Nature – Culture Interactions Among Peasant Communities Near La Amistad Trans-boundary Park, Panama and Costa Rica

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A thesis submitted for the degree of PhD

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September 2010

Dedicated to my Mother and Father

who inspired me to love the countryside and its people

and encouraged me to constantly look for

new opportunities to learn.

ACKNOWLEDGEMENTS

I am indebted to my supervisor, Jules Pretty, for giving me the freedom to build my own research project and for constantly encouraging me to explore challenging new grounds. I would also like to thank my two committee members, Dave Smith and Leanne Hepburn, for their support on statistical and practical issues regarding this research. I'm also grateful to Rachel Hine who read various drafts of this thesis and provided useful comments.

Many thanks for Sarah Pilgrim and Ambra Sedlmayr for their friendship, support and for always making my stay in England intellectually motivating and fun. My gratitude goes also to Stuart Bunting and Jo Peacock who in the first stages of this research were great listeners of my often extravagant ideas.

I am especially grateful to members of the communities, conservation organization representatives and government officials in Panama and Costa Rica who received me and my family with a warm welcome and patiently answered all my questions. I do hope that some of the findings of this thesis are useful their efforts to built nature conservation that matters to people.

I have been very fortunate to be accompanied in this journey for two extraordinary men: my husband Bill and my son Ian. Huge thanks to them for their love, patience, understanding, constant encouragement and support. Without them this adventure would not have been possible.

This research was funded by a doctoral fellowship provided by the Panamanian Government (SENACYT/IFARHU).

ABSTRACT

This research examines culture - nature interactions in five colonist communities near La Amistad Trans-boundary Park located along the Panama – Costa Rica international border. This frontier park is unique, as the Costa Rican sector excludes people whereas the Panamanian sector allows human presence in certain zones. The main objectives of this research were to understand how these communities structure their relationship with nature and whether there were any cross-boundary differences given Costa Rica's reputation as an environmentally-minded nation.

Both quantitative and qualitative methods were used. Quantitative results show that the human - nature separation model, implicit in park ideology has not been fully adopted in these communities. Instead, local people frame their relationship with nature based on the benefits they receive for subsistence and income generation and for environmental services and bequest values. These two categories are held simultaneously and are poorly predicted by the individual's socio-economic characteristics.

Comparative analysis shows that there are more similarities than differences across the international border. Thus, the argument of Costa Rica as a nation with higher levels of environmental concern is not supported by this thesis' findings. Besides, the management of the park is rated as average in both countries suggesting that the adoption of eviction or zoning has not had an impact on current people's attitudes to the park. Despite the fact that Costa Rican communities receive better prices for environmentally-friendly coffee no cross-country differences were observed in the adoption of these practices. Qualitative findings suggest that contextual and cultural factors related to unfair application of environmental regulations, historical power relationships, rural – urban migration and frontier idiosyncrasies are critical to understanding these findings.

The key policy recommendations include increased local participation, equitable sharing of benefits and costs, more attention to power imbalances and the role of cultural identity in nature conservation.

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CHAPTER ONE: INTRODUCTION

Without doubt, protected areas have become a major tool for conserving species, ecosystems and their associated services. Their worldwide support is reflected in their inclusion as part of the United Nations millennium development goals. By 2008 there were more than 120,000 protected areas covering about 21 million square kilometres of land and sea, an area that is more than twice the size of Canada (UNEP-WCMC 2010).

Within this global movement, protected areas crossing international borders have received increasing attention. These trans-boundary protected areas (TBPAs) have almost quadrupled in number since the late 1980s. In fact, the latest inventory of trans-boundary protected areas identified 227 complexes incorporating 3,043 individual protected areas and covering 4.6 million square kilometres. This area represents almost a fourth of the global protected area coverage (UNEP-WCMC 2007b).

Despite their enthusiastic adoption, protected areas are criticized on several grounds, including inadequate biodiversity representation, poor management effectiveness and potential high social and economic costs to local populations (Terborgh 2000; Bruner *et al.* 2001; Reyers 2003; Brockington 2004; UNEP-WCMC 2007a; Chape *et al.* 2008; Jenkins and Joppa 2009). Conservation costs imposed on local communities are receiving growing criticism and include physical displacement, the loss of land and jobs, restricted access to resources, marginalization, food insecurity, increased incidence of diseases, reduced income, loss of common property and services and social disarticulation among others (Brandon and Wells 1992; Ghimire and Pimbert 1997; Schwartzman *et al.* 2000; Bruner *et al.* 2001; Redford *et al.* 2006; Brockington and Igoe 2006; West and Brockington 2006; Hammill and Besancon 2007; Agrawal and Redford 2009a; Agrawal and Redford 2009b). Also it has been suggested that these costs are greater in local populations that are marginalised socially, economically and politically (Kabra 2009) as it is often the case in frontier regions.

A literature review sponsored by the UN Environmental Programme and the World Conservation Monitoring Centre (UNEP-WCMC 2007a) suggests that to a large extent the impacts of protected areas upon local communities depend on their management and governance. Strictly protected areas, the report asserts, with top-down management structures such as national parks can result in important livelihood costs. According to Chape *et al* (2008), these strictly protected areas represent 38.3% of the total global area under protection.

Experience of decades of declarations also suggests that the main social challenge that protected areas currently face might be conceptual (Berkes *et al.* 2000; Adams *et al.* 2004; Berkes 2008; Pretty *et al.* 2009). And it is that the creation of national parks not only signifies the enclosure of large tracts of natural habitats for nature conservation but also implies a new conceptualization of the culture – nature relationship in which humans are seen as separate from nature (Pretty and Pimbert 1995; Pretty 2002c; Reid *et al.* 2006; Berkes 2008). As humans are destroying nature, the narrative suggests, they need to be excluded from it. In order to protect the wild, we need to draw borders, establish limits and develop dichotomies (Pretty 2010b). This *simplistic narrative of enclave thinking*, as Pretty (2002b) calls it, is artificial though deeply ingrained in our minds and has unfortunately led to the belief that the only nature that is worth protecting exists within protected areas.

Furthermore, to many resource dependent cultures, this human – nature dichotomy that is the foundation of ideas such as "the wild", "wildlife" and "wilderness" remains problematic (Barucha and Pretty 2010). Though at present for many people "the wild" refers to situations or spaces where humans have not interfered, such as national parks, research has found that many of these places are the result of long-term, almost imperceptible management by humans (Cronon 1992; Cronon 1995). Therefore, particularly for many communities whose livelihoods are linked to natural resources, there are not easy, straightforward distinctions between "wild" and "domesticated" or between "anthropocentric" and "biocentric" spaces, contrary to the concept implicit in national park management. Conflicts between national park protection and local communities might be the result, at least partially, of these different concepts.

1.1. Statement of the Problem

In the last decades, the study of the relationship between humans and nature has shown that there is increasing concern about the environment around the world (Inglehart 1990b; Thompson and Barton 1994; Stern *et al.* 1995; Kempton *et al.* 1996; Stern 2009; Kennedy *et al.* 2009). Most of these studies are based on socio-psychology theories that postulate that environmental action is influenced by core individual principles called values, which in turn affect attitudes, and these affect behaviour. This cognitive hierarchy model also recognizes the impact of other elements such as knowledge and socio-economic factors inherent to the individual. These investigations follow positivistic epistemological stances in which only the material world is considered "real" and therefore, quantitative methods such as attitudinal surveys are the preferred instruments to study how people relate to their environment. Though most of this research stream is focused on cognitive aspects, more recently others

have explored the affective connections with the environment as well (Schultz *et al.* 2004; Mayer and McPherson 2004). The quantitative study of human – nature interactions has received considerable attention from resource managers and is often supported by government agencies and international conservation agencies (Reading *et al.* 1994; Zinn *et al.* 2002; McFarlane and Boxall 2003; Scott and Willits 2004a; Scott and Willits 2004b; Schelhas and Pfeffer 2005).
Another stream of literature explores culture – nature relationships through the application of qualitative methods (see Paoliso and Chambers 2001; Paoliso 2002; Smith 2006a; Van Den Born 2008). These anthropological and sociological studies are based on the postulates of social constructivism, which admits the existence of an external reality that exists independent of our understanding but also asserts that reality is knowable only through socially constructed meanings. According to this research line, different meanings that people hold about nature affect the different attitudes they have towards it. Meanings are formed from the understanding people develop about their world and are closely linked to their cultural and historical contexts.

In general, these two streams of research tend to remain separate and there are very few studies that adopt a practical stand, that is to say, use both quantitative and qualitative approaches (see Smith 2006b). Most of the quantitative studies suppose a good understanding of human – nature interactions and therefore impose categories on the participants through the application of attitudinal scales to try to uncover biocentric - anthropocentric orientations that also reflect the human – nature dualism. For the most part these studies have been conducted with university students in Northern countries and when implemented in different cultural context the results often show discrepancies (Schultz and Zelezny 1999; Moreno *et al.* 2005; Bechtel *et al.* 2006; Shen *et al.* 2006). Furthermore, socio-psychology theories supporting this quantitative research tend to emphasize the capacity of the individual to make decisions independently and attribute less importance to the context. This situation might be the opposite to that in rural communities that are often economically and politically disadvantaged as is the case in communities located along an international frontier and near protected areas. Despite these limitations, quantitative studies are useful when the objective of the research is to make comparisons or establish baselines for future monitoring of the impacts of conservation policies and remain as the predominant approach among most international conservation agencies and government institutions.

Qualitative approaches, on the other hand, tend to concentrate on understanding, rich descriptions and emergent concepts and theories, allowing the voices of participants to be heard without imposing frameworks. In some cases, qualitative approaches have been used to

complement statistical research by identifying underlying constructs before relevant questions are structured or as a follow- up to explore issues of interest and triangulate quantitative data (Ritchie 2006). They are, however, difficult to replicate and use small, often unrepresentative samples.

This study is based on the assumption that both quantitative and qualitative research approaches provide distinctive types of evidence and that used together they can offer a powerful resource to inform conservation policy and practice (Ritchie 2006). These two approaches do not need to be competing and contradictory. On the contrary, trans-disciplinary, multi-method research strategies that draw from the different sources available are more suitable to address complex research questions in understudied contexts such as a trans-boundary park along the Panama - Costa Rica international frontier.

In this sense, trans-boundary protected areas offer an unmatched opportunity to study human – nature relationships through time. This is the case as most of these trans-boundary parks though established with the objective of protecting a particular habitat type that crosses international borders, for the most part are declared and managed independently by nation states, which not infrequently present divergent political and economic interests, social realities and management capacities. From this point of view, adjacent protected areas located along the international borders can be considered as experiments on large tracts of habitats subject to different conservation treatments or management regimes.

1.2. Purpose of the Study

The primary objective of this investigation was to understand how colonist communities near La Amistad International Park in both Panama and Costa Rica, structure their relationship with nature in general and the park in particular, 25 years after the creation of this protected area. This was achieved by developing a quantitative survey to measure environmental attitudes, attitudes towards the management of the park and conservation behaviours and studying their association with socio-economic variables. Once a better understanding of human - nature associations in these communities was attained, cross boundary comparisons, the second major objective of this thesis, were conducted.

The third objective of this study was to triangulate quantitative results and further explore the influence of other cultural factors on how local people relate to their natural surroundings and to the park. This exploration was achieved by putting aside pre-determined theoretical frameworks and allowing local people to develop their own ideas about nature and the park.

A final objective of this investigation was to situate its main findings within the larger picture and draw some recommendations for future research and conservation management.

1.3. Research Questions

Based on the objectives of this thesis, four main research questions were asked:

1. Do peasant communities near La Amistad International Park structure their relationship to nature as a biocentric – anthropocentric dualism? How do the socio-economic variables under study influence these relationships?

2. Are there any differences in environmental attitudes, attitudes to the park and conservation behaviours between the Panamanian and Costa Rican communities under study?

3. What other cultural factors influence environmental attitudes and behaviours in these border communities?

4. What are the implications of these findings for research and conservation management?

1.4. Relevance of the Study

This research contributes to both environmental socio-psychology theory and conservation practice. In terms of research and theory, the results of this study challenge the application of environmental socio-psychology theories and in particular the cognitive hierarchy model, to marginalized peasant communities in border regions in Latin America. It also emphasizes the role of the historical and present day contexts influencing how these communities relate to their natural surroundings and suggests new elements that need to be considered when crafting quantitative instruments such as attitudinal scales. This research also highlights the benefits of moving beyond epistemological barriers to adopt a pragmatic mixed-method approach to gain a better understanding of human – nature interactions in complex, understudied settings. It confirms that people attach different meanings to environment in general and the protected areas in particular and uncovers wider societal issues affecting this interaction.

In terms of conservation policy and practice, this research provides new perspectives on local people's perceptions of opportunities and barriers related to park management which might help policy makers and practitioners to understand the necessary conditions for new

conservation incentives, capacity building and regulations. It also establishes a baseline that can be used for future monitoring. This study identifies cross border commonalities and differences and conservation issues that need to be addressed to foster trans-boundary cooperation not only between government agencies but between local communities as well. This study calls for a renewed analysis of the role of protected areas in promoting attachment to the land in communities suffering from the increasing migration of young people to urban areas, a poorly studied topic. Finally, this study brings elements from the new field of border studies that not only serve as a framework to understand the emergence of frontier idiosyncrasies that might explain the lack of cross-border differences found but also recommend new approaches for socially sound trans-boundary conservation.

1.5. Thesis Organization

This thesis is organized into eight chapters, beginning with this introductory chapter.

Chapter II then provides a review of the relevant literature relating to the application of quantitative and qualitative approaches to understanding human - nature interactions and situates this research within these theoretical frameworks. Secondly, the literature review directs attention to trans-boundary conservation, its origin, arguments and pitfalls.

Chapter III provides essential geographical and historical information on the colonization of the frontier region. This chapter aims to facilitate the understanding of how both physical and societal factors have shaped the way peasant communities, as subjects of this study, currently relate to the forests. It also analyses the regional, national and international events that fostered the colonization of these frontier forests as well as the final delimitation of the international border. This chapter also re-constructs the process of establishment of the trans-boundary park along the Panama and Costa Rica border and brings to light how these processes are intertwined with issues of state control, national security and sovereignty. Finally, a comparative analysis of the content of the decrees that created La Amistad Trans-boundary Park in both countries is conducted to better understand their influence on the on the ground management of the protected area.

Chapter IV argues for the mixed - method approach to the thesis and the theories that guided the selection of methods to collect and analyze the data. It discusses the need for an iterative social research process, historical depth and the adoption of a pragmatic stance beyond epistemological barriers to better address the research questions. Issues of validity, ethics and reflexivity regarding the researcher's background and experience are discussed as well.

The research findings are presented in Chapters V and VI. Results from the application of a quantitative survey, based on the cognitive model of environmental concern, are presented in Chapter V (see research questions 1 and 2). Data are analyzed to assess the biocentric and anthropocentric orientation of the participants and their relation with socio-economic variables. The partiality of these results is discussed and the need for a more in depth approach to understand the factors influencing the culture - nature connection is introduced.

The results of the qualitative approach to the study of culture – nature interactions are presented in Chapter VI (see research question 3). The adoption of this qualitative approach allows an in-depth study of the meanings interviewees attach to their natural environments without imposing predetermined categories following the premise that "it does matter who tells the story" (Pretty 2002b page 23). This section helps to explain some of the results of the statistical study but also sheds some light on other factors that might be affecting the way local people see and act upon their environment in these regions.

In Chapter VII qualitative and quantitative data are integrated when appropriate to provide a rich and contextual understanding of people's attitudes to the environment in general and to the park in particular. This chapter also uses elements presented in the environmental history and the literature review chapters and links them to the research findings thus providing a more thorough picture of culture – nature associations in these frontier communities. It also introduces some key contributions of the new discipline of border studies to assist in the understanding of the unique frontier dynamic that could explain the similar environmental attitudes and behaviours found across the border.

Finally, Chapter VIII summarizes final conclusions and proposes recommendations for future research and conservation policy and practice (see research question 4).

CHAPTER TWO: LITERATURE REVIEW

The literature that deals with the impact of protected areas on how human societies envision nature tends to be separated into two main streams and as such they are presented here. The first stream of literature that is analyzed here refers to the study of human – nature interactions. These studies are divided, in turn, according to their theoretical stances. First, research based on environmental psychology theories, and the hierarchical cognitive model in particular, is discussed. Results of using quantitative instruments, as well as their application to natural resource management and their effectiveness when implemented in different cultural contexts and in establishing cross-country comparisons are also presented. Second, approaches following constructivist theories are presented and their results discussed.

The second stream studies the emergence of protected areas, in particular trans-boundary protected areas, as part of the global paradigm, their rationale, contradictions and impact on local communities.

The overarching purpose of this literature review is to familiarize the reader with theories and issues surrounding human-nature interactions within the context of trans-boundary protected areas.

2.1. Culture – Nature Relationships

The way nature is understood has a profound significance in conservation (Pretty 2002b; Adams and Hutton 2007). The adoption of protected areas or place-based conservation in general has implicit a conceptual scheme in which nature and human societies are considered separate. This is particularly the case in nature reserves, wilderness areas and national parks which are defined by the IUCN as the most strict management categories and where human presence is limited or totally banned. According to the IUCN classification system, a national park seeks to protect natural biodiversity and its supporting environmental processes by limiting human activities to scientific research, education and recreation (Dudley 2008).

In a broader sense, the mastery of nature has been central to the modern state (Scott 1998). Indeed for the state, science provides the tools and means to understand, classify and manipulate nature, so its natural resources can be used for the countries' social and economic development (see next chapter). The state makes these divisions between nature and humans, between the vacant and cultivated lands even clearer through the use of maps. Thus, nature and people are separated both conceptually and in space (Adams *et al.* 2007). Like

development projects, protected areas emerged from this artificial dichotomy as two sides of the same coin (Pretty *et al.* 1995; Pretty 2010b).

A number of observers have drawn our attention to how separating humans from nature can have negative consequences such as the intensification of ecological degradation outside protected areas (Bruner *et al.* 2001), physical and emotional health problems (Pretty 2007; Pretty 2010a), disappearance of ecological knowledge and language (Pilgrim *et al.* 2008; Pilgrim and Cullen 2008; Pretty *et al.* 2009; Pilgrim *et al.* 2009) and loss of sustainable social norms and regulations (Berkes *et al.* 2000; Berkes 2008; Pretty *et al.* 2009) . Pretty describes the argument: "as nature is separate from us, so it should be strictly protected in pockets and patches away from human activity. If it is protected, then we can shrug our shoulders at damaging economic activity in the surrounding landscape" (Pretty 2002b page 43).

Two main approaches have been found in the literature regarding the study of human – nature interactions. One is based on socio-psychology theories of environmental attitudes and behaviour. This approach uses mostly quantitative methods and exemplifies the human-nature dichotomy previously explained. The other finds its foundations in anthropological and sociological constructivist theories and tends to use qualitative methods to gain an in-depth, detailed understanding of the studied phenomenon.

2.1.1. Quantitative Approaches to Human – Nature Relationships

Human values are often involved when discussing how to achieve a more environmentally sustainable society. The literature on environmental values spans several disciplines including philosophy, economics, sociology, psychology and political science. For philosophers, values are moral stable principles that convey what is considered good and help us to make decisions (Benton 2008); economists use values when analysing several alternatives as guides to assess the best choice, though generally under a utilitarian perspective; social and political scientists consider environmental values as an emergent trend in post-materialist societies whose members have achieved the fulfillment of their basic needs (Inglehart 1990a; Kempton *et al.* 1996) but also as the manifestation of core human value clusters such as self-interest, altruism, traditionalism and openness to change (Schultz *et al.* 1999; Schultz 2001).

Most of the theory about human values is based on the seminal work of Rokeach (1973; 1979). According to this author, a value is "an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode or conduct or end-state of existence. A value system is an enduring organization of beliefs

concerning preferable modes of conduct or end-states along a continuum of relative importance" (Rokeach 1973 page 5). This theory assumes that the total number of values that a person holds is relatively small and that all humans possess the same values to different degrees. Additionally, values can be traced to culture, society and its institutions as well as personality.

