, emotional attachment, also called place identity, refers to the affective aspect of a person's connection with a place. This psychological investment does not stem from a singular experience, but grows over time, through repeated encounters and accumulated memories with the place. Eventually, the place gains symbolic importance for the person, thus creating a sense of belonging and community (Tuan, 1980). For many of the local community members who practically spent most of their lifetimes in the Taal Lake area, they find their lives directly and intimately tied to the lake. They not only have extensive semantic networks (or associations) about the *tawilis* and the lake, but the lake also becomes a part of their self-identity. As a case in point, one respondent even proudly declared that he was born in the village right by the lake.

People who have a strong emotional relationship to places are highly motivated to safeguard and improve the places they consider significant, especially since they are more likely to stay in that place. Furthermore, because they are immediately aware of and affected by changes in the place, they are more concerned about the use and management of resources (Vaske & Kobrin, 2001; Manzo & Perkins, 2006). The results of this study confirmed these ideas. Some of Taal Lake's most devoted protectors are those who expressed deep affinity and love for the lake. They live by the lake and see themselves remaining there for a long time to come. They are most alarmed by the destructive changes in the lake given that they experience these firsthand, and they are also most keen about conservation efforts. Emotional attachment has practical implications on policies. For example, local people should be given priority in putting up fish cages because they consider the lake area their home and they feel more psychological ownership to the place. In contrast, outsiders who are more profit-oriented and do not stay long enough to form enduring or profound connections with the lake are less disturbed by the impact of their activities on the lake.

While place attachments are, to some extent, very personal, they can be elevated to the group or community level. Sharing a common space does not necessarily lead to a collective feeling of rootedness. The communal history and other socio-cultural processes of the group exert a more cohesive force which bonds the group to a place (Manzo & Perkins, 2006). Projects for development and conservation must be sensitive to the affective

bonds of the community to the place. Community members must be given a venue to participate in the planning and to articulate the meanings and importance of the place. For instance, how do local community members feel about plans to put up a spa right on Volcano Island? The consultative process applied in drafting the URR for Taal Lake appears to be promising.

Development and conservation planners would benefit greatly from knowledge of the dynamics of place attachments. Effective biodiversity and ecosystem conservation must integrate the values, meanings, and emotions that people attach to areas where these are to be protected. In engaging affective dimensions, they will be able to understand why some people are more involved in addressing problems than others and why certain changes are met with resistance.

Conclusions

This study attempts to fill a gap and provide a modest contribution to the growing body of knowledge by affording a perspective into the social psychological dimensions of biodiversity conservation. "Pure" conservation, isolated from social forces, does not exist. Conservation is always situated within a social context, interlinked with a network of social issues and processes. Research and subsequent planning have to be rooted in the local situation and experience. Qualitative methods of inquiry that were used in this study produced significantly richer data and a more holistic understanding of the phenomenon by investigating meanings and processes, drawing on the perspectives and interpretations of the participants of the study, and applying sensitivity to different forms of expression. It is hoped that the insights gained from this research will provide alternative understandings to people's beliefs and actions in nature, and help in crafting better conservation programs and developing more effective ways to communicate nature protection. In addition, this study was situated in the context of a developing country which faces a unique set of environmental challenges that may not be true of other countries. Social psychological insights about sustainability are crucial for building a sustainable culture (Winter, 2000).

Note

¹In the full study, there are four key categories that influence the valuing and protecting of the *tawilis* and Taal Lake. Due to space limitations, only two of these factors were featured in this paper. The other two key categories are economic factors and governance.

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GUIDELINES FOR SUBMISSIONS

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