Values are important because they are thought to lead to changes in decisions and these to changes in behaviour. According to socio-psychology theory, values influence behaviour through a complex interaction of different levels of cognition. A cognitive hierarchy framework recognizes several layers of cognition where values provide the foundation for higher order general beliefs which in turn influence specific attitudes and these in turn influence behaviours and political action (Figure 1.1) (Fulton *et al.* 1996; McFarlane and Boxall 2000; Oppenheim 2003; Dietz *et al.* 2005).

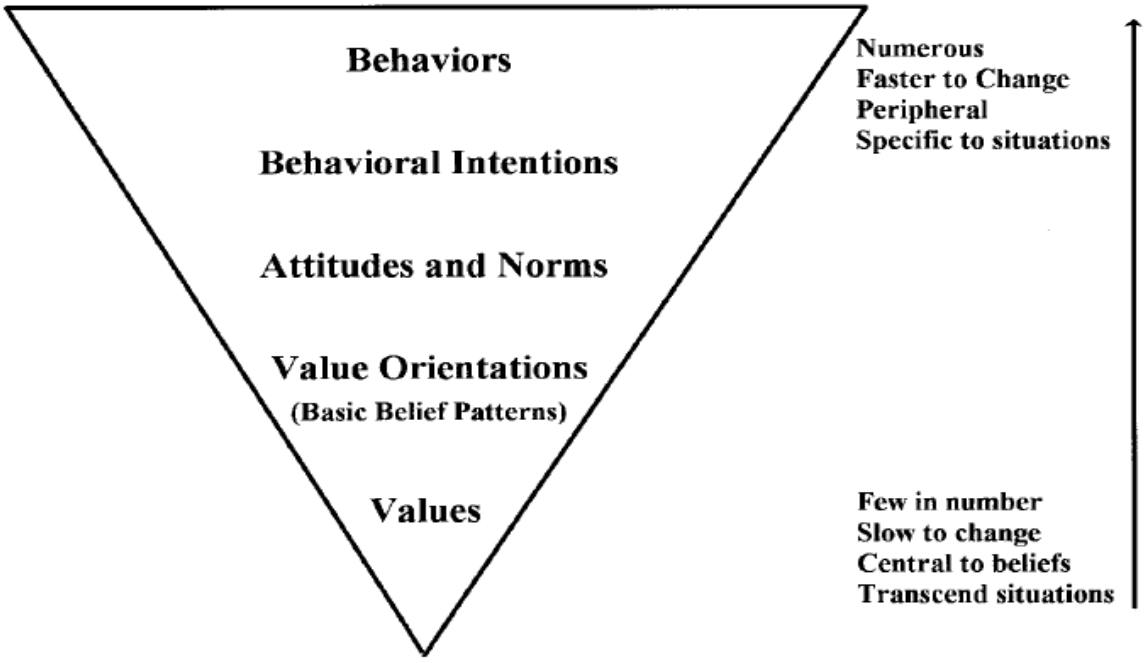


Figure 2.1. The cognitive hierarchy model (Fulton *et al.* 1996 page 36).

Figure 1.1 should not be taken literally, however. It is useful to make a distinction between different levels from stable and general to changeable and specific. But it is important to understand that there are relationships and patterns of connections between these different layers of cognition that can occur through time (Oppenheim 2003). There are also exceptions including important feedbacks that must be assessed such as the effects of newly acquired

behaviours on future beliefs and attitudes, as non-adjacent variables may also affect each other directly (Stern *et al.* 1995).

At this point it is useful to clarify some terms found in the literature as there is a tendency to use them somewhat differently among the different research traditions (Dietz *et al.* 2005). Brief definitions of these concepts can be seen in Table 1.1 below.

Table 2.1. Definitions of common terms in value theory.

Concept definition	
World views refer to a person's belief about humanity's relationship with nature. Sometimes considered similar to the idea of connectedness to nature.	(Schultz *et al.* 2004; Mayer *et al.* 2004)
Values are beliefs about desirable states or behaviours that are personally or socially preferable and that transcend specific situations.	(Rokeach 1979)
Value orientations are general beliefs that represent two ends of a continuum such as liberalism and conservatism or biocentricism and anthropocentricism.	(Vaske and Donnelly 1999)
Attitudes are positive or negative evaluations of something specific.	(Schultz *et al.* 2004; Dietz *et al.* 2005).
Beliefs are understandings about the state of the world. They are facts as the individuals perceive them.	(Dietz *et al.* 2005)
Norms are accepted standards of behaviour.	(Dietz *et al.* 2005).
Environmental concern reflects both a sense that something is important and the belief that it is at risk.	(Stern *et al.* 1993; Schultz *et al.* 2004; Dietz *et al.* 2005)

Introducing these definitions is also relevant as many of them have been used, sometimes interchangeably, as attitudinal variables in quantitative studies of human – culture associations. The selection of the concept and its definition directly affects the measuring instrument developed in these studies. In the next section some of these quantitative instruments will be discussed.

2.1.1.1. *Measuring and explaining human-nature relationships*

In the last decades, the emergence of environmental problems as major policy issues was taken as an expression of a growing awareness among the general public of the need to

reconcile human needs and the protection of natural environments. Interested in assessing this potential transformation of our relationship with the environment, Dunlap and Van Liere developed in 1978 the new environmental paradigm (NEP) scale. The instrument included twelve Likert items and aimed to assess people's beliefs regarding the impact of human activities on upsetting nature's balance, the need to define limits to growth for human societies and the right of humans to rule over the natural world. The scale that was applied to a Washington State study proved to have very good internal consistency and was able to differentiate between environmentalists and the general public (Dunlap and Van Liere 1978) and therefore researchers argued that the scale could be used as a good measure of the adoption of a new paradigm or world view regarding human relationships with nature. Though other measuring instruments emerged during the early 1980s, the NEP scale became a widely used tool to evaluate people's ecological word view (Dunlap *et al.* 2000).

This idea of an increasing environmental awareness among the United States population received further support with the study published in 1995 by Kempton and colleagues in the book "Environmental Values in American Culture". Using the theoretical foundations of cognitive anthropology, these investigators applied semi-structured interviews to uncover the diversity of cultural understandings or models developed in American society regarding nature, and used quantitative methods, including factor analysis, to examine how those models were shared within and between different segments of society. These groups included environmentalists from Earth First! and the Sierra Club, members of the general public and groups that have been affected by environmental legislation such as managers of dry cleaning shops and laid-off sawmill workers in Oregon. The findings of this research indicated that environmentalism has become part of core US values and that it is built on the understandings people have on how nature works and how humanity should interact with it. According to this study, environmentalism is not based on a single component but includes various elements such as a utilitarian view of nature, obligations to our descendants, spiritual or religious values of nature and in some cases the existence value of nature. Furthermore, most interviewees expressed a pro-environmental stance which does not seem to be opposed by any alternative coherent view (Kempton *et al.* 1996).

Five years after the publication of "Environmental Values in American Culture", Dunlap and colleagues presented a newly revised New Ecological Paradigm (NEP) scale. This fifteen item Likert scale was updated to include items that represented issues that had appeared in discussions about the environment since the first scale was designed. These were the notion that unlike other species, humans as exempt from nature's constraints and the possibility of an eco-crisis due to the negative impacts of human activities on the biosphere. Results from

the item-total correlation and factor analysis demonstrated that the scale had a high degree of internal consistency, meaning that there was a predominant factor that in this case could be called world view, underlying the informants' responses. Also, in accordance with previous research, the revised scale consistently found that young, well-educated and politically liberal adults scored higher, but probably most importantly, NEP scores correlated significantly and positively with self-reported pro-environmental behaviours (Dunlap *et al.* 2000).

So far, both the previously discussed new ecological paradigm and the environmental cultural models aimed to investigate people's basic beliefs about nature and our relationship with it but there was also a parallel stream of research that focused not so much on beliefs but on a wider group of elements influencing the adoption of behavioural changes. In this respect, Schwartz introduced his norm activation theory of altruism (Schwartz 1968). This theory suggests that the adoption of certain norms of conduct or pro-environmental behaviours becomes more probable when an individual is aware of harmful consequences to others from the environment or what he calls altruism, and when the person ascribes responsibility to herself or himself for changing the damaging environmental condition.

Schwartz's model which treats environmental concern as altruism toward other human beings was expanded by Stern *et al.* (1993), to include self-interest (egoism) and concern for other species (biospheric values). Stern *et al.* (1993) argue that environmental concern found in American society through the application of the NEP scale has three distinguishable but correlated components: self interest, concern for other human beings and concern for other species and the environment. These authors found that all three elements had some influence on expressed willingness to take action but concern about others showed weaker influence when actions such as increased tax payments to protect the environment were considered. According to Stern *et al.* (1993), this was the case because different questions draw attention to different value frames in the individual. In this case the monetary or egoistic aspect of environmental problems was called upon and therefore, yielded a differing degree of environmental concern. Also, Stern *et al.* (1993) found that women are more attentive than men to links between the environment and things they value and therefore they tend to be more aware of the negative effects of environmental degradation.

In another study, Stern *et al.* (1995) attempted to provide a socio-psychological context to the NEP scale developed by Dunlap and colleagues as most of the related literature had been criticized for lacking a theoretical foundation. With this in mind, the authors proposed a theoretical framework similar to the cognitive model presented earlier but including some

interesting novel elements such as the importance of the cultural context and general beliefs or what the authors call folk ecological theory. This model is depicted in Figure 1.2. below.

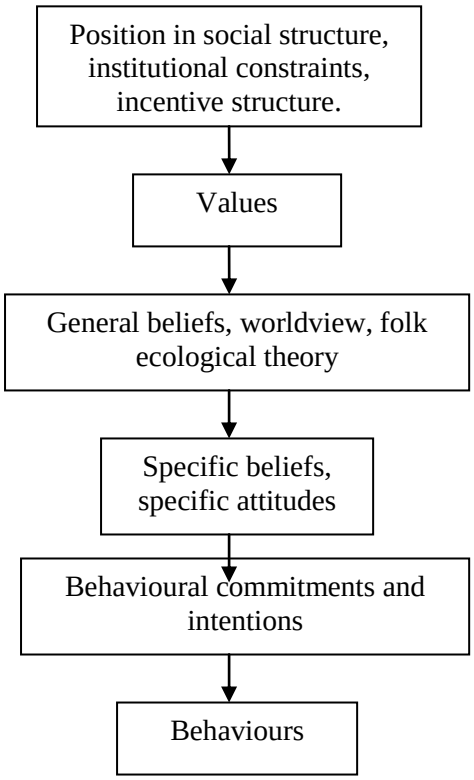


Figure 2.2. Causal model of environmental concern (Stern *et al.* 1995).

Though causal arrows are not presented in Stern *et al*. (1995), the authors suggest that the major flow of causation goes from top to bottom, therefore the factors at the bottom end are more mutable by the individual or over the individual's lifetime than those near the top. This model also proposes strongest causal effects between variables that are adjacent, though influences between non adjacent variables can also occur. It is also important to note that there might be important feedbacks between variables that need to be assessed empirically.

According to this proposed model of environmental concern, individuals are embedded within a social structure which shapes early experience and therefore core values and beliefs or worldviews. This social context also provides opportunities and challenges to specific behaviours. General values and worldviews are antecedent to specific beliefs and act as filters for new information. General values are antecedent to worldviews because they are probably formed earlier in life, are broader and as basic as personality itself and probably more stable throughout life (Stern *et al.* 1995). Worldviews or general beliefs are more vulnerable to

experience but causal links between values and worldviews need to be further studied, the authors warned.

In this study Stern *et al.* (1995) conducted a telephone survey on a sample of 199 adults in Virginia. Results indicated that the NEP scale measures a paradigm or worldview about human – environment relationships and it is highly correlated with the measure of awareness of the consequences (AC) of environmental problems. Both measures behave similarly when related to specific attitudes and behaviours. The authors conclude that NEP and AC measure generalized beliefs about human – culture relationships or what they call "folk ecology". This set of beliefs might be influenced by the social structure and influence specific attitudes and behaviours.

But Stern and his colleagues go further to develop a Value-Belief-Norm (VBN) model to explain environmentally significant behaviours (Stern *et al.* 1993; Stern *et al.* 1995; Stern 2000). This model links value theory, norm-activation theory and the NEP perspective and suggests that there is a causal chain of variables that leads to environmental behaviour. These variables are personal values, beliefs (such as NEP, awareness of adverse consequences (AC) or perceived ability to reduce the threat (AR) and personal norms of environmental conduct) (Figure 1.3.).

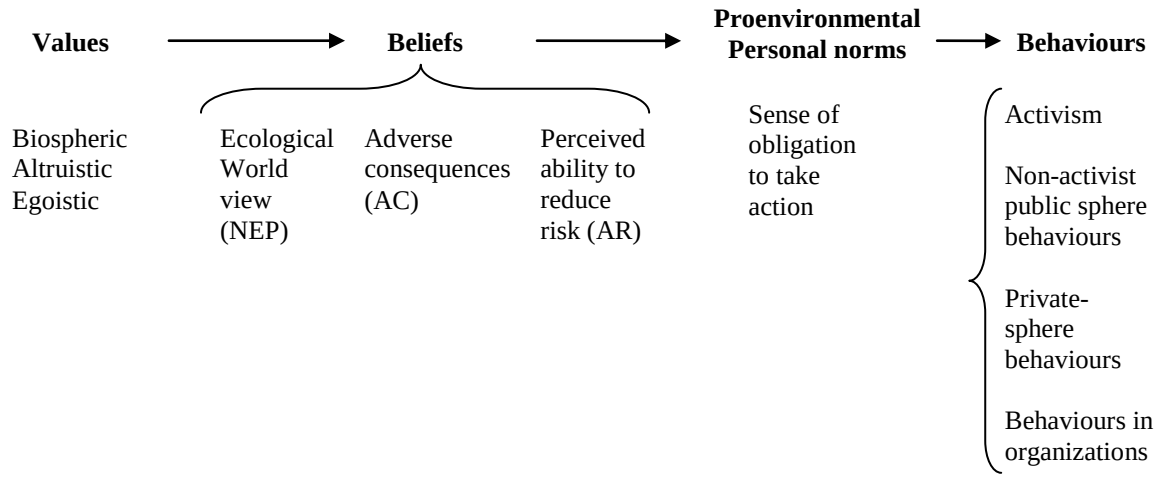


Figure 1.3. A schematic representation of variables in the value-belief-norm (VBN) theory of environmentalism (Stern *et al.* 1995 page 412).

The causal chain goes from relatively stable elements to more changeable elements about human – nature interactions, their consequences and the individual's responsibility to take action. The authors postulate that each variable directly affects the next and may also affect

other variables farther down. This model relates value theory to norm activation theory as it suggests that the consequences that are important in activating personal norms are the negative effects on whatever the individual values. It is important to note that in the figure egoistic values should be negatively correlated to environmentalism. Also though the arrows represent suggested directed effects, this influence can also be observed on variables more than one level to the right. Similarly, feedback may also occur mainly on less stable variables such as behaviours and personal norms.

An important contribution of this model is that it makes clear that the link between values and actual behaviour is mediated by particular beliefs. In this sense, beliefs about the effects of environmental degradation on what people value and people's capacity to make a change, seem to be of particular importance. This is also interesting as it suggests that norms and behaviours, which are farther down to the right of the causal chain, can actually be shaped when new information is learned.

In another related work, Guagnano *et al.* (1995) proposed the ABC theory. According to this proposition, behaviour (B) is the result of the interaction between personal attitudinal variables (A) and contextual factors (C). This helps to explain the results of several studies that have failed to find a positive correlation between attitudinal factors and behaviours. To have a strong attitude-behaviour association, the influence of contextual factors needs to be neutral or zero. If the contextual conditions are strongly positive or negative, they will be compelling or prohibiting the related behaviour (Kennedy *et al.* 2009).

Based on this ABC theory, Stern *et al.* (2000) identify four types of variables that influence environmental behaviour. These are attitudinal, contextual, personal capabilities and habit or routine and should not be considered in isolation but interacting on one another. Attitudinal factors include norms, beliefs and values related to the environment but also non-environmental attitudes related to issues such as luxury, family responsibility, security, solidarity, fairness, etc. Contextual forces include advertising, government regulations, monetary incentives and costs, physical or technological limitations, etc. Personal capabilities refer to knowledge and skills that are necessary to pursue certain types of activity and include power, literacy and economic resources. In this sense it is important to note that some studies have shown that sociodemographic variables such as gender, education, income or age have very limited explanatory power for environmental behaviour (Stern *et al.* 1995; Guagnano *et al.* 1995). And finally, the adoption of some environmental behaviour requires changes in habits that sometimes are difficult to eradicate.

The low association between attitudinal factors and environmental behaviours was also explored by Thompson and Barton (1994). Apart from contextual factors that may favor or hinder the adoption of pro-environmental behaviours they suggest at least two "motives or values" that inspire support for the environment. These are anthropocentrism and eco-centrism. Some authors have suggested that eco-centrism as proposed here is similar to biospheric altruism in the Schwartz tradition, while anthropocentrism combines self-interest and humanistic altruism (Dietz *et al.* 2005). According to Thompson and Barton (1994), individuals with either motive might support environmental protection but for different reasons. This distinction, they suggest, is useful in understanding and predicting pro-environmental behaviour as anthropocentric individuals will be less likely to act to protect their environment if these actions interfere with other human-centered values such as material wealth or political power.

Thompson and Barton's study is particularly relevant to this research because it reduces the complexity that other theories dealing with human values and environmental behaviours have tried to capture and explain. This reductionist model of a biocentric – anthropocentric continuum proposes to discriminate between people who consider nature as important in its own right (biocentric) and those who consider that nature as important only to serve human needs (anthropocentric). This dualistic vision of humans and nature as separate entities seems to have been particularly well accepted in natural resource management circles as it provides further support for and goes in agreement with the establishment of national parks. Limitations of the biocentric/anthropocentric dualism theory to human values and behaviours are further discussed in the cross national studies section of this literature review.

A different approach to the study of human – nature associations is presented by Kellert *et al.* (1996) as part of their efforts to understand the interactions between humans and wildlife. These authors suggests that people's attitudes to wildlife are influenced by basic values that people hold about nature and wildlife, their perceptions, their knowledge and their general understanding of human – wildlife relationships. Based on this assumption six attitudinal categories have been proposed:

1. Humanistic: strong affection for wildlife and for its existence, value and protection
2. Naturalistic: strong interest in direct outdoor recreational contact with wildlife
3. Negativistic: strong fear, dislike or indifference towards wildlife
4. Doministic: strong interest in mastery, control and dominance of wildlife
5. Utilitarian: strong support for utilization or subordination of wildlife for practical benefit of humans

6. Ecologistic: strong interest in the ecological value of wildlife and its relationship with other species and the natural environment.

More recently another stream of research has sought to understand human – environment interactions by focusing on whether humans feel themselves part of nature or not. These investigations are based on a long history of environmental literature which draws attention to the importance of feeling connected to nature to encourage environmental protection (Leopold 1949a; Pretty 2002b; Pretty 2007). In the foreword of his book *A Sand County Almanac*, Aldo Leopold summarized this view: "We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect" (Leopold 1949a, page xviii). Later in 1993, Kellert and Wilson (1949b) proposed that human beings possess an innate need to connect with other living things but as humans started to concentrate in cities this connection becomes increasingly weak. They coined the term "biophilia" to describe this human affiliation to nature.

The novelty of this stream of research that aims to assess this human connectedness to nature resides in its departure from the traditional emphasis on cognitive psychology to further explore feelings and emotions as essential components of human – nature relationships. Four different approaches have been presented so far. These are the inclusion of nature in the self scale (INS) (Schultz *et al.* 2004), the connectedness to nature scale (CNS) (Mayer *et al.* 2004), the implicit association test (IAT) (Schultz *et al.* 2004) and most recently the relatedness to nature scale (NR) (Nisbet *et al.* 2009).

The inclusion of nature in the self scale (INS) is a single item scale that uses images of pairs of circles, each circle containing either the words "self" or "nature" and "me" or "not me". Individuals have to choose the image that best represents their relationship with nature. Most concerned people select entirely overlapping circles between "me" and "nature". This scale has been found to be weakly associated to biospheric concerns and self-reported environmental behaviour.

The application of the implicit association test (IAT) has shown that an individual with less association with nature can still be concerned about the environment but for reasons that directly affect him or her and that this connection is relatively stable across time (Schultz *et al.* 2004). Criticism regarding this instrument relate to its low capacity to predict environmental behaviour and the logistical complications of its applicability (Bruni and Schultz 2010).

More recently, Bruni and Schultz (2010), based on the IAT principles developed a game version of the IAT called *flexitwins*. This computerized game proved to be internally reliable and positively correlated to the inclusion of nature in the self scale (INS) but only marginally. Gender differences were found with women scoring higher than men.

The connectedness to nature scale (CNS) developed by Mayer and colleagues (Mayer *et al.* 2004) consists of 14 Likert scale items and attempts to measure an emotional sense of closeness with nature. CNS has been found to be correlated moderately to NEP and biospheric values but not with altruistic and egoistic values and has a relatively good ability to predict behaviour. Some of the strongest points of this tool are its high reliability (Cronbach's alpha=0.82) and easiness to administer. However, Perrin and Benassi (2009), argue that the connectedness to nature scale measures cognitive and not emotional connections to nature and make some suggestions on how to improve it.
Recently, a nature relatedness scale (NR) has been proposed by Nisbet *et al.* (2009). This scale contains 21 items to assess the cognitive, affective and experiential aspects of one's connection to nature. This scale strongly correlates with the New Ecological Paradigm scale and it seems to predict environmental attitudes but not behaviour.

As explained before, theories about environmental values and behaviours have received considerable attention in the last 30 years because of their potential to explain environmental action. Not surprisingly, this type of research has found fertile ground among resource managers interested in promoting environmentally sound practices.

2.1.1.2. Application of environmental values theory to natural resource management

Theories that try to explain human – nature interactions on the grounds of environmental values and behaviours have provided a useful analytical framework for analysis in natural resource management in the last decades. In most cases these theoretical structures have been applied to the development of conservation policies and actions related to wildlife, forest and protected areas management, particularly in cases where the integration of social issues and the incorporation of different actors' perspectives and interests have been acknowledged as vital for conservation success.

From all the concepts that aim to define human – nature relationships discussed above, the identification of the biocentric/anthropocentric value orientations of different stakeholders has been by far the most frequently used with little reference to other value measurements (Dietz *et al.* 2005). This is not surprising as this bipolarity reflects well how environmental

debates are perceived (Vaske *et al.* 1999) and particularly how human separation from nature seems to have become a precondition for nature conservation among some conservation practitioners.

This biocentric/anthropocentric analytical framework has proved to be particularly useful when investigating support for protected lands by different stakeholder groups such as campers and hunters (McFarlane *et al.* 2000; Zinn *et al.* 2002; Voorhies-Holloway 2009), when the evolution of forest management policies from timber production and economic development to sustainable ecosystems and services is being promoted (McFarlane *et al.* 2003; McFarlane and Hunt 2006) and even when the competing demands of local and federal interests on natural resource management are feared among different stakeholders (Reading *et al.* 1994). Most of this research has been conducted in the US and Canada where results seem to indicate that the participants exhibit a marked dichotomy between biocentric and anthropocentric value orientations. This means that people who have a biocentric value orientation tend to reject anthropocentrism and vice versa. Though these findings seem to support the biocentric/anthropocentric value orientations model, results of its application to different cultural setting have been less encouraging.

The relationship between biocentric/anthropocentric value orientations and other human values and demographic characteristics has also been studied. A good level of knowledge about nature (Reading *et al.* 1994; McFarlane *et al.* 2006; Voorhies-Holloway 2009), young people (McFarlane *et al.* 2006), females (McFarlane *et al.* 2003; McFarlane *et al.* 2006), higher education (Zinn *et al.* 2002; Voorhies-Holloway 2009) and belonging to a conservation organization (McFarlane *et al.* 2003; McFarlane *et al.* 2006) seem to be positively related to biocentric views. Also libertarian and dominionistic values have been suggested as influencing anthropocentric views (Reading *et al.* 1994). However, in other studies no influence of socio-economic variables has been found to be associated to forest value orientations and attitudes (McFarlane *et al.* 2000) and though most studies seem to suggest the idea of progressive change in values from anthropocentric to biocentric among the general public, one analysis found no evidence that this trend is maintained (Staples *et al.* 2001).

According to most theories, environmental values influence behaviours and serve as a reference when people are confronted by difficult choices, especially those that involve trade off between preferences. Studies exploring this relationship have yielded mixed results, however. Investigations in the US and Canada have found a positive association between consumer and political behaviours and environmental attitudes/worldviews or biocentric

value orientations (Thompson *et al.* 1994; Vaske *et al.* 1999; Dunlap *et al.* 2000; Scott *et al.* 2004a; McFarlane *et al.* 2006) but in most cases linkages between pro-environmental attitudes and worldviews and conservation action were modest or even low (Thompson *et al.* 1994; Dunlap *et al.* 2000; Scott *et al.* 2004a). Others, in contrast, have found no influence such as in the case of environmental activism in the forest sector in Canada, (McFarlane *et al.* 2003).

Different authors have tried to explain these inconsistent results on several grounds. First of all, there is a pervasive lack of actual behaviours reported in the literature analyzed. Instead, authors tend to use self-reported behaviours or behavioral intentions as proxies. According to the theory of reasoned action, relevant behaviours are under the control of the individual and therefore the most direct predictor of a particular behaviour is the intention of engaging in that behaviour (Ajzen and Fishbein 1980 cited in Vaske *et al.* 1999). Though the common use of these measurements is mainly due to limitations in the resources available to measure behaviour directly (Dietz *et al.* 2005), it is widely accepted that this research strategy might be yielding incomplete results (Guagnano *et al.* 1995; Vaske *et al.* 1999; Stern 2000; Dietz *et al.* 2005).

Second, there is a wide variety of environmental behaviours being analysed in different studies and as it is likely that specific actions relate to a specific set of values, many of which are not necessarily environmental values, the number of psychological factors involved is enormous (Stern *et al.* 1995). Though there is no universally accepted classification of environmentally significant behaviours, a distinction is often made in the literature between behaviours in the public sphere that try to influence the actions and policies of government or the corporate sector and everyday behaviours in the private sphere that seek to reduce personal impact on the environment (McFarlane *et al.* 2003; Scott *et al.* 2004a). Among the first group, often used indicators include environmental activism, belonging to a conservation organization, writing to a politician and voting intentions. In the second groups are considered action such as recycling, forest conservation on private property, energy-saving and green-consumer behaviours. Besides being the result of specific sets of values, specific behaviors might require particular skills and knowledge that might not be available in certain cases.

Third, the low attitude - behaviour linkage might be also the result of a disparity between what is reported and the real possibilities of taking action. For example, the increased coverage of environmental issues by the media might be resulting in people adopting the environmental discourse without committing to behavioural changes. Also interviewees

might be unaware of how their behaviour might be causing environmental degradation or what options they have to change those actions or simply most environmentally friendly options may not be available to them (Stern 2000; Scott *et al.* 2004a).

If attitudinal factors have been found to have low predictive power to explain environmental behaviours, the effect of socio-economic factors seems to be even weaker. Education and income seem to be associated positively to conservation voting intentions in one study (Scott *et al.* 2004a; McFarlane *et al.* 2006). Also it seems that men tend to engage more in political behaviours while women do so in environmentally oriented consumer behaviours (Scott *et al.* 2004a). Contrastingly, in another study neither age, income, gender nor education were associated with environmental activism (McFarlane *et al.* 2003).

In sum, of all proposed theories on environmental values and behaviour, the biocentric/anthropocentric value orientation proposition has received most attention from environmental managers maybe due to its simplicity and its accordance with the generalized view that human population needs to be fenced out in order to protect nature. Studies on environmental value orientations and their relationship with socio-demographic factors have proved to be relatively consistent. However, when links between value orientations and conservation actions are explored, findings are far from conclusive (Kennedy *et al.* 2009). This lack of predictability is further amplified when environmental value and behaviour theories are examined under different cultural conditions.

2.1.1.3. Cross-country studies on environmental values and behaviours

There are very few multinational studies on environmental values and behaviours (Schultz *et al.* 1999). Contrary to the notion that environmental concern is a post materialist attitude more likely to emerge in industrialized countries, studies conducted in Latin American and Asian countries found that environmental issues are a much wider concern (Schultz *et al.* 1999; Bechtel *et al.* 2006), though there seem to be differences in how other personal values influence environmental value orientations in different countries. For example, Schultz and Zelezny (1999) in their analysis of US and Latin American samples suggest that altruistic values appeared to be positively related to NEP and that eco-centrism and tradition were negatively associated while Midori *et al.* (2003) found that in Japan, Bangkok and Manila, environmental values are linked to both traditional and altruistic values.

Also, Bechtel *et al.* (2006), in their comparative study in Japan, the United States, Mexico and Peru found that participants in these countries do not show dualistic views about the

environment but they adhere to both views simultaneously. That is to say, one individual might present both biocentric and anthropocentric views about the environment. Also Bechtel *et al*.(2006) and Corral-Verdugo and Pinheiro (2009) found a bias towards holism and collective action as characteristics of Latin Americans in their interaction with their environment. Similar results have been reported for New Zealand students who presented two factors responsible for their environmental views (Milfont and Duckitt 2006).

Along these lines, studies in Belize, Ecuador, Canada and Finland have also found that, a single protection - use continuum does not emerge from the data. Instead two factors corresponding to both biocentric and anthropocentric value orientations, coexist within each individual (Fulton *et al.* 1996; Finchum 2002; Berninger and Kneeshaw 2009). Using these value orientations internationally also show surprising results such as those found by Sarigöllü (2009) that indicated that respondents from Istanbul scored higher in environmental concern that interviews from Montreal. She argues that this might be because environmental problems are more acute in Istanbul.

Also studies on the biocentric - anthropocentric continuum using sophisticated factor analysis techniques have also shown that both factors were present simultaneously among the general public in Canada where previous studies have found only the biocentric - anthropocentric continuum (McFarlane *et al.* 2003). Furthermore, these authors suggest that creating a continuum by combining anthropocentric and biocentric factors, as most of the studies in northern latitudes do, may mask the different impacts these factors have on other variables. In the Canada study for example, the anthropocentric factor had a greater impact on specific environmental attitudes but only the biocentric orientation was associated to pro-environmental behaviour. These findings support Thompson and Barton's idea that the biocentric and anthropocentric factors may be providing distinct justifications for environmental conservation and therefore they need to be treated independently.

Some authors have suggested that difficulties in finding this dualism internationally might be related to the different levels of dependence on and contact with natural environments that different societies have. Vaske *et al.* (1999) have suggested that in cultures that are more dependent on technology and where citizens are increasingly removed from nature, people will tend to develop environmental values that are less complex than societies that are still highly dependent on natural resources. In a recent study Berninger *et al*. (2009) explore this proposition by studying value orientations among groups that had different levels of dependence on forestry in Finland and Canada. These authors found no evidence to support the proposition that resource dependence influences value orientations.

The analysis of the influence of socio-economic factors on environmental attitudes and values internationally has produced diverse results. Milfont and Duckitt (2006) in their cross cultural study conducted in Brazil, New Zealand and South Africa found that women tend to score high while Cowie (2006) in New Zealand found that women and men hold similar levels of environmental values. Sarigöllü (2009) also found that in Istanbul well educated females were more environmentally minded but found no association between age, gender and income and environmental concern in Montreal. Moreno *et al.* (2005) found that both individual concerns and social norms and opinions were determinants for shaping environmental attitudes among Spanish populations. These results point to the relevance of socialization and cultural process in the definition of environmental attitudes in different parts of the world.

Along these lines, one of the cultural factors that requires attention in international investigations about environmental concern is religion. As religious beliefs are the basis for the individual's morals and values it has been hypothesized that religious beliefs might be associated to how people perceive their relationship with the environment. In this sense, international studies indicate that the adherence to Judeo-Christian doctrines tend to correlate negatively with the NEP scale (Hand and Van Liere 1984) and justify the use of nature to satisfy human needs (Kim and Kim 2010) while Buddhism and Native American animism tend to favor the idea of humans as parts of nature (de Groot and Van Den Born 2007).

Despite the association found between kinds of religion and environmental concern, it is important to note that research on the connection between levels of religiosity and positive environmental attitudes and behaviours has led to divergent conclusions. In Judeo-Christian societies, for example, some studies have found a negative effect of religiosity measures on environmental concern (Schultz *et al.* 2000), others have found no influence (Pepper *et al.* 2010) or even a positive effect (Sherkat and Ellison 2007). Similarly, studies in countries that share other religious beliefs such as Korea, Japan and China have shown that these countries widely differ in their attitudes towards the environment (Kim *et al.* 2010). Cross country comparisons are often hampered by methodological problems such as the use of different measures of religiosity in nations that share similar religious beliefs (Pepper *et al.* 2010; Kim *et al.* 2010).

When studies aimed to examine the relationship between environmental attitudes and behaviours are conducted internationally results become more varied. For example Midori *et al.* (2003) found that in Japan biospheric values are positively related to both consumer and political behaviour, while in The Netherlands biospheric values are only associated to

political behaviour. In rural communities of Costa Rica Jantzi *et al.* (1999) found that conservation action was influenced by environmental values but these in turn were rooted in childhood experience with the forests and in the wider social and moral values present in religious doctrines. Milfont *et al.* (2006) also found that in New Zealand specific environmental attitudes completely mediated conservation behaviour while in Brazil and South Africa this mediation was weaker. According to the same authors, in Brazil ecological behaviour seem to be judged based on the costs and benefits to the person while in New Zealand and South Africa the impact of conservation behaviour on the community as a whole seems more relevant.

2.1.1.4. Limitations of quantitative studies

An examination of the literature devoted to the study of environmental values and behaviour shows that this research shows limitations that deserve some discussion. First, the conceptual ambiguity that some authors have considered inherent to the assessment of environmental values (Dunlap *et al.* 2000) results in different researchers measuring different concepts that, though theoretically related, are not strictly the same. For example, the NEP scale has been treated as a measure of environmental values, worldviews and attitudes (Dunlap *et al.* 2000). Also the diversity of instruments used to quantify these different variables hampers potential comparisons across studies and places (Dietz *et al.* 2005).

Second, the interpretation of the findings using this anthropocentric - biocentric dualism in particular differs significantly from one study to the other. In some studies researchers assume that biocentrism and anthropocentrism are related and that every person can be located somewhere along this continuum. Therefore, only a single measure is calculated. However, some authors have argued that the existence of this single continuum is not supported by research conducted in developing countries (Finchum 2002; Dietz *et al.* 2005), thus these authors argue that two different measures are required for each individual.

Third, it is important to note that nearly all the reviewed studies use correlation as an analysis tool to establish some association among variables. In this sense it is important to remember that though the theory of environmental values suggests that values influence specific attitudes and these in turn behaviours, the methods used mostly can not establish a causal order. Long term studies and experimental design have been proposed to overcome these obstacles (Milfont *et al.* 2006). If the assumption that human values are relatively stable throughout the individual life, is correct, however, then it seems that these sort of designs will not contribute much to the exploration of these causal chains (Dietz *et al.* 2005).

Fourth, most of the studies use self-reported behaviours or behavioural intentions as proxies of conservation action. Though this, it has been argued, is the result of the inadequate time and financial resources available to conduct research (Dietz *et al.* 2005), it is admittedly one important limitation of these studies. Also it is important to make a distinction between environmental behaviours and environmental impact as not all actions have the same effect upon the environment (Stern 2000).

Fifth, in most studies, samples are made up of university or college students and among them an important number comes from social sciences so that participants are not randomly selected, which has implications for the extent to which findings can be extrapolated to the wider population (Milfont *et al.* 2006). These circumstances also lead to studies that are for the most part correlational instead of quasi-experimental. Sixth, when studies are conducted in other countries and surveys are translated, statements could be culturally inappropriate or difficult to understand (Schultz *et al.* 1999).

2.1.2. Qualitative Approaches to Human – Nature Relationships

The sociological and anthropological literature offers a different approach to that of the socio-psychological school of thought previously presented here. These mostly qualitative studies emphasize the social construction of nature as an alternative to overcome the conceptual duality of nature and society. Though social production and social construction of nature are currently used almost interchangeably, they have different theoretical origins (Neumann 2005). The social production of nature is based on Marx's idea of nature being shaped by labour and the labourer in turn being shaped by nature through time. Social construction of nature, on the other hand, more strictly refers to the importance of concepts such as representation, discourse and imagery in structuring our knowledge of nature.

There are many positions within this social constructivist theory. For example, absolute relativism states that reality is only knowable through socially constructed meanings and therefore there is no single shared social reality, but a series of different social constructions (Ritchie *et al.* 2006b). This philosophical stance has been highly criticised for its strong anti-realist position, but it has also brought into the picture the importance of discourse, representation and imagery that different actors, from local resource users to government officials, conservationists and scientists, use to frame the causes and solutions of environmental problems (Neumann 2005).

As an alternative, a variant of social constructivism has emerged which recognizes that reality is socially constructed and therefore composed by multiple truths but also limited by material reality. According to this constrained constructivism, reality exists independently of our beliefs and understandings and reality is knowable through the human mind and socially constructed meanings (Snape and Spencer 2006). Meanings that people attach to nature are intangible, symbolic and even emotional devices that help them to make sense of their surroundings and are influenced by both social influences as well as the physical world. Constrained constructivism has become a middle ground between the absolute realism that argues for an objective reality and the absolute relativism that proposes multiple subjective ways of seeing (Smith 2006a).

Within the constructivist theory, cognitive anthropology has developed two concepts that are relevant here. One is that people organize their belief and values within cultural models. The other is that these models vary across society's different groups. People create mental models to make sense of their surroundings and they use them to make interpretations, inferences, solve problems and reinforce their own values. When those individual mental models are shared within a cultural or social group they are referred to as cultural models.

While psychology's human values and behaviour theories have found fertile ground in natural resource management, research focusing on cultural models and the meanings people attach to nature, though gaining momentum, is still scant (Smith 2006a). As these studies of human – culture relationships are culturally and contextually very specific the extrapolation of their results tends to be problematic.

Despite the aforementioned, for the purposes of this study it is relevant to review in more detail two investigations that have used a qualitative approach to explore human – nature associations. One of these studies is the already mentioned exploration of Kempton *et al.* (1996) into environmental cultural models in the US. The other is the study of cultural models among peasant colonists of the Costa Rican section of La Amistad International Park prepared by Schelhas and Pfeffer (2008).

Kempton *et al.*'s study (1996) started with semi-structured interviews to gain insight into people's beliefs and values about the environment (cultural models). These interviewees were followed by a quantitative survey to identify variations in the distribution of those models across diverse groups of US society. In the first part of their study these researchers found three general environmental models of nature:

Model 1: Nature is a limited resource humans depend upon.
Model 2: Nature is balanced and interdependent. This includes two elements. One was the idea of chain reactions as nature's balance is upset by humans and the other is the difficulties of predicting such interdependancies.
Model 3: Society and nature which covers three aspects: the devaluation of nature because of the economic market, the lack of appreciation of nature due to our separation from it and the American idealization of the indigenous peoples as balanced with nature.

This study concludes that these models have become a shared set of environmental values and beliefs within American culture and that there is no alternative coherent belief system that opposes it.
The other study that deserves a detailed consideration here is Schelhas and Pfeffer (2008), as it studies the cultural models of colonists communities on the Costa Rican section of La Amistad. These authors also use the concept of cultural models to study culture – nature interactions. Schelhas and Pfeffer (2008) asked a series of questions to local members of the Costa Rican communities about when is it acceptable to cut trees and when is it not, in order to gain understanding on how they make trade-offs between environmental values and other values. Based on these data, the researchers were able to identify six mediating cultural models that are used by local people to come to terms with conflicts between forest conservation and livelihood needs. These models are:

Mediating model 1: Waste is wrong, but people should be able to cut trees for subsistence needs.
Mediating model 2: Because of our need, the government should compensate us for conservation.
Mediating model 3: When is it a forest and when is it a *tacotal* (second growth)?
Mediating model 4: The rich and outsiders can cut the trees but we can't.
Mediating model 5: Government regulations should not apply within my private property.
Mediating model 6: Direct opposition to conservation.

According to these results, local people deal with the conflict resulting from the establishment of a protected area by rationalizing their actions, blaming other actors and even challenging the definitions of forests and conservation. Though the first five mediating cultural models were by far the most common responses, outright opposition to conservation was also present. Those opposed were mostly people who had owned lands in the park which

were expropriated or who do not feel adequately compensated (Schelhas and Pfeffer 2008). These findings highlight how the history of the management of the park influences the way people currently negotiate their relationship with it and how other societal issues are immersed in these models. In this sense, the next chapter will present historical data to help understanding how the physical as well as the social context have shaped human – nature interactions in this border region.

2.1.2.1. Limitations of qualitative approaches

Qualitative studies such as the aforementioned make visible the multiple elements that surround human – nature relationships but they also present certain limitations. First, most on them rely on small samples that frequently fail to distinguish between the general public and the uniqueness in an individual's attitudes and behaviours. Second, they often offer a very complex representation that makes generalization in theory and practice troublesome. Third, most of these studies assume that the individuals are aware and able to indicate the aspects of environmental concern that are relevant to them (Winkel *et al.* 2009).

2.2. Trans-Boundary Conservation

In the last decade the adoption of trans-boundary protected areas (TBPAs) has increased dramatically but so has the skepticism about their effectiveness as a mechanism of global environmental governance. According to the IUCN, trans-boundary protected areas are "areas of land and/or sea that straddle one or more boundaries between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed co-operatively through legal or other effective means" (Sandwith *et al.* 2001). In addition, TBPAs are also referred to as Parks for Peace when one of their main goals is to promote peace and co-operation among nation states (Sandwith *et al.* 2001; Budowski 2003).

The concept of trans-boundary protected areas has become influential in the agenda of international institutions (Sheppard and Lopoukhine 2009). The World Commission on Protected Areas launched a task force on trans-boundary areas in 2004 and since then, it has supported the expansion of this initiative and the publication of numerous technical and policy documents. In Europe, IUCN is currently developing the Pan-European Greenbelt initiative to strengthen trans-boundary conservation along the former 'Iron Curtain' to create

the continent's longest ecological network (Sheppard and Lopoukhine 2009). Similar initiatives have been recently promoted at continental scale such as the protection of mountain ranges in the Pyrenees and the Andes to mitigate and address global threats such as climate change. Also, international organizations, such as IUCN, Conservation International, The Nature Conservancy and The World Wildlife Fund, promote the idea of TBPAs through the preparation of general guidelines (Sandwith *et al.* 2001; Sandwith 2003; Sheppard and Lopoukhine 2009), description of current trends (Sheppard 2000; Zcibz 2001) and ecological planning and monitoring (Danby and Slocombe 2004). General guidelines are drawn from specific case studies particularly from the USA (Chester 2000), Southern Africa (Katerere *et al.* 2001; Hanks 2003; Swatuk 2005; Whande 2007; Spencely and Schoon 2007), Eastern Europe (Bruner *et al.* 2001) and Asia (Trisurat 2003; Chai 2003).

As trans-boundary conservation efforts proceed, more terms are introduced to try to capture the variety of these approaches. This process is similar to that of the evolution of the concepts of national parks into protected areas previously discussed. Zcibz (2003) in her inventory of trans-boundary protected areas found that often there are more than one protected area involved and introduced the term complexes of TBPAs. Bakarr (2003), on the other hand, refers to the need to go beyond protected areas and suggests the term trans-boundary conservation areas (TBCA). This author also presents a typology of trans-boundary conservation areas that can be taken as an indicator of the increasing complexity that practitioners encounter when attempting to implement conservation across borders.

The momentum gained by TBPAs as part of the global strategy for biodiversity conservation is illustrated by the number of areas created recently. In 1997 Zcibz (2001), found 136 complexes of two or more TBPAs involving 488 protected areas and encompassing 98 countries. Ten years later, there are 227 complexes incorporating 3,043 protected areas (UNEP-WCMC 2007b). The reasons for this sudden surge are still debated. Some commentators indicate that trans-boundary cooperation is part of a wider political process leading towards new forms of global environmental governance (Katerere *et al.* 2001; Duffy 2002; Wolmer 2003a; Duffy 2007); others suggest that it is a brand new mechanism to attract donors (Duffy 2005; Fall 2009); and others state that they are not merely a consequence of geopolitical changes but a response to the increasing need to scale up biodiversity conservation to larger landscapes (Bakarr 2003).

Independently of the reasons that sustain this sudden interest on conservation beyond political borders, an analysis of the literature indicates that these efforts are frequently based on ecological, political, socio economic and peace building grounds. These justifications tend to

lack scientific evidence to support their claims and have found some level of criticism among different stakeholder groups.

2.2.1. Rationales for establishing trans-boundary protected areas

2.2.1.1. Ecological justifications

According to TBPA proponents, the ecological benefits behind the creation of TBPAs stem from their large scale. Extensive areas of good habitat are better suited to support low density, rare and endangered species and provide linkages within and between ecosystems for the migration of animals. Arguably they are in a better position to provide better representation of species and habitat diversity than smaller areas (Bakarr 2003; Hanks 2003) and might be better to address threats such as habitat loss, civil unrest, poor management, fragmentation, overhunting and even climate change (Bakarr 2003; Hanks 2003).

Despite these claims, almost no work has been done to assess the biodiversity conservation benefits of these trans-boundary areas (Bakarr 2003; Reyers 2003) and the few studies conducted show contradictory results. Research by Reyers (2003) in Southern Africa indicates that the expansion of the Kgalagadi Trans-frontier area beyond the South African border resulted only on a minimal increase in bird species representation. Similarly, vegetation types are poorly represented and show a bias towards particular vegetation types. This author concluded that, though further research is required, particularly on rare species distribution and the availability of migration corridors, biological data collected question the expansion of TBPAs in protecting greater samples of biodiversity and points out that the gains obtained do not justify the greater costs of managing a larger area.

In a similar fashion, the lack of a unified conservation policy across borders seems to be producing negative effects on biodiversity. Agrawal (2000) and Katerere (2001) demonstrated how along the Polish-Belarusian and South Africa-Mozambique borders, the implementation of distinct conservation policies was responsible for very visible and different distribution of plant and animal species. Likewise Homewood *et al*. (2001) based on an analysis of the long-term biodiversity changes in the Serengeti-Mara Reserve in East Africa, showed that despite the creation of a contiguous reserve, the differences in land tenure, agricultural policies and market conditions are producing declines in habitat and wildlife in these semiarid savannas on the Kenyan portion of the reserve.

Thus data supporting the ecological rationale of the TBCA is scant and ambiguous. In some cases, the additional transaction costs do not seem to be justified while in other cases the need for joint management is argued to conserve large scale ecosystems. The increasing awareness of global threats such as climate change seems to increase the need for large conservation areas to facilitate ecosystems resilience.

2.2.1.2. Political rationale

TBPAs can be interpreted as being embedded in a wider project aiming to shift authority from nation states to a diverse network of actors on the world stage (Duffy 2005; Duffy 2007). As a consequence, the creation of trans-boundary conservation areas is not neutral but a highly politicized process in which a variety of actors with unequal levels of power struggle to put their interests forward. Governments might not be willing to cede power to a supra-national body, perceive trans-boundary agreements as a top-down agenda promoted by international donors (Wolmer 2003a) or link conservation to historical issues of national security and sovereignty (Duffy 2005). Conversely, nation states might support collaboration if they perceive it as a means to reinforce their control over remote areas prone to illicit activities. The latter, however, might curtail trans-boundary use of natural resources that are important for local peoples' livelihoods and fuel tensions between local communities and government officials (Katerere *et al.* 2001; Wolmer 2003a; Wolmer 2003b).

Inequalities among actors can emerge when one partner stands to gain more than others from the implementation of TBPAs. In the case of southern Africa, the prominence of South Africa and the Peace Park Foundation in the declaration of TBPAs in the region has been qualified as "aggressive and as a factor that may undermine the spirit of the partnership"(Katerere *et al.* 2001). This scenario questions the feasibility of developing a shared vision and the ability of TBPAs to foster collaboration among nation states, particularly when actors perceive disparities in access to financial and technical resources.

The creation of protected areas and in particular the limitations that they impose on the use of natural resources have historically fuelled tensions between governments and local resource users, therefore the rationale for peace-building does not seem to be well supported by practice. In this respect, Hammill and Besançon (2007) proposed the introduction of the Peace and Conflict Impact Assessment (PCIA) as a tool to evaluate how an intervention may affect peace and conflict dynamics and reduce unintended potentially negative consequences. In his book Peace Parks: Conservation and Conflict Resolution (2007a), Ali argues that though conservation efforts are often causes of tremendous conflict, there are certain

elements of environmental concerns that would lead hostile parties to consider them as a means of cooperation. According to Ali (2007b), the acceptance of peace parks as cooperation catalysers faces both conceptual and practical challenges, including the perception that conservation is a consequence rather than an integral part of peace-building. In addition, international conservation NGOs are often hesitant to interfere in border issues and there is always expectation of instant solutions to complex problems. Results from Zbicz's (2001) study indicate that trans-boundary cooperation is happening world-wide but at a very low level. Essential requisites which had been identified for cooperation include the participatory definition of a shared vision and leadership and face to face meetings among the stakeholders. This study concluded: "trans-boundary conservation can be cultivated and nurtured but not forced".

2.2.1.3. Social issues and sustainable development rationale

TBPAs are often presented as the green face of larger economic development initiatives (Swatuk 2005). These programs are optimistically seen by conservationists as an opportunity to implement at a larger scale experience gained in community conservation projects (Wolmer 2003b) and as a means to influence the agendas of international donors. One frequently proposed mechanism to engage local communities near TBPAs is the promotion of a market-based mechanism, particularly ecotourism. These projects however, have proved to be highly dependent on adequate infrastructure, often absent in frontier regions, such as roads, airports and basic accommodation, and their implementation tends to exacerbate the differences in the distribution of benefits for example between local communities and tour operators (Suich *et al.* 2005). Furthermore, the adoption of ecotourism as a unique source of income, in detriment of more varied livelihood strategies, can make communities more vulnerable to global economies and events (Katerere *et al.* 2001). Community consultation and participation are often lacking in TBPA declaration and management (Wolmer 2003b; Swatuk 2005; Duffy 2005). This situation is not surprising as the declaration of transfrontier areas is often driven by international interests under conditions that emphasize massive asymmetries of power among different actors (Wolmer 2003a).

For the last two decades, there has been a heated debate regarding the impact of community based conservation projects on both communities and biodiversity. Most researchers have faced serious limitations as many of the projects did not have clear ecological outcomes or did not identify the trade offs between conservation and development activities (Brandon *et al.* 1992). Most of these initiatives have produced poor economic benefits to local communities (Salafsky *et al.* 2001), exacerbated social and economic inequalities within local

communities (Ghimire and Pimbert 1997; Brockington 2004; Brockington and Schmidt-Soltau 2004) and served as window dressing favouring major interests and players (Jeanrrenaud 2002; Duffy 2009). Adams and Hulme (2001) have also indicated that these programs are failing because they depend heavily on favourable institutional, social and ecological conditions, which are often lacking. Despite these criticisms, it is also recognized that community based conservation projects have occasionally assisted in reducing conflict and creating trust in areas where escalating tensions exist between local resource users and government officials (Salafsky *et al.* 2001). Additionally, some of these projects have had a tremendous impact on the creation and strengthening of local organizations to manage natural resources (Salafsky *et al.* 2001; Pretty and Ward 2002; Pretty 2002c). These new local capacities are essential in order to negotiate and facilitate the transfer of rights and responsibilities as new opportunities for co-management between governments and local groups arise.

In sum, ecological, political as well as socio-economic justifications for the establishment of trans-frontier conservation areas are still a subject of debate. Scientific data and analysis of the potential benefits of scaling up conservation are still mostly lacking and the few studies that do exist are somewhat inconclusive and even contradictory. Despite these drawbacks, trans-frontier conservation areas are increasingly adopted, suggesting that their declaration does not rest on their tangible conservation results alone but is closely linked to wider processes in which the environment becomes an integral part of a new global visualization of the world.

2.3. Summary

This review has aimed to cover an extensive and often unrelated group of investigations expanding from cultural models as mechanisms to mediate new forms of human –nature relationships to trans-boundary conservation. Though trans-boundary conservation based on ecological, socio-economic, and political rationales has received increasing attention, the impact of imposing these initiatives on human – nature interactions is still limited.

As the establishment of a protected area implies a separation of humans with respect to the natural world, the other group of studies reviewed here examines the different approaches to assessing these human – nature interactions. One approach based on socio-psychology theories uses the cognitive hierarchy model that assumes that individual environmental values provide the foundation to general attitudes, which in turn influence specific attitudes and these in turn influence behaviours. The application of this model has been popular among

natural resource managers for more than two decades and matches perfectly a vision of the world bisected into natural and man-made landscapes, as humans are divided into two discrete groups, bio-centric and anthropocentric, according to the environmental values they hold. Thus, these theoretical frameworks and methods seem to be well suited to the investigation of how effective the establishment of a protected area 25 years ago has been to promote this separation of humans from the natural world among local communities.

The other approach to the study of human – nature relationships draws on the concept of the social construction of nature. In contrast with quantitative approaches that build on realism as an ontological stance, qualitative approaches are based on constrained constructivism. This ontological position, though it agrees that reality exists independently of our beliefs and understandings, argues that reality is knowable through both the human mind and socially constructed meanings. According to this constructivist position, the environment is a symbolic landscape where concepts such as power, conservation, national parks and biodiversity reflect the diversity of society's specific beliefs and values. To make sense of their surroundings societies construct cultural models as a coherent set of values and beliefs about how nature and human societies work. These cultural models are a simplified version of reality but become a powerful frame of reference to make interpretations, make decisions and even mediate conflicts. The study of these cultural models to exploring human – nature relationships is still scant and its application to natural resource management remains limited.

CHAPTER THREE: ENVIRONMENTAL HISTORY, POLITICS AND CONSERVATION

Historical factors have a great influence on current events and do not constitute only a frame of reference but the account of a relationship that is still being written (Malgrat 1994). Previous experiences affect not only local communities' views regarding the environment and the meanings they attach to it but also influence their social relationships with other stakeholders, particularly the state, private enterprises and influential landowners, which might, in turn, influence how locals relate to nature. Historical events might also influence the perceptions of political actors regarding a particular region, affecting the decisions they make about its development and conservation.

This chapter aims to understand the peasant colonists as a human group and their relationship with the land within their historical context, trying to address questions such as who they are, where they came from, what motivated them to colonize these forests and what cultural elements have contributed to define their current relationship to the land and its resources. As the colonization of the region was affected by national and international events, this chapter frequently traverses geographical scales to attain greater understanding of the processes and actors involved. This section does not pretend to be a detailed account of the environmental history of the frontier but instead aims to provide elements to further the understanding of how current human – nature connections have developed through time.

After discussing the history of the colonization of these forests, an in depth examination of the creation of La Amistad International Park on both sides of the border is presented in order to understand the rationale behind its declaration, the actors involved and the prevailing vision of human - nature interactions at the time of the establishment of the park. Finally, the scant information available regarding the implementation of eviction and zoning on both sides of the park is presented.

The chapter begins with a brief description of the natural settings where these events and this study took place.

3.1. Geographic Setting

Panama and Costa Rica are located at the southern end of the Central American isthmus. Curiously, Costa Rica as well as the rest of the Central American countries runs north south, while Panama runs east west. This peculiarity means that the region of this study is known by

the Costa Ricans as the southern Pacific, while for Panamanians this is western Panama. According to the countries' political division, this study concentrates on the district of Renacimiento in the Province of Chiriquí in Panama and on the Cantons of Coto Brus and Buenos Aires in the Province of Punta Arenas in Costa Rica.
The dominant feature of the study region is a central spine of mountains and hills that forms the continental divide as it bisects both countries into two coastal plains, one on the Caribbean and another one on the Pacific (Figure 3.1). In Costa Rica this mountain range is known as the Talamanca Mountain range. In Panama it is more commonly known as the Central Cordillera. The highest points of both countries are located on this mountain range: Chirripo (3819m) in Costa Rica and Volcán Baru (3474 m) in Panama.

The topography of the Costa Rican section is more varied and heterogeneous. Apart from the Talamanca mountain range and the Pacific coastal plains, three topographic features are clearly distinguishable. First, the Costeña or Brunqueña Mountain range, a line of lower elevation hills rising in the south parallel to the Talamanca Mountains. Second, the El General - Coto Brus Valley, which is an intermontane depression located between the Talamanca Mountains and the Costeña Mountain range and is approximately 110 kilometres long and between 15 and 25 kilometres wide. And third, the Osa Peninsula farther south (Figure 3.1).

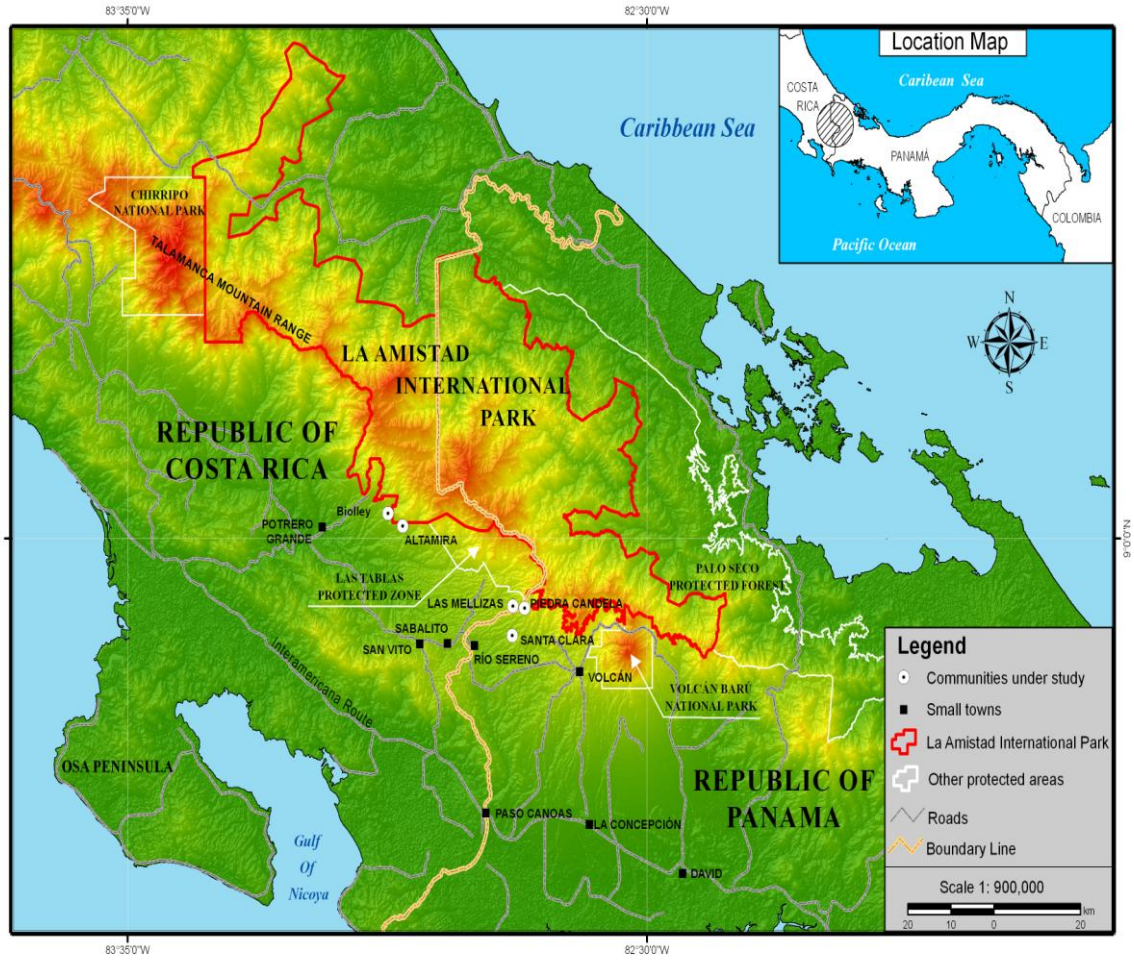


Figure 3.1 Main geographical features of the study area

The Panama section can be divided into three main topographic features, the Central Cordillera, the pacific coastal plains and the fertile valleys east and west of the Baru Volcano. Panama's Pacific coastal plains are a wider extension of the narrower and more heterogeneous coastal lowlands of Costa Rica. The natural continuity of the Pacific plains was a decisive factor in the earlier colonization of these Costa Rican plains by Panamanians in the middle of the nineteenth century as will be explained later.

The communities on which this study concentrates are located in the foothills of the Talamanca Mountains between 900 and 1,000 metres above sea level. This study focuses on three communities in the Costa Rican sector: Biolley and Altamira located to the west and Las Mellizas, right on the international border. On the Panama side, two communities were surveyed: Piedra Candela located on the border and a few kilometres east from Las Mellizas and Santa Clara farther south (Figure 3.1).

3.2. Environmental history of the border region

3.2.1. Precolumbian and Colonial Times

Pre-Columbian human occupation in the region under study dates from 5,000 BC (Tous 1995). Most of the remains of this period have been found in the Talamanca Highlands where hunter gatherers occupied areas near small rivers and lived in caves. Once agriculture was established and villages were settled, spare time was dedicated to other activities such as trade, gold mining and stone carving. Given their similar cultural traits, human groups that inhabited the border region of Southern Costa Rica and Western Panama are regarded as one pre- Columbian cultural zone, Gran Chiriquí.

Though there are no data on the population of this border area by the time of the Spanish arrival, the indigenous population of what currently is Panama has been estimated between 250,000 and 400,000 (Bennet 1968; Jaén Suárez 1981c; Illueca Bonnet 1985). Before the arrival of European diseases, Costa Rica's indigenous population was also about 400,000, (Molina Jiménez and Palmer 1997a) though there is a widespread belief that the country was inhabited by a very small indigenous population in comparison to nearby countries. This argument has been the foundation for assertions such as "*ninety seven percent of Costa Ricans are of either European or mestizo stock"* (Lara *et al.* 1995 page xvi) that are at the heart of the present day Costa Rican identity.

Among the most important chiefdoms in the study area at the time of the Spanish arrival, were the Quepos, Coto, Boruca, Doraces and Changuenas. In contrast to indigenous cultures of Mexico or Peru, these groups were dispersed and lacked a centralized social and political structure, which hindered Spanish control but at the same time facilitated native resistance. The existence of pre-Columbian burial sites or *huacas* in the border region, has attracted nationals and foreigners alike and stories abound of fantastic pre-Columbian treasures and raiders affected by the curses that the natives set up to protect their sacred sites.

When the Spanish arrived, the lowland tropical forests south of the Central Cordillera had been cleared (Bennet 1968), so the Spanish expeditions rode easily on horseback through the Pacific coast savannas from eastern to western Panama (Illueca Bonnet 1985). This was the result of the practice of slash and burn agriculture employed by the native population. This technique, which is still practised by peasant communities, starts with slashing the vegetation to clear the land, letting the cuttings dry and then setting them on fire. This practice clears dense vegetation, kills pests, delays forest re-growth and the ashes provide nutrients that are incorporated into the soil.

Nonetheless, these man-made savannas recovered into secondary forests at least partially after the native population plummeted due to the introduction of European diseases to which the American Indians had no immunity (Bennet 1968). Wars, constant exploitation and trade of Indians as slaves to Peru and the Antilles also took their toll. By 1575, Panama's indigenous population had decreased to 14,000 (Jaén Suárez 1981c) and Costa Rica's to 15,000 by 1622 (Fournier 1969).

Forest recovery was partial because the Europeans also introduced new practices and species, particularly cattle and horses, which were kept in a semi-wild state on the Pacific coastal savannas (Illueca Bonnet 1983d; Cooke 2005). Apart from gold and trade, cattle production was the most important economic goal for the Spanish settlers (Illueca Bonnet 1985). The Pacific plains of Central America were preferred as they were relatively wide, flat and much drier than the Caribbean plains, facilitating slash and burn agriculture, reducing the incidence of tropical diseases and making it easier to raise and transport cattle. These coastal plains also resemble the arid regions of the Spanish homelands.

The Spanish also brought new ideas about tropical America and their relationship with it. Most of the Spanish who arrived in the region came from relatively dry places such as Castilla and Extremadura, where forests were not abundant. Also many of them had received military training or had fought against the Moors. These two elements played a key role in the development of a view of the forests of tropical America as "*el mare magno e oculto*" as they were described in the Spanish chronicles. According to Fournier (1979), this phrase can be interpreted as *"great mysterious sea…, something new and that constituted a true challenge, something that must be conquered and eliminated"* (page 181).

Despite the early discovery of the Caribbean coasts of Panama and Costa Rica by Christopher Columbus in 1502, these two countries had a divergent colonial history. The finding of a path through the narrow Isthmus of Panama to reach the Pacific Ocean in 1513, determined the prominence of Panama as a communication route between Europe and the new continent. Soon after this discovery, the town of Old Panama was founded as the first Spanish settlement on the Pacific coast of America. From there expeditions departed to the conquest of Mexico and Peru and a trans-isthmic trade was rapidly established from Panama City on the Pacific coast, to the towns of Nombre de Dios and later Portobelo on the Caribbean coast. Sixty percent of the Peruvian gold and silver passed on mules through this Camino Real to be shipped to Spain (Heckadon Moreno 1997). Panama's destiny as a commercial route, which is part of the Spanish legacy, was further reinforced throughout modern history, as will be seen later, and became one element that indirectly resulted in the emergence of regional identities in marginal or peripheral

areas. This center – periphery relationship becomes relevant to the understanding of resistance to national policies in marginalized areas, including the establishment of a nation–wide, urban managed park system.

Meanwhile, the Spanish conquest of Costa Rica was much slower. The southern Pacific coast was explored in 1522 but it was not until 1563 when inland exploration led by Juan Vasquez de Coronado culminated in the foundation of Cartago, the capital in the central valley. This settlement was enclosed by mountains and far from the main routes and trade and the rest of the Costa Rican territory was described as "empty" or occupied by rebel Indians (Molina Jiménez and Palmer 1997a).
The study area reached the status of border area early in the colonial period as it was the boundary of the Province of Nuevo Cartago (Costa Rica), dependant on the *audiencia* or jurisdiction of Guatemala and the province of Veraguas (of which the present Chiriquí was part), under the *audiencia* of Panama. The limits of the two *audiencias* remained, however, unclear and the region vastly marginal.

This situation changed when the Spanish Crown ordered the opening of a terrestrial route or Camino Real from Mexico to Panama to assist the consolidation of the Spanish domains, pacify bellicose Indians and provide an alternative to the Caribbean maritime route, often raided by British and Dutch pirates. With this in mind, Vasquez de Coronado, the founder of Cartago, following several paths previously opened by the Indians, reopened a trail from Costa Rica's Central Valley to Chiriquí in 1601 (Molina Montes de Oca 2005). The 500 kilometre mule trail increased the commerce between Costa Rica and Panama despite the constant attacks by rebel Indians and bandits. Joint efforts were done to reduce these assaults as Catholic priests in Costa Rica intensified the "pacification" of bellicose Indians and local defenders in Chiriquí created an army to repel the attacks (Illueca Bonnet 1983d; Molina Jiménez and Palmer 1997a).

Costa Rica's vocation as an agricultural export territory started in 1660 when cacao was sold overseas. Cacao was exported to Nicaragua, Curaçao, Jamaica, Cartagena and Portobelo in Panama, though there was also a large contraband with British and Dutch traders. The development of cacao plantations along Costa Rica's Caribbean coast absorbed a good proportion of the agricultural workforce and this stimulated the trade for food supplies brought from Chiriquí (Illueca Bonnet 1983d). This condition continued throughout the eighteenth century when Costa Rica became an attractive market for Chiriquí's cattle and mules which were driven by land and sold in Cartago. Chiriquí also continued exporting mules, cheese, tallow, dry beef and poultry to Old Panama city, Colombia and Peru. By 1790 the number of

cattle grazed in the Chiriquí plains occupied approximately 100,000 hectares (Illueca Bonnet 1983d), reducing forest recovery and consolidating a whole culture around cattle production.

3.2.2. Independence from Spain

By the end of the nineteenth century there was a widespread economic crisis due to the collapse of many important exports which resulted in local armed revolts. This economic downturn was worsened by the events in Europe, especially the French revolution and the dissemination of republican and liberal ideas, the invasion of Spain by Napoleon and the removal of the monarchy. The combination of these factors led to the independence of several countries in Spanish America (Heckadon Moreno 1997).

By the end of the colonial period the study area remained as the political border of the *audiencias* of Guatemala (Costa Rica) and Nueva Granada (Panama). This status of border region was maintained during the formation of the national states, as Panama joined the new South American states of Venezuela, Ecuador, Colombia and Peru while Costa Rica became part of the United Provinces of Central America (Heckadon Moreno 1997).

By 1850, Costa Rica had consolidated its position as a leading coffee export nation (Illueca Bonnet 1983d; Heckadon Moreno 1997). The expansion of coffee led to a reduction of communal property as coffee growers privately appropriated the land and labour became a tradable commodity. These factors together with an increasing population size in the Central Valley resulted in the colonization of premontane and montane forests beyond the central plateau. This expansion was supported by British merchants who bought Costa Rican coffee and sold European goods to local importers (Molina Jiménez 1999). Costa Rica suffered two short periods of armed unrest in 1823 and 1835, but coffee prevailed as an element for national unity and identity for the new republic. Compared to other Central American nations, Costa Rica remained peaceful, imprinting its inhabitants with a sense of distinctiveness as citizens of a peace loving nation.

In Panama, on the other hand, the end of the Spanish domain was the beginning of a time of economic variations associated with the up and downs of the trans-isthmian trade and the emergence of a strong regionalism in Chiriquí. The independence from Spain resulted in a drop in inter-oceanic commerce which lasted until the discovery of gold in California in 1850 when a railroad was built across the isthmus to serve as a major link between the East and West coasts of the United States. The construction of the railroad and the population increase due to the both the railroad and the passengers, became an expanding market for products coming from

Panama's interior, including Chiriquí. The prosperity brought by the Panama railroad finished in 1869 when the transcontinental railroad across the US was completed.

However, Chiriquí continued to grow economically and demographically despite the decreasing demand along the inter-oceanic route. It did so by maintaining a variety of markets for dried and salted meat, hides and tallow in the Pacific coast markets of the Choco and Costa Rica (Illueca Bonnet 1983d). Furthermore, rich immigrants disappointed by the reduction in trans-isthmian trade, saw in Chiriquí an alternative for new investments. The province's equidistant location from the important markets of Cartago (400 km) and Panama City (435 km), the diversity of environmental conditions to grow a variety of agricultural products, the steady demand for cattle products and the need for local shops attracted new settlers from Panama, Nueva Granada, France, the US, the United Kingdom, Italy and Spain (Illueca Bonnet 1983d). A number of these immigrants were well educated, possessed financial resources for initial investment and had commercial and family ties with the government of Nueva Granada. This led to the emergence of a social class of merchants and *ganaderos* (cattle ranchers) in Chiriquí capable of exercising political and economic power beyond the region (Illueca Bonnet 1983d).

Cattle demand increased once more after the discovery of gold in California. In 1855, cattle were driven 400 kilometres by foot from Chiriquí to Panama City but this situation changed in 1879 when a coastal steamship service connecting the ports on the Pacific coast with Panama City was inaugurated (Illueca Bonnet 1983d). During this period, the expansion of the cattle frontier moved farther west towards to Costa Rica and higher up into the premontane forests of the eastern and western slopes of the Baru Volcano. Between 1850 and 1875, cattle production was improved by the introduction of exotic grasses and fences to enhance cattle feeding and management (Illueca Bonnet 1983d). These technologies were embraced first by the wealthier *ganaderos* and led to the final enclosure of the few remaining communal lands, pushing smaller producers towards the cattle frontiers of Dolega, Boqueron, Bugaba and the highland savannas of the Baru Volcano (Illueca Bonnet 1983d).

This expansion of cattle grazing in Chiriquí and the lack of definition of the international boundaries also stimulated a migratory flow of *Chiricanos* into the lowlands of Southern Costa Rica as early as 1848 (Amador 2003a; Amador 2003b). These *Chiricanos* extended westwards towards the El General Valley plains, grazing their cattle and establishing small settlements such as Potrero Grande and Volcán. In response, the Costa Rican government established the jurisdiction of Golfo Dulce in 1849 and offered land and economic incentives to establish a French colony in the Osa Península (Molina 2007b). Also in 1861, the Costa Rican Congress financed the opening of an access route from the Térraba Valley to the El General Valley. These

efforts, however, were not enough to encourage colonization and the area near the border remained effectively outside of Costa Rican control (Molina 2007a).

As the cattle frontier moved towards the slopes of the Baru Volcano, the foothills and highlands of Chiriquí were opened to agricultural production. Groups of landless Costa Ricans, British and US citizens, introduced coffee and settled in the so called coffee belt between 800 and 1300 metres above the sea level, marking the beginning of the colonization of these montane and premontane forests. By 1880, coffee had started to be produced as an export commodity in Chiriquí (Illueca Bonnet 1983d).

But parallel to the introduction of coffee as a commodity and the expansion of cattle grazing to the Costa Rican lowlands, important transformations occurred within the *Chiricano* society. The prosperous, well educated middle class of merchants and *ganaderos* had gained economic independence from Nueva Granada by keeping commercial connections with Costa Rica and other Central American nations. At the same time, their family and political ties permitted them to successfully lobby for the creation of the province of Chiriquí in 1849. This sense of economic independence and political influence together with a strong belief that the province of Chiriquí had it all, from a great variety of natural resources to the hands and minds to develop them, led to the emergence of a strong *Chiricano* regionalism and identity (Illueca Bonnet 1983d).

Meanwhile, the trans-isthmian route saw a new impulse as the French Canal Company successfully negotiated the construction of an inter-oceanic canal with the Nueva Granada government in 1880. The project, however, was delayed due to economic problems of the company, the high incidence of tropical diseases and a period of turmoil that would extend from Nueva Granada to Panama. The relationship between Panama and Nueva Granada progressively deteriorated as the sovereign states that were part of Nueva Granada lost their independent rights and new central taxes were imposed. By 1899 civil war had broken out between liberals and conservatives and Panama had become a main point of resistance. The Thousand Days War, as it is known, ended in 1902 after the intervention of the US. By the end of the war the internal commerce, agriculture and livestock were in ruins and most Panamanians felt that the future of the isthmus would be better as independent nation.

These national events had important repercussions in the study region. Back in 1861, a number of prominent *Chiricanos* had signed the David Act, a declaration calling for the establishment of Panama as an independent country. *Chiricanos* became increasingly bitter during the Thousand Days War, when the Colombian Army imposed *contribuciones de guerra* or war taxes and the

enrollment of young men from *Chiricano* families. During and after the war an important number of criminals and political refugees escaped to Costa Rica where some of them had relatives and were able to take advantage of the undefined border.

3.2.3. Liberal Independent States

The advent of the twentieth century found Costa Rica and Panama as independent nations. Costa Rica had separated from the Central American Republics in 1838 and Panama achieved independence from Gran Colombia later, in 1903. Costa Rica consolidated an agro-export economy based almost solely on coffee, creating the conditions for the rise of a privileged group of coffee producers and merchants. Though ideologically divided, this privileged group found common ground in the need for the creation of a state to promote a national identity and political stability. Panama, on the other hand, had consolidated an economy based on service provision around the canal and the trans-isthmian zone had become the country's decision making center.

Early in the process of state formation, the liberal ideology was embraced by the new political class of both countries. The influence of international thought, mainly from Europe and the US, was evident in the adoption of the discourse of progress and modernity (Vargas 1999a). Positivism influenced education, and technological advancement was admired and seen as an essential condition to overcome backwardness and impel material development. Roads, schools and health centers were opened with the idea of not only improving people's living conditions but also to bring modernity, spread national values and identity and access new markets (Vargas 1999b).

To stimulate financial and technological investment, both governments provided a series of fiscal incentives but above all concessions of large tracts of "vacant" lands to attract immigrants mainly from Europe and the United States. Given the conditions of early twentieth century Europe, European settlers were attracted by these offers, but, many of them found the environmental conditions of the humid tropics did not match the technological developments brought from temperate regions, a situation that led to failure of a number of these development projects (Illueca Bonnet 1983d).

Whether these liberal policies that regarded the land as a free commodity came from the Spanish attitude towards tropical forests described earlier or from frontier mentality prevalent at the time in countries such as the United States, it is difficult to say. The final outcome was the same. Lands once a communal property were appropriated by the new states and used to amortize debts, increase state revenue, reward service to the nation, encourage settlement in outlying

regions, promote the production of particular crops or as an escape valve for people displaced by population growth or land concentration (Edelman and Seligson 1994a). Those claiming new lands only had to ask their neighbors to testify in front of a public authority that the claimant had worked that land continuously and his possession was uncontested. Then the claimant could obtain a provisional right or right of possession that could be inscribed in the public registry as private property. This is a procedure that is still in place in both countries. In most remote areas, claimants only need to demonstrate possession by clearing a narrow strip indicating the limits of the plot.

By the early twentieth century the colonization of the Central Valley in Costa Rica had been completed and people started to move towards the west and south looking for appropriate conditions to plant coffee and, to a lesser extent, produce milk and cheese (Molina Jiménez and Palmer 1997a). Land appropriation took place particularly during the dry season when conditions were more appropriate for clearing the forests and new roads were opened into the Cerro de La Muerte area to provide access to Pérez Zeledón and the El General Valley and from there to the border region.

Back in Chiriquí, most of the lowlands were dedicated to cattle and sugar production. Lands previously inhabited by the Guaymí Indians where privately appropriated and by 1920 they started to migrate to Costa Rica (Molina Jiménez and Palmer 1997b). The forests of the premontane and montane zones continued to be replaced by dairy production and coffee plantations though production was hindered by the lack of adequate transportation. In 1914, coffee was carried by ox-drawn carts that took between 1.5 and 2 days to get to the main port of Pedregal in David (Illueca Bonnet 1983d).

During the 1920s and 1930s agricultural production began to diversify. Many of the immigrants kept gardens or "*huertas*" where they grew fruits, vegetables and flowers brought from their native lands and these products slowly found a market in Panama City. These foreign immigrants introduced new technologies for milk and cheese production and imported highland cows, while most of the traditionally raised lowland cows were for meat, fat and leather. This diversification of the agriculture in Chiriquí was also encouraged by the construction the Chiriquí Railway from the Port of Pedregal to David in 1916. This railroad construction resulted in a massive appropriation of the land along the line, mainly in the District of Bugaba (Illueca Bonnet 1983d) and sparked further the colonization movement towards the border.

3.2.3.1. Foreign Interests and the Definition of the Frontier

But a new and powerful international actor entered the scene in 1926, when a commission of scientists and agronomists of the United Fruit Company (UFCO), the US Banana Company, arrived in the Pacific lowlands of Golfito in Costa Rica and Puerto Armuelles in Panama with the objective of setting up new plantations regardless of the controversial political boundaries (Illueca Bonnet 1983c). The company had extensive plantations on the Caribbean coast of both countries but an outbreak of the back sigatoka virus had reduced the production to almost zero. The appropriation of these lands by the company took place under the liberal policies promoting the investment of foreign capital.

The establishment of extensive areas of monoculture had profound socioeconomic and political consequences. It put an end to the subsistence farming economy concentrated in the production of food for local consumption and replaced it by a system that emphasized the commercial value of the land through the establishment of monocultures. Banana plantations would not only control extensive areas but also social processes by creating a social hierarchy of foremen and labourers (Castro 2005a).

As nation-states became stronger and more consolidated, issues of sovereign control, including border definition, became a high priority for both governments. Efforts to settle the border had started in 1914 with the Laudo White agreement which was rejected by Panama as it did not include the Coto Colorado, an area colonized by Panamanians since back in 1848. During the early 1920s, the need for a precise delineation of the border was exacerbated by the interest expressed by UFCO in the region. In February 1921, the two countries entered into a short period of war which ended again with the intervention of the United States in favor of Costa Rica. Panamanians but above all *Chiricanos*, deeply resented the loss of the Coto Colorado area. Panama and Costa Rica ceased diplomatic relations until 1928 (Castro 2005b).

Banana plantations created a new regional market, absorbed a great proportion of the workforce and encouraged massive settlement in the Pacific lowlands of the border region. As part of the incentives to attract the banana company the Panamanian government financed the extension of the Chiriquí railroad 81 kilometres from Concepcion to Puerto Armuelles in 1928, which encouraged new settlements and population concentration. Meanwhile, the Costa Rican government signed in 1927 a contract with UFCO to transform 3,000 hectares into banana plantations. Though banana production had started with small farmers in 1920, the opening of the UFCO activities represented the economic rise of the Golfito area in Costa Rica (Castro 2005c).

Despite this period of economic prosperity, by the end of 1930's the relations between the company and the local actors were strained in both countries (Illueca Bonnet 1983b; Illueca Bonnet 1983d; Royo 2004). The independent banana producers considered that the prices paid by the company were unsatisfactory but did not have an alternative. Labourers were paid average salaries but a large proportion was reabsorbed by the company's commissary. The g*anaderos* felt that they had to compete with the company for the best workers. Landless farmers complained that most of the land granted to the company remained unused while they had to struggle to find a vacant piece of land. Between 1932 and 1934 social disturbances erupted and the Panamanian government promised a series of measures, but these promises were never fulfilled (Illueca Bonnet 1983d). In Costa Rica, the strikes brought the social issues to the top of the political agenda and were one of the social struggles sparking the 1948 social revolution (Illueca Bonnet 1983a).

Apart from the occupation of the lowlands of the border region by the banana company, other international events finally ignited the colonization of the foothills of the study area. The outbreak of the Second World War led to an increase in the number of US troops in Panama for the protection of the Panama Canal partially increasing the demand for agricultural products from the interior. At the same time, the construction of the Inter-American Highway the dream to unite the Americas by road from Canada to Tierra del Fuego in Argentina, suddenly became a military priority to allow the US troops to reach the Canal by road, avoiding the potential attacks of enemy submarines. For the governments of Central America this project was central to bringing progress and modernity to isolated areas under the rubric of the liberal ideology but also an effective way to access and control their international borders.
Though four routes to cross the Panama-Costa Rica border were developed by the US Highway Administration, all of them crossed the border at the same point, Cañas Gordas, a village located around 500 metres above sea level, and near the Coto Brus area (Edelman *et al.* 1994a). In Panama, the highway became a key factor for the final entrance of landless farmers to the westernmost forests above 500 metres, while in Costa Rica the project sparked the appropriation of large tracts of forests by foreigners and influential nationals. However, a problem remained. The border dispute between Panama and Costa Rica had not yet been settled.

With some pressure from Washington, the Arias - Calderon Guardia Treaty was signed in 1941, just six months before the attack on Pearl Harbor. The laborious task of surveying the 363 kilometres of the border section, passing through mountain jungles in previously uncharted terrain was completed by a bi-national commission in 1944. At the same time, the US firm that had obtained the contract to build the road, the Martin Wanderlich Company, locally known as "*la Wanderlich*" had started to open the road from Volcán to Cañas Gordas on the Panama side.

In Costa Rica, the same company had also built a 21-mile rustic feeder connecting Golfito and the Coto Brus Highlands.

Five years after the final demarcation of the international borders, five large *latifundios* (large properties) of 10,000 hectares each appropriated most of the northern and south-western lands in the Coto Brus area (Edelman *et al.* 1994a) (Figure 3.2). These large properties were registered under the provisions of the *poseedores en precario* law passed in 1942 in which owners whose properties have been invaded by squatters mainly in the Central Valley, could exchange these lands for public lands of equivalent value, usually in remote areas, such as the border region (Edelman *et al.* 1994a).

Among these claimants was Jorge Zeledón Castro, a major coffee producer from the Central Valley cantons of Aserrí and Acosta and who had acquired the 10,000 hectares Finca Coto Brus in the early 1950s. He had connections in the Transport Ministry, played a key role in charting the border and was among the first people to drive to Coto Brus along the new, unpaved road in 1943 (Edelman *et al.* 1994a). Zeledón selected the best men from his other properties in the Central Valley and brought them to establish Las Mellizas, one of the communities under study. These men and their families would work part-time for Zeledón while establishing their own *fincas*. Interestingly, a good proportion of these *fincas* are located on the two-kilometre border strip that, according to the law, can not be titled. Recently, conflicts have sprung up when the Ministry of Defence presented a project to reclaim those lands under its jurisdiction.

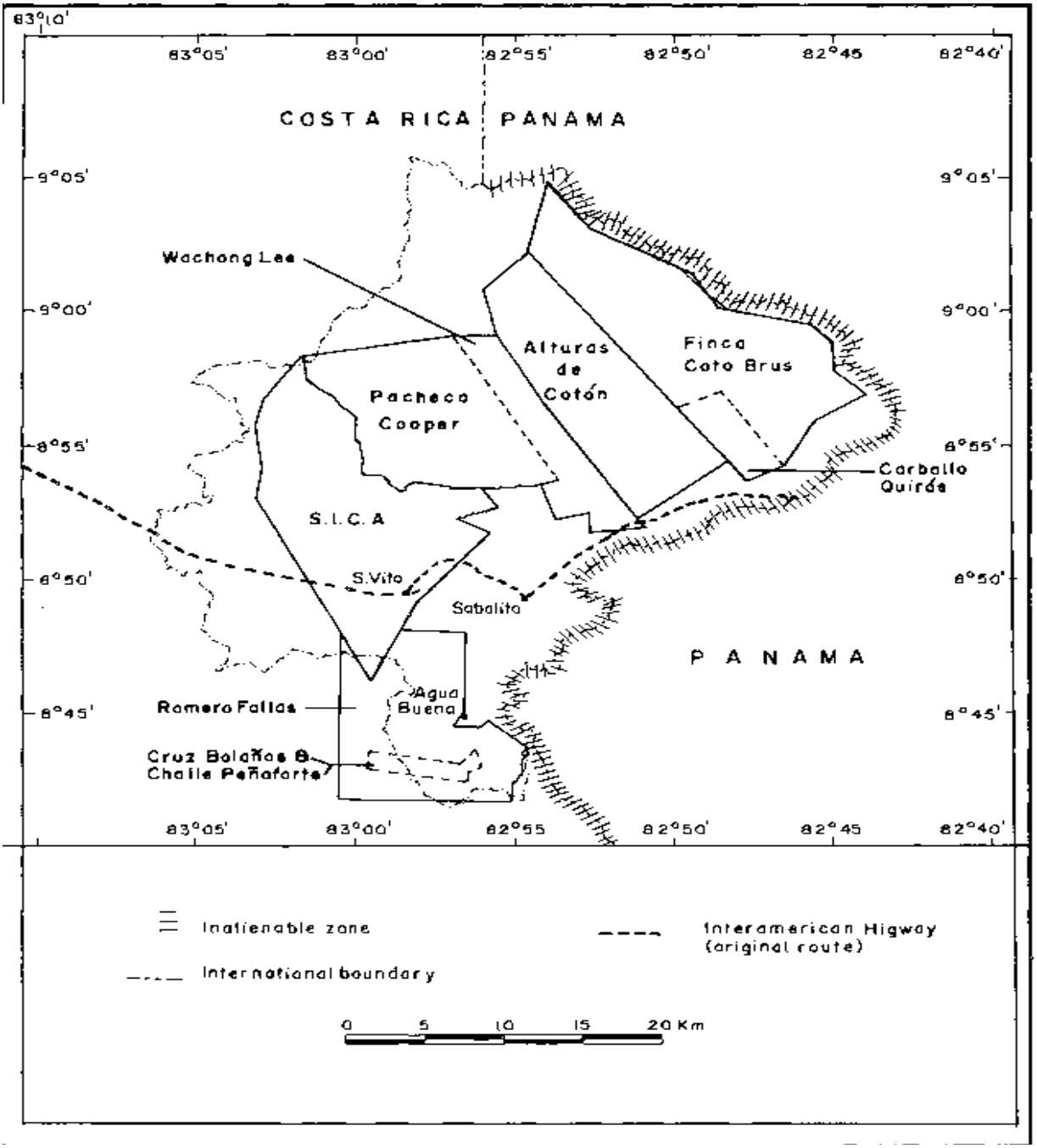


Figure 3.2. Major properties located in the Costa Rican portion 1945-1955.

From Edelman and Seligson (1994a).

In 1951, the Costa Rican government conceded 10,000 hectares of forests to the Italian Society of Colonization (SICA) in the Coto Brus area. According to the contract, SICA would populate and developed the area while the Costa Rican government would provide access to the colony (Sansonetti 1995). Other concessions were also granted by the Costa Rican government to private companies in the study area such as GROMACO which belonged to a group of North Americans and was originally located in the lowlands of Bajo Coto where it grew grains and bananas. Later another *finca* was bought by the same owners higher up, which was dedicated to

coffee cultivation. Another concession, Kamuk Ltd, located farther west, belonged to a Costa Rican private company and was dedicated to timber extraction and cattle ranching. The lands of both GROMACO and Kamuk Ltd were later occupied by colonists during the late 1960s who established the communities of Altamira and Biolley, where this study took place.

While most of the north and west of Coto Brus was occupied by the large private *latifundios* (Figure 3.2), the southeastern area underwent a different land appropriation process during the early 1940's (Edelman *et al.* 1994a). There, former banana workers accessed the Coto Brus area through Villa Neilly and established medium and small farms, some of which were acquired from Panamanians who had previously settled in the area.

Meanwhile, in Panama, the colonization of the border started earlier and was at least partially spearheaded by foreigners who had established in the Volcan area as early as 1920. Most of these families were of US and European origin and were dedicated to the production of corn, banana, coffee, vegetables, fruit and cattle for both beef and milk (Cuestas 1993) In 1928 a group of German families had settled in the Cotito river area and in 1938 a religious group of Swiss origin had arrived at Piedra Candela, right on the current international border. The sect was known by their reclusion and complete lack of interest in any contact with the outside world. Two years after their arrival, the leader of the group decided to move the colony to the more accessible location of Cotito to a property that belonged to one of the German families. In 1941 most members of the Swiss colony were assassinated in a confusing incident with the Panamanian police (Cuestas 1993).

Before the road was built, in order to access the foothills of the border region, colonist families had to come to Volcán and take a long and difficult trail, crossing the dangerous waters of the Old Chiriquí River. This changed when the Swiss arrived at Cotito and designed and constructed a concrete bridge to cross the Old Chiriquí River, facilitating the access to the forests beyond the town of Volcán for Panamanians and foreigners alike (Figure 3.2). This bridge still stands as a proof of the technological abilities of the Swiss colonists (Cuestas 1993), but also as a contribution of foreigners to the colonization and development of the border area.

This bridge also provided facilitated access to another community, Piedra Candela, farther west and which is also part of this study. The area where the community is currently located was originally a small group of *fincas* owned by Panamanians and foreign migrants of US, German and Swiss origin that had arrived to the area with the demarcation of the international border. Later, during the 1950s as land became scarcer due to the expansion of the banana plantations and pastures for cattle ranching, landless peasants started to arrive as well aided by the trail opened for the construction of the highway. In most cases forests were logged and then the land

was cultivated for a few years, though the final goal was to convert them into pastures. Later, given the difficulty of taking cattle to the main markets and the close contact with neighboring Costa Ricans, some Panamanians starting experimenting with coffee until it became the main cash crop that it is today.

In 1945, the war ended and the US lost interest in the highway. The road company kept on working for some time but the road was never paved. Though coffee production in the Italian colony was very successful, the Costa Rican government did not fulfill its commitment to provide access to the colony and the project went bankrupt. In fact it was easier to take the coffee to Panama than to San Jose at the time (Sansonetti 1995) and no doubt some of this coffee was smuggled to Panama, a practice known to have happened since the 1920's when a tariff for coffee imports was imposed by the Panamanian government to protect local producers (Illueca Bonnet 1983d).

After complaints of a fraudulent election in 1948, Costa Rica found itself in the middle of the "revolution of 1948", a short but intense struggle that imprinted a social democrat seal to Costa Rican government that would last until present. In the meantime, UFCO and the US Department of Commerce, which had opposed the route through the Coto Brus highlands, took the lead and succeeded in changing the route. The Inter- American highway would now run along the Pacific coast and close to UFCO banana plantations (Edelman *et al.* 1994a). But the line of the original route had been opened, facilitating the colonization of the foothill forests.

Similarly, occupation by landless peasants was the major factor in what Edelman and Seligson (1994a) called the "democratization" of land in the Coto Brus area. The three southernmost large properties including the Italian colony were at least partially invaded during the 1970s. Some of the owners of the large properties reached an agreement and sold the land to the squatters, others sold to the Costa Rican Institute of land and colonization (ITCO), which established agrarian reform projects on those lands. ITCO was created in 1961 by the government to aid *precaristas* (squatters), to penalize landowners who did not use their properties and to encourage migration to "improve" virgin lands. In some communities near the park ITCO still has the legal tenure of the land and their current occupants have been left in a state of land insecurity which hampers their possibilities of access to agricultural credit or to apply for payment for environmental services. Also this land insecurity together with the instability of the coffee prices, reduced employment and the lack of appropriate public services particularly road access and transport, has created an incentive for people to migrate to urban areas.

Though most land invasions in the area occurred during the 1970s, in 1984 there was an attempt to invade another large *latifundio*, Alturas de Cotón. Around four hundred squatters tried to

settle in the finca but were repelled by the rural guard, killing one of them and wounding more than ten (Edelman *et al.* 1994a). This event and in general the history of land concentration in Costa Rica has shaped the perception local people have about the park and its management. For some, the park is a large estate owned by the government similar to those of Alturas de Cotón, Coto Brus, Kamuk Ltd or GROMACO and park rangers, locally called *parqueros*, are simply paid guards responsible for keeping people away.

3.2.3.2. Cattle, Economic Recession and Political Turmoil

These trends of land invasion and forest colonization were further exacerbated during the end of the 1970s and 1980s when cattle became a important international export for Costa Rica and Panama (Jaén Suárez 1981c; Edelman and Seligson 1994b). An exponentially growing North American market, strongly rooted in the need to supply fast-food restaurant chains with hamburger due to a sharp shortage of cheap cuts in the United States, encouraged Central American countries to expand ranching. The number of cattle in Costa Rica and Panama tripled in three decades: from 607,850 head in 1950 to 2,050,350 head in 1985 in Costa Rica (Jaén Suárez 1981b) and from 727,794 head in 1950 to 1,403,440 in 1970 in Panama (Jaén Suárez 1981c). This combination of international and national factors resulted in an exponential increase in deforestation in both countries particularly during the 1970s and 1980s.

Apart from the international demand for beef, the adoption of an economic model that entailed the growth of the state, large investments in infrastructure, and international credits characterized the period between1960-1980. Infrastructure projects such as roads provided access to previously forested areas which entered the same cycle of being logged, then converted into agricultural fields and finally into pastures. In the study region, this process that had been initiated with the demarcation of the international frontier and further encouraged by the opening of the highway route considerably expanded during the 1980s, reaching the forests above 900 metres.

The investments of the state resulted in an increase in international debt and, in order to pay it, national governments focused on attracting foreign capital in the form of exports. Coffee, bananas and beef became the main sources of foreign capital in both countries. Cattle ranching, in particular, benefited from cultural patterns long established in areas such as Chiriquí in Panama and Guanacaste in Costa Rica. These economic and cultural factors together with population growth resulted in the conversion of a third of Costa Rica's forests into pastures by 1980 (Jaén Suárez 1981a). The same factors led Panama to lose half of its forests by 1986 (Autoridad Nacional del Ambiente 1999).

By 1981, Panama could no longer keep up with the payments of its international debt and Costa Rica stopped paying it, though temporarily, in the same year. Escalating petroleum prices and rising interest rates were added to this already precarious situation. Though initially resisted, a structural adjustment plan was prescribed by the international banking community to promote economic stabilization.

This economic downturn, the reduction in social investment and the political discontent resulted in armed conflicts in El Salvador, Guatemala and Nicaragua. In Panama, the democratic government had been overthrown in 1968 by General Torrijos but he died in an aviation accident in 1981 and was succeeded by General Noriega. Under Noriega's leadership the Panama Defence Forces were strengthened to assume the protection of the Panama Canal and the relationship with illegal drug trafficking intensified (Barry *et al.* 1995). Costa Rica in the meantime remained as the only country in Central America with a democratically elected government. It is within this period of forest devastation, economic downturn and regional political unrest that the idea of preserving one of Central America's largest expanses of forest straddling international borders was adopted as a symbol of peace and cooperation.

3.3. National politics and the creation of La Amistad Trans-boundary Park

La Amistad is one of the oldest trans-boundary protected areas in Central America (Sandwith *et al.* 2001). It is a UNESCO World Heritage Site and part of a much larger La Amistad biosphere reserve. Its history goes back to the First Central American Meeting on the Conservation of Natural and Cultural Resources in 1974, followed by a meeting between the presidents of both countries in 1979 in which a bi-national commission on natural resources was instituted to initiate the joint planning and management of the common border wildlands. Two main rationales gave focus to these meetings: the need to conserve the natural and cultural heritage and to serve as models of peace and friendship between neighbouring countries, particularly in that period of socio-political turmoil (Castro *et al.* 1995). However, these government meetings were also part of a wider effort for regional economic integration originally sponsored by the Inter- American Development Bank (IDB). The involvement of such international financial institutions is a general feature of the creation of most trans-frontier conservation areas world-wide as discussed in Chapter 2.

The idea of trans- boundary conservation, nonetheless, took time to be formally adopted by the governments. It was not until 1982, that the governments of Panama and Costa Rica signed an agreement committing to the establishment of La Amistad International Park. Later that year, the Costa Rican President Rodrigo Carazo signed the government decree establishing this

country's sector of the park, but the Panamanian government did not do so until 1988, six years later.

The decrees that were approved showed important differences, some of which had repercussions on how the park is being managed. In Costa Rica, the first rationale for establishing the park rested on the precepts of the World Conservation Strategy, a guiding document produced by the IUCN towards achieving environmentally friendly development, and explicitly acknowledged the international conservation agencies that supported the preparation of the strategy, many of which were also supporting the creation of La Amistad. On the contrary, the rationale for the creation of the park in Panama was found in the nation's constitution, recently modified by the military regime and the institutional responsibilities of the new environmental institution, the Natural Renewable Resources Institute (INRENARE). No international influence was admitted in the Panamanian decree. Both decrees mentioned the presidents' joint declaration to create the park as part of the historical background of these documents.

In Costa Rica, the justification for the creation of the park was largely based on its biodiversity value. There is a clear recognition of the intrinsic value and diversity of the park's ecological systems; however their conservation is justified based on an economic rationale as well. Potential economic benefits included the protection of soils for agricultural purposes and the potential to generate hydro-electric power as well as some novel benefits provided by the park as a gene-bank and research and tourism destination. In contrast, the Panamanian decree puts more emphasis on the ecosystem services of the park such as water and soil protection and hydro-electric power generation. Although it also mentions scientific research and ecological conservation, both were presented as important components for the country's economic development. Unlike Costa Rica, tourism and recreation activities were not mentioned in the Panamanian decree.

In both cases, the management of the park is conceived as the full responsibility of the national governments. INRENARE (Panama) and MIRENEM (Ministry of Natural Resources, Energy and Mines) (Costa Rica) were the institutions charged with the management of the area, though other government institutions such as the Ministry of Planning and Economic Policy in Panama and the Ministry of Agriculture and Cattle in Costa Rica were also mentioned in an effort that is described in the decrees as relating to inter-governmental cooperation. However, the complex politics of the border are evident as the Panama Defence Forces are charged with providing park guards for park protection. Costa Rica, though it had abolished its army back in 1948, designated the Rural Guard to serve as park guards, although it clarifies that this situation will be until park rangers are appointed.

The decrees' most striking difference resides on how the relationships between humans and nature for both indigenous and non-indigenous populations were re-defined. The Costa Rican decree is somewhat contradictory. On one hand, in the rationale section it describes the park as "*unhabited"* territory and "*isolated, unaltered spaces"* ignoring the presence of the indigenous population who currently inhabited the Talamanca range and its surrounding areas. The notion that these groups belong to the country's history rather than to its present is also expressed in the decree when it indicates that: "*the region possesses important archaeological zones such as indigenous cemeteries and petroglyphs"*. On the other hand, the regulation section of the decree acknowledges that there are zones of the national park that are an "*enclave*" between indigenous reserves. "*To access those areas of the park*, it recommends, *park rangers should be selected from the indigenous neighbours, who are knowledgeable about the area*". The decree also recognized the need to coordinate with CONAI, the Indigenous National Council. The Panamanian decree, in contrast, completely ignored the presence of indigenous populations in the park.

Land tenure issues, which directly affected colonist communities that are the focus of this study, are considered very differently in the decrees. The Costa Rican document indicates that the lands within the park are inalienable; they can not be registered as private property following the regulation of the Forest Law, and therefore existing properties should be expropriated. Furthermore, the Republic's Attorney General is to register the park's lands as part of the national heritage. According to Campbell (2002c), the exclusion of people from protected areas in Costa Rica, has been key for ecotourism investment and is a manifestation that, though the sustainable development narrative seems to be adopted in theory, it is the exclusion narrative that is pursued in practice.

The Panamanian decree, on the other hand, recognises the existence of private properties and agricultural activities taking place within the park's limits and mandates that they should follow INRENARE's land use regulations. Neither expropriation nor eviction was proposed. These differences in the treatment of human – nature interactions had an impact on how the park was managed as will be discussed later.

A wider look to the political, economic and social conditions of both countries at the time of the establishment of the park, sheds light on how different wider societal issues permeated the process of the creation of La Amistad trans-frontier park.

3.3.1. Costa Rica: the construction of a green nation

During the late 1970s and early 1980s, Costa Rica was the only nation in the Central American isthmus with a democratically elected government. Armed conflicts had sprung up in El Salvador, Nicaragua and Guatemala, whilst Panama had been governed by a populist military regime since 1968. The United States had increased its attention to the region as a result of these problems but also as a consequence of the increasing involvement of the Soviets, through their support to left wing guerrillas.

Resources that other countries had used to create and strengthen military institutions were invested in education and health as Costa Rica had abolished its army in 1948. As a partial result of these socio-democratic investments, the country had higher social quality indicators than the rest of the region, except for Panama, and was considered the showcase of capitalist and democratic development, an example for the rest of the Central American nations. The model however was put to the test in 1981, when Costa Rica entered a sharp economic recession and became the first third world country to stop paying its economic debt (Lara *et al.* 1995). Concerned for Costa Rica's democratic future and by the impact of this crisis on the northern revolutionary Nicaragua, the United States provided generous and continuous economic assistance that would maintain Costa Rica's economy for more than a decade.

The United States' financial aid, the tradition of peace and democracy, motivated the establishment of the regional headquarters of most of the international cooperation agencies interested in the region in San Jose (Lara *et al.* 1995). These included the main offices of North American as well as European bilateral and multilateral cooperation agencies and international organizations, interested in promoting peace, cooperation and the economic restoration of Central America (Campbell 2002c).

The idea of peace parks was born within this broader context of economic integration, cooperation and conflict resolution as explained before. At the time, peace parks were advocated as political mechanisms to facilitate both collaboration among countries and trans-boundary natural resource conservation. Peace parks were further promoted in Central America by the University for Peace, an academic institution established in 1980 as a Treaty Organization by the UN General Assembly but the concept also received considerable attention from conservation organizations such as World Wildlife Fund (WWF), The Nature Conservancy (TNC), International Conservation Union (IUCN) and Conservation International (CI), all of which had regional offices in San Jose.

The joint effort of these international conservation organizations and government agencies is evident in the justifications for the park expressed in the Costa Rican decree. The inclusion of novel activities such as bio-prospecting and ecotourism as potential contributions of the park to the country's economy in a time of financial breakdown are the direct result of this influence. In fact, two of the main figures leading the creation of the Costa Rican national park system within the government structure were Mario Boza and Alvaro Ugalde, who had been strongly influenced by US park management ideas. Openly expressing his view of nature conservation, Boza in the book *The Quetzal and the Macaw: the story of Costa Rica's National Parks* (Wallace 1992) concluded that "it's a big mistake to try to manage a forest that doesn't belong to you. Parks have worked better than reserves because we own them, because the Park Service has a clear mandate to protect the land" (Wallace 1992). This vision of nature conservation through the exclusion of human presence was shared and supported by a third group of relevant players: the relative large community of environmentally-minded foreigners established in Costa Rica. According to Brockett and Gottfried (2002), this group was concerned by the high rate of deforestation in Costa Rica, which by the 1970s was one of the highest in the world. Campbell (2002c) in her analysis of conservation narratives in Costa Rica identified nine protected areas, two of which were private reserves, that were established as a consequence of the active engagement of US-born biologists and in some cases US universities as well.

Alliances between government conservation officials, international conservation organizations and US scientists based in Costa Rica thus played a crucial role in the establishment of the Costa Rican portion of La Amistad. This unlikely alliance might also account for the appearance of apparently contradictory intrinsic and utilitarian values of nature in the decree, which can be interpreted as an effort to negotiate conservation and economic goals in a period of economic crisis. The declaration of La Amistad might have also been an integral part of the wider project of converting Costa Rica into the global leader in biodiversity conservation as, with the declaration of the park, the size of the Costa Rican Park system doubled.

This project has been very successful. A decade after the declaration Costa Rica consistently scores high in most publications ranking nations by their interest in conserving the environment. For example, in 2005 the environmental sustainability index (ESI) that measured the ability of countries to protect the environment by integrating the status of natural resources conservation, pollution levels, management efforts and society's capacity to enhance conservation, ranked Costa Rica as number 55 among 141 nations (Esty *et al.* 2005). The same exercise considered Panama as number 67. More recently, the environmental performance index (EPI) that assesses both public health and ecosystem vitality through the use of 25 performance indicators, locates

Costa Rica in third place among the most environmentally friendly nations in the world. In this analysis of 163 countries, Panama was placed as number 24 (Emerson *et al.* 2010).

Though the sustainable development rationale that characterized the creation of trans-boundary protected areas around the world, as discussed in Chapter 2, is included in the Costa Rican decree, the participation of private enterprises in the preparation of the decree is not apparent. According to Campbell (2002c), based on the work of Carriere (2002b), in Costa Rica there was a public-private sector alliance that appreciated the potential economic benefits of ecotourism and bio-prospecting. This general recognition might have resulted in the private sector actively supporting the creation of protected areas in Costa Rica.

Data regarding the participation of local communities in the preparation of the decree are also scant. Some international organization representatives have indicated that there were no indigenous communities within the park at the time of declaration (Jim Barborak, personal communication), which served as a justification to not consult them in the declaration process. However, even if indigenous communities were not located within the park boundaries, it is likely that these populations frequently entered the park to pursue some of their traditional activities such as hunting, gathering and mining, particularly as their territories were being encroached upon by colonist groups.

The apparent irrelevance of indigenous groups in the preparation of the decree might be also rooted in the poor recognition of an indigenous background in modern Costa Rican identity, as was previously explained in this chapter. Also the low political and economic influence of these groups in national society might have played a role. Indigenous populations represent only 1% of the total Costa Rican population (Instituto Nacional de Estadística y Censos 2002).

Similarly, evidence regarding the participation of non indigenous, peasant local communities in the creation of La Amistad in Costa Rica is lacking. According to Campbell (2002c) in Costa Rica there seems to be a shift from the traditional exclusionary model of nature conservation to the sustainable model but this has been only partial and only the “for profit” component of the sustainable model led by the private sector is being implemented. The community-based component, according to this author, remains theoretical. In addition, community-based organizations in Costa Rica in general seem to have been institutionally weak and had low capacity to influence government policies at the time of declaration. According to Lara (1995), this was a direct result of the application of the international economic measures or structural adjustments and the concomitant decrease in social investment.

Finally, the lack of a participatory process in the declaration of the park does not seem to have been questioned. This might have been due to the relative newness of community conservation and participation at the time of the establishment and to characteristics of the Costa Rican government, but also to an early incorporation of civil society organizations into the government structure. For example, in 1979 government conservation officials actively promoted the creation of the National Parks Foundation, a national NGO, to serve as a channel for international funding and sidestep the bureaucratic red tape (Boza 1993).

3.3.2. Panama: national parks, sovereignty and national security

Panama legally created La Amistad six years after the establishment of the Costa Rican section. At the time, the country was under the rule of General Manuel Antonio Noriega, successor to General Torrijos, who had died in a mysterious plane accident in 1981. According to Gandasegui (1993), Torrijos' period was focused on a program of economic development and the negotiation of a canal treaty with the US, while the goal of Noriega's regime was to create an army to defend the Panama Canal. Though Noriega received ample support from the US at the beginning of his period, by 1985 US-Panama relations were strained and in 1987 the US had imposed severe economic sanctions on Panama to force Noriega's resignation (Gandasegui 1993). The hostilities escalated and when La Amistad was created in 1988, General Noriega had been indicted in Florida on two counts of criminal acts and involvement in illegal drug trafficking.

The military regime drew upon technical expertise to meet the needs of the national economic development plan (Gandasegui 1993). This opened the opportunity for the creation of a semi-autonomous institution, INRENARE (Renewable Natural Resources Institute) charged with the administration of the country's renewable natural resources. This institutionalization of the environment was in agreement with the monumental expansion of the government apparatus which occurred during the 1970s and 1980s and the transformation of natural resources management into a military objective. The latter was closely related to the fact that, though Panama had successfully negotiated the devolution of the Panama Canal, questions remained about the ability of the country to administer this asset well. A crucial element to fulfill this responsibility rested on the capacity of the Panamanian government to protect the forests of the canal watershed that supplied the fresh water to run the inter-oceanic waterway.

The political and economic elements previously discussed help to explain why the rationale of Panama's decree was founded on the state itself and not on international conservation ideas as was Costa Rica's. The nation's constitution modified by the military regime and the newly

created environmental institution were the legal and institutional pillars on which the new park would rest. Additionally, the utilitarian view of nature stated in the decree indicates the prominence of the discourse of progress and modernity reinforced by the historical transformation of the Panamanian environment to serve international commerce through the trans-isthmian route.

The influence of international conservation organizations, the conservation-minded ex-pats and the US trained government officials that was crucial in the adoption of La Amistad in Costa Rica was very restricted in Panama, given the country's political and economic conditions. The relatively large foreign community living in Panama was composed mainly of members of the US military forces located along the canal and their conservation interests revolved principally around the canal watershed. Another foreign organization, with potential to influence the development of conservation in Panama, the Smithsonian Tropical Research Institute, kept its activities restricted to the security area of the US controlled Canal Zone.

The acceptance of international conservation ideas within the Panamanian state was hampered by the general anti-US stance of Noriega's regime but also by the volatility of the government administration. Between 1982 and 1988 there were six presidents appointed by the military regime which made any follow up difficult. In addition, a considerable number of INRENARE's professionals were alumni from Soviet bloc universities, though some of them had also received short training courses in the US and in the Tropical Agronomic Centre for Research and Training (CATIE) based in Turrialba, Costa Rica. The latter, though depicted as a neutral actor focused on academia and research, became an important facilitator in the diffusion of conservation ideas in Central America during the 1980s, mainly through the training of young professionals and civil servants. At the time, CATIE had strong financial and academic ties with international conservation organizations such as WWF and a number of its academic fellows were also representatives of those organizations. In fact, it was through one of CATIE's MSc students that the first proposal to create La Amistad was finally considered by the Panamanian government in 1987. The student was also an experienced government official and his thesis proposed the application of protected area planning for the creation of two protected areas, one of which was La Amistad (Ramon Alvarado, personal communication).

Given the political and economic conditions predominant in Panama during the 1980s, the Panamanian government was not very receptive to international conservation ideas particularly those proposed by US based organizations. Instead, international actors assisted the creation of networks of Panamanian civil society organizations that would embrace and disseminate these trans-boundary conservation ideas. Two environmental non profit organizations, the

Environment and National Parks Foundation (Fundación PANAMA, by its acronym in Spanish) and the National Association for the Conservation of Nature (ANCON) were created in Panama with the support of US funds. Fundación PANAMA was launched in 1983 with funds of the US Agency for International Development (USAID) and was constituted as a federation of about 15 small grassroots organizations distributed throughout the country. Some of its most active members based in Chiriquí, where La Amistad is located, actively supported the creation of the park at the regional level. ANCON, on the other hand, was founded in 1985, also with major support from US based organizations, particularly The Nature Conservancy (TNC). ANCON was the leading environmental organization in Panama and played a major role in the creation and further implementation of national parks but it was also sharply criticized for being the green arm of the Panamanian private sector (Barry *et al.* 1995). ANCON channeled funding from international conservation organizations to fund the master's thesis that provided the technical foundation for the creation of the park (Ramon Alvarado personal communication).

In addition to these networks of regional research and training organizations and national conservation NGOs, Costa Rican government officials also played an active role encouraging the commitment of the Panamanian government to establish its portion of La Amistad through diplomatic means (D. Tovar personal communication).

Apart from the participation of conservation NGOs in Chiriquí, it is difficult to estimate the role of local organizations in the creation of the Panamanian portion of La Amistad. The creation of a multi-class alliance had resulted in the assimilation of many of the popular organizations and their representatives by the Torrijos government, explaining their passive role during this period (Barry *et al.* 1995). This multi-class alliance might also provide a political explanation for the reluctance of the Panamanian government to adopt expropriation and eviction actions as did Costa Rica. Despite the populist tone of the military regime, these were not actions easily taken even during the implementation of agrarian reform.

Despite its resistance to US park conservation ideas, the military regime conveniently adopted protected areas as a strategy of state re- appropriation of lands of military importance. Protected area declaration at this particular time in Panamanian history seems to have been part of the prevalent discourse of national sovereignty and control. These ideas explained actions supported by the military regime such as the institutionalization of the environment with the creation of an autonomous institution which was, at least during some period of time, led by a high ranking military officer. It also helps to understand why during the military government the number of national parks grew from two to eleven during the 1980 decade alone. Notably, two large parks, Soberanía (Sovereignty) and Chagres, encompassing more than 150,000 hectares, were created

on the lands that the US transferred back to Panama as part of the implementation of the Panama Canal treaties signed in 1977. In addition, two even larger parks totaling more than three quarters of a million hectares were established to secure Panama's international borders: Darien on the border with Colombia and La Amistad on the border with Costa Rica.

3.4. Implementation of the Trans-boundary Park: eviction and zoning

3.4.1. Costa Rica

Information regarding the eviction of colonists from the Costa Rican side of the park was difficult to find. Documents regarding the process of eviction were not available from government achives. Efforts were made to contact park officials who participated in the implementation of these actions 20 years ago, but most of them are not currently employed by the ministry and the few who still are now work elsewhere in Costa Rica. Like local people, most government officials do not seem to feel comfortable talking about how exclusion of local people from the park took place, making difficult the detailed documentation of this process.

Costa Rican government officials' reluctance to discuss eviction might be the result of changing approaches to park – people relationships. Some of the most experienced park officials indicated that during the 1980s the park was administered to exclude people but that this management system has changed through the years. According to some, this change was followed by a more active role of the park service in providing information about the park's benefits and facilitating the provision of basic services to the communities. This period is criticized by some officials as "paternalistic" (Luis Sanchez, personal communication) but fondly remembered by locals as a time that helped to construct mutual respect and understanding between the "parqueros" and local people (Roberto Jimenez and Jimmy Urena, personal communication). In the last years, the adoption of a new management scheme in which the responsibilities and the benefits of managing the park are shared by both government institutions and local organizations, is being proposed by local leaders and emerging local organizations with support from international organizations. This approach is reflected in the most recent version of the management plan (Borge 2004).

During the initial period of park management, land tenure claims were dealt with depending on whether land had been legally registered or not. This categorization was important as it was directly related to how compensation was calculated. The first category comprised lands that were legally registered. These properties tended to be large, owned by companies or absentee

landlords and dedicated to timber extraction or cattle ranching. Some of them still had extensive forested areas.

The second category comprised “improvements” and rights of possession, smaller pieces of land that were claimed by colonists who had cleared the forest and converted it into pasture, coffee or staple production. Though some colonists had started the process of obtaining the right of possession that showed that they had occupied the land for more than 10 years, most of them lacked these official documents. The generally accepted way for a colonist to claim land was to show that he had “improved it” by cutting the forest and planting pastures or crops (see section 3.2.3. in this chapter).

Based on this categorization, the first management plan indicates that by 1987 the park service had estimated that “there were 3,000 hectares of improvements of which 1,340 hectares had been paid to evict the occupants of these park lands” (Centro Agronómico de Investigación y Enseñanza 1987 page 152). The plan also states that there were 5,720 hectares of registered private properties.

The prices that the government was willing to pay were in accordance with these categories. The 1987 management plan estimated that buying 5,720 hectares of private property would cost approximately 170,000 dollars (30 dollars per hectare). The plan also estimates that buying 1660 hectares of improvements would cost 13,000 dollars (8 dollars per hectare).

There are no official data on how many people were evicted and what they did after eviction. The management plan indicates that eviction took place in the southeast corner of the park, including the communities of Biolley and Altamira, where this study took place. From the 1987 management plan it can also be inferred that this process took place between 1982 and 1987.

The number of people evicted can only be estimated based on secondary data. If the 1987 plan indicates that there were 3000 hectares of improvements within the park boundaries and according to Schelhas and Pfeffer (2008) the average size of the small holdings was 20 hectares, it could be concluded that there were about 150 small land holdings located within park lands. This estimation needs to be taken with caution as Schelhas and Pfeffer (2008) also report that the size of the farms varied greatly.

The way eviction was conducted and the inadequate compensation reported by the colonists are the main sources of resentment in the communities. According to members of the communities, the park was imposed on them, park officials did not come with the idea of starting a negotiation

but instead came accompanied by rural guards to demarcate the park boundaries and evict people (Minor Sibaja personal communication).

Conflicts between local communities and park officials also arose when park rangers were in charge of enforcing forestry law outside the park boundaries. According to this law, secondary forest, that is part of the shifting cultivation system, must not be cut but left to recover even if it is outside protected areas. However, there were often contrasting views between park rangers and local people on what constituted a secondary forest. Therefore conflicts emerged when local farmers tried to use secondary growth that had been left fallow for some time in their "fincas" outside the park boundaries (Schelhas and Pfeffer 2008).

In response to the enforcement of conservation laws, local producers adopted a series of strategies. Many of the local farmers decided to work in their "fincas" in groups as park rangers, who were few, were also reluctant to face large groups of colonists (Schelhas and Pfeffer 2008). Also meetings of the local development associations that were held with other government institutions were taken as opportunities to discuss and resolve conflicts between the park and colonists. Leaders of these associations served as mediators when a local farmer was jailed for clearing the forests in a piece of land that he claimed as his (Minor Sibaja personal communication). According to this local farmer, park officials stopped bothering him when he mentioned that park personnel were involved in illegal extraction of timber from the park's fallen trees. Tensions between the communities and the park escalated to such a point that in one occasion local people threatened to set fire to park forests if the rangers were too strict in enforcing conservation laws (Schelhas and Pfeffer 2008).

It is unclear whether the government bought additional "improvements" to those reported by the management plan in 1987. However, some locals still argue that the park still owes them money for their "fincas" located in the park. Some of these farmers are legally demanding compensation from the park service (Abundio Monje, personal communication). In an interview with Nelson Elizondo, the administrator of the park, he confirmed that there are still pending land issues within the park boundaries.

It is likely that after the first evictions were conducted, some colonists decided to abandon lands they thought were located within the park boundaries. The first evictions might have also discouraged other colonists from further clearing forests. In this sense, Schelhas and Pfeffer (2008), concluded the exclusionary model seems to have been effective in halting deforestation inside the park boundaries. Also, Costa Rican government officials point out that that the park

on their side of the border is easier to manage and better conserved than the Panamanian portion because nobody lives within the park boundaries (Luis Sanchez, personal communication).

Though it is known that eviction occurred in Altamira and Biolley, Las Mellizas, the other Costa Rican community under study, also has pending land tenure problems as this community is located in the two kilometers inalienable zone along the international border. During field work rumors had spread in this community about the interest of the ministry of defence to evict local people arguing the increasing need to strengthen control of illegal trafficking across the border with Panama.

According to Borge (2004), in Costa Rica park lands have been bought with ample support form international organizations. In later years, however, the Costa Rican park service has been buying large properties with resources from the central government. During 2002 and 2005 a 23 hectares-property was bought in La Amistad Park with government funding. The cost of the property was 13,974 dollars (Murillo *et al.* 2004). According to the Ministry of Environment and Energy (2006), 12% of the land declared as national park, biological reserve and natural monument, management categories where human occupancy is prohibited, is still privately owned in Costa Rica as a whole. Buying this land would cost the Costa Rican government about 55 million dollars (Ministerio del Ambiente y Energía 2006).

3.4.2. Panama

As in the case of Costa Rica, the on the ground enforcement of the park is not documented in Panama. Most information presented here was provided by park personnel and local people. Initial funding for the management of the park came from the Parks in Peril Program financed by USAID and The Nature Conservancy and that was channeled through ANCON, the Panamanian conservation organization mentioned above. Most of these funds were dedicated to train and equip park rangers, demarcate priority areas and produce environmental education materials.

It was through the field demarcation of the park that most local people realized that a conservation area has been established (Melania Barrows personal communication). As the delimitation proceeded formal meetings were organized in local communities to provide information about the decree that created the park and the new regulations. As a general rule, park authorities indicated that those farmers occupying park lands were allowed to stay but not to expand their agricultural areas and activities such as hunting, logging and small scale

agriculture were also permitted but only for subsistence purposes (Leonel Quiros personal communication).

At the same time meetings with other government institutions were also held to provide information about the new regulations and to coordinate future government investments within the park area. Much effort was dedicated to this task as other government institutions were reluctant to follow the park's lead. This was particularly the case regarding the prohibition of the registration of further park lands as private property and regarding the cessation of the granting of agricultural credits for existing agricultural land within the park (Leonel Quiros, personal communication). The construction of new roads, schools and health centres within the park boundaries was also discouraged by park authorities. These actions were aimed to provide incentives for local farmers to abandon their land and discourage further colonization of the park's forests.

This strategy seems to have found limited success. Indeed some interviewed farmers indicated that they abandoned their lands and moved to communities where they had access to basic services. But others sold the "improvements" or rented their lands to other local producers who have the economic resources to cultivate the land or to raise cattle. Therefore, though there is no data regarding the number of hectares under production before the establishment of the park, the current situation shows that there are still lands under agricultural production in the park and these areas are expanding (TNC *et al.* 2004).

Furthermore, most of these lands are controlled by regionally powerful cattle ranchers who have the economic and political clout to avoid the already weak government control. These cattle ranchers operate in coordination with other cattle producers from the Caribbean slope of the park to move cattle seasonally through the protected area. Two of the main paths to bring cattle from the Caribbean to the Pacific slope of the park are located in the area of study. Cattle ranchers have expanded pastures in the park by financing small producers who clear the forests, plant pastures and raise cattle that is later sold to the same large cattle producers (TNC *et al.* 2004).

This situation has also been the result, at least partially, of a chronic lack of control by park authorities. This poor institutional capacity is reflected in the lack of trained personnel and scant logistical support to implement basic patrolling and maintenance activities. During the field work phase of this thesis there were only 7 park rangers who took turns to patrol the area. Also, in the last years the park has received poor international support and funds assigned to the park by the Ecological Trust Fund administered by Fundacion Natura, are often not invested in the

protected area but re-directed by the Environmental Authority elsewhere in the province (Leonel Quiros, personal communication).

Another element that reflects the poor institutional capacity of the government to administer the park is reflected in the fact that the first management plan for the Panamanian portion of the park was produced in 2004, more than 15 years after the creation of the protected area. It is in this plan that a zoning system, referred to in the decree of creation, is proposed for the first time. According to this zoning system, the communities under study are located in the buffer zone of the park while at least some of their "fincas" are under the intensive use zone. Though the plan recognizes that according to the management category, agricultural activities should not be allowed in the national park, these will be permitted in the intensive use zone of La Amistad as "these activities are very difficult or impossible to eradicate" (Autoridad Nacional del Ambiente 2004). Instead, the plan proposes that in this intensive use zone producers pay a concession fee and follow certain regulations. Among these are: the restriction of cattle ranching to flat terrain and a reduction in the use of agrochemicals. Despite the fact that this plan was officially approved, no actions have been taken to implement this zoning system and its regulations, due mainly to the lack of resources (Leonel Quiroz, personal communication).

Though there have been conflicts between park authorities and local communities in the past, these do not seem to have escalated as much as in the Costa Rican portion of the trans-boundary park. Most local people complained about what they considered an unfair application of environmental regulations as small farmers were forced to leave the park lands while influential producers seem to have flourished (Cledys Pitty personal communication). Also, some owners of lands within the park boundaries argue that the Panamanian government should compensate them for their lands as the Costa Rican government did on its side of the park.

3.5. Summary

Though Panama's history has been marked by its geographical position and Costa Rica has been mostly an agrarian nation, the area located along their international frontier, due at least partially to its isolation and marginalization, has developed a dynamic of its own based on the production of the land, and cross-border exchange. The modern colonization of the area under study has taken place during the last 50 years but its inhabitants have brought practices that date back to the native population, such as slash and burn agriculture, and to the first Spanish settlers, such as a strong cattle ranching tradition, but, above all, their perception of the forests as an enemy that needed to be conquered. This vision of the relationship between humans and the natural world was later reinforced during the emergence of the nation states which adopted the idea of

progress and modernity within which forests were symbols of backwardness and mere suppliers of raw materials. To understand whether this vision of nature and culture still holds after 25 years of the existence of the trans-boundary park, in which nature is seen as separate from humans, is a primary objective of this thesis.

There have been common factors that have shaped the relationships of people to the land on both sides of the border. Foreign interests have seen the region as a path for continental communication, from Vasquez de Coronado's mule trail to the Inter-American Highway. Others, such as the banana company have seen the region's potential beyond political borders and in the process have played a decisive role in creating new social relations with their concomitant impact on the environment. Foreign immigrants have also brought new ideas and technologies.

Major differences also arise. On the Panama side of the frontier, the emergence of a social class of politically and economically influential Chiricanos, the province's ecological diversity and the commercial and social ties with the rest of Central America, contributed to the emergence of a strong Chiricano identity during the 1850s. Around that period the Chiricano cattle ranching culture, taking advantage of the geography of the area, expanded its domains into the drier areas of present day Costa Rica. The descendants of these Chiricano emigrants, together with the more recently arrived Guanacastecos from northern Costa Rica, another leading cattle ranching region, led the conversion of the forests into pastures in the Costa Rican section of the study area.

This strong sense of social identity is not apparent in the Costa Rican section. Apart from the Chiricanos and Guanacastecos, this area has been most recently colonized by families looking for lands for coffee cultivation, a symbol of social status and national identity. The cattle ranching and the coffee cultures meet in the Costa Rican portion to take advantage of the varied environments of the region. The coexistence of these two cultures of production as well as the diverse origin and relatively recent arrival of the colonizers seems to hinder the emergence of a sense of commonness and unity on the Costa Rican side of the border.

Country differences are also evident particularly in the evolution of land tenure. In Costa Rica, the colonization of the forests of the study area started with a massive land concentration followed by the break up of the properties into small farms. On the contrary, forest clearings in the Panamanian section was mostly spearheaded by non-influential Panamanians who claimed medium size plots and for whom the main purpose was to become wealthy cattle ranchers. This

colonization reached its limit with the enclosure of the remaining forests in a trans-boundary protected area.

As is characteristic of frontier areas, the imaginary political border is highly permeable, facilitating cross-border interexchange. Though the main purpose of the first Panamanian colonizers was to access land to convert it into pastures, the close contact with Costa Ricans favored the adoption of coffee on the Panamanian side of the border. The Chiricano cattle raising culture is strong and, as the Panamanian administration of the park permits cattle ranching to prosper even within the protected area, this favors the illegal trade of Costa Rican cattle through the border. As with coffee, cattle are often smuggled to either side of the border depending on prices and market demand and supply.

Finally, the analysis of the process of adoption of cross boundary conservation in both Panama and Costa Rica shows how the different cultural, political, economic and social in-country conditions at the time of declaration led to the adoption of contrasting park management regulations to deal with human activities within the park boundaries. The analysis of the literature also points out the influence of networks of actors acting beyond political boundaries to move forward common interests.

CHAPTER FOUR: RESEARCH DESIGN AND METHODS

A key feature of this research is that it was interactive. After the first quantitative study it became apparent that an emergent research design was needed that allowed continuous feedback, as new findings were available. The initial research questions were narrowly focused on measuring the local people's relationship with nature along a biocentric/anthropocentric continuum and making comparisons across the international border. However, doubts regarding the appropriateness of the measuring instrument and changes in my understanding of concepts and categories took place as data started to be analyzed.

Based on these preliminary results, qualitative interviews were conducted and improvements in the content of the survey statements were made. Finally, the partiality of the findings of the quantitative study raised more questions than answers regarding human – nature interactions and qualitative data already gathered were re-analyzed to widen the scope and uncover additional societal issues affecting local perspectives regarding the environment.

Research questions were reformulated based on this interactive process as follows:

1. Do peasant communities near La Amistad International Park structure their relationship to nature as a biocentric – anthropocentric dualism? How do the socio-economic variables under study influence these relationships?

2. Are there any differences in environmental attitudes, attitudes to the park and conservation behaviours between the Panamanian and Costa Rican communities under study?

3. What other cultural factors influence environmental attitudes and behaviours in these border communities?

4. What are the implications of these findings for research and conservation management?

4.1. Mixed Methods Approach

The research design adopted to investigate these questions was the mixed method approach. According to Creswell and Plano Clark (2007 page 5), a mixed method research design is:

> *"a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. As a method, it focuses on collecting, analyzing and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems that either approach alone".*

In this approach, therefore, emphasis is put on the type of research questions instead of the methods to be employed to deal with the questions. Mixing the data is also another essential aspect of the mixed method research. This mixing can occur by merging the two types of data, connecting them or embedding one data set on another, so one data set provides support to the other.

The utilization of quantitative and qualitative methods together helps to compensate their inherent weaknesses and build on their strengths (Creswell and Plano Clark 2007). Quantitative methods are criticized for not paying enough attention to the context and because the voices of the participants are not directly heard but instead conceptual categories are imposed on them. Furthermore, quantitative researchers are supposed to be detached from their object of study and their personal biases are seldom presented and discussed as part of the study. All these weaknesses are overcome by using qualitative methods. However, qualitative methods have their own limitations as well. They tend to rely on the researcher's personal interpretations and their results are difficult to use for generalizations as they are usually based on limited, often unrepresentative samples. These limitations are offset with the adoption of quantitative methods.

Despite bringing together the best of quantitative and qualitative methods, mixed method research also has its own problems. The implementation of both methods is difficult and time and resource consuming. Mixed method investigations can be difficult to explain to an unfamiliar audience and researchers, often trained on one form of inquiry, are reluctant or do not feel competent using both. Furthermore, there are still questions regarding the philosophical inconsistency that might emerge from using qualitative and quantitative data. In this respect, Snape and Spencer (2006) argue that it is important to acknowledge that quantitative and qualitative data do not calibrate exactly but this should be taken as an indication of the ways each method contributes to the understanding of the problem.

Behind each study there are assumptions the researcher makes about reality (ontology), how knowledge can be obtained (epistemology) and the methods that can be used (Creswell and Plano Clark 2007). These assumptions are called paradigms or worldviews and offer a philosophical foundation for the research. There are multiple classifications of the different paradigms as they are continually debated and modified, but Creswell (2003) summarizes them into four: post-positivism, constructivism, advocacy and participatory and pragmatism. These are not rigid classifications but organizing frameworks for understanding different philosophical stances. Table 4.1 shows the main characteristics of these worldviews.

Table 4.1. Four worldviews used in research

Positivism	Constructivism	Advocacy and participatory	Pragmatism
▪ Determinism ▪ Reductionism ▪ Empirical observation and measurement ▪ Theory verification	▪ Understanding ▪ Multiple participants meanings ▪ Social and historical construction ▪ Theory generation	▪ Political ▪ Empowerment and issue oriented ▪ Collaborative ▪ Change oriented	▪ Consequences of actions ▪ Problem centered ▪ Pluralistic ▪ Real-world practice oriented

Modified from (Creswell 2003).

Positivism and constructivism differ on several grounds. In positivism, the phenomena are seen as independent and unaffected by the researcher and therefore, the research can be objective and value free (Snape *et al.* 2006). In contrast, according to constructivism, the relationship between the researcher and the social phenomena is interactive and findings are mediated through the researcher or negotiated with the research participants. Research can not be value free but the assumptions made by the researcher should be made transparent as they might affect the way data are collected and analysed (Snape *et al.* 2006; Creswell and Plano Clark 2007).

These two paradigms also diverge on what they regard as the "truth". According to the positivists, observations match the natural world and an independent reality. Constructionists, on the other hand, consider that this "independent" reality can only be gauged in a consensual rather than an absolute way (Snape *et al.* 2006) through the participants' views. Positivists investigate the social and the natural world using the "scientific method" with emphasis being given to hypothesis testing, cause - effect explanations, generalization and prediction. The constructionists, by contrast, concentrate on understanding, rich description and emergent

concepts and theories and generally use qualitative methods (Snape *et al.* 2006). Differences between qualitative and quantitative research are summarized in Table 4.2.

Table 4.2. Elements of qualitative and quantitative research

Process of research	Qualitative research tends toward…	Quantitative research tends toward…
Intent of the research	Understand meaning individuals give to a phenomenon inductively	Test a theory deductively to support or refute it
How literature is used	Minor role Justifies problem	Major role Justifies problem Identifies questions and hypothesis
How intent is focused	Ask open-ended questions Understand the complexity of a single idea	Ask closed-ended questions Test specific variables that form hypotheses or questions
How data is collected	Words and images From a few participants at a few research sites Studying participants at their location	Numbers From many participants at many research sites Sending or administering instruments to the participants
How data are analysed	Text or image analysis Themes Larger patterns or generalizations	Numerical statistical analysis Rejecting hypotheses or determining effect sizes
Role of the researcher	Identifies personal stance Reports bias	Remains in background Takes steps to remove bias
How data are validated	Using validity procedures that rely on the participants, the researcher, or the reader	Using validity procedures based on external standards, such as judges, past research, statistics.

Adapted from (Creswell and Plano Clark 2007).

Advocacy and participatory worldviews tend to be more associated with qualitative approaches than with quantitative ones and are influenced by the need to improve society (Creswell and Plano Clark 2007). Issues of empowerment, marginalization and hegemony are considered relevant and researchers often collaborate with participants to have an impact and change the social world.

Finally, pragmatism, the paradigm typically associated with mixed method research, focuses on the questions being asked rather than on the methods. Thus the use of multiple methods is advocated and oriented towards "what works" in practice (Creswell and Plano Clark 2007). According to this view, qualitative and quantitative investigations should not be seen as competing or contradictory but complementary research strategies appropriate to better address certain types of research questions. This approach is an attempt to overcome the entrenched epistemological positions of positivism and constructivism as they might

undermine the researcher's capacity to choose and implement more suitable research designs (Snape *et al.* 2006). This trans-disciplinary, multi-method research strategy is at the core of the present study.

The quantitative survey and the qualitative interviews were collected using a modified version of Creswell and Plano Clark's (2007) explanatory design (Figure 4.1). It is important to remember that even though the methods here are presented sequentially, the actual work was more iterative and based on continuous revision of the findings as they emerged.

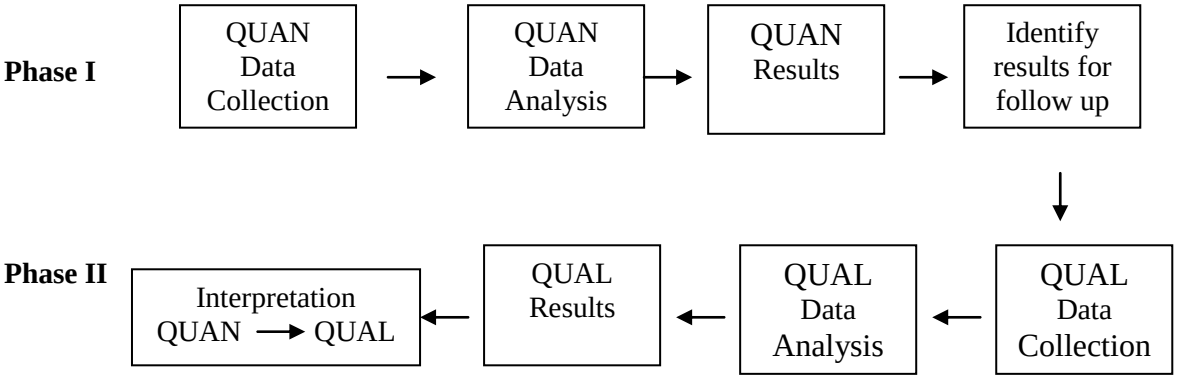


Figure 4.1. The explanatory sequential design

Modified from Creswell and Plano Clark (2007).

This two-phase design starts with the collection and initial analysis of quantitative data followed by the subsequent collection and analysis of qualitative data. In this case, the researcher identifies specific quantitative findings that need to be explained or expanded and uses qualitative methods to do so. The rationale behind this approach is that the quantitative data and their subsequent analysis provide a general understanding of the problem while qualitative data and analysis refine and explain those statistical results by exploring in depth participants' points of view. Though, according to Creswell and Plano Clark (2007) the qualitative phase takes place after the quantitative stage, in some cases both types of information were collected simultaneously, as opportunities arose in the field. Also, instead of giving preponderance to one of the methods of data collection, this research gives equal relevance to both quantitative and qualitative methods.

This explanatory design is considered the most straightforward of all the mixed methods designs because the investigator implements the two methods in two clearly separate phases and collects one type of data at the time (Creswell and Plano Clark 2007). Also the design lends itself to multiphase investigations. However, the implementation of this research design

tends to be lengthy as one type of data needs to be collected and analysed before the next step can be taken. Also the researcher needs to decide which part of the quantitative results needs to be expanded or explained further and this can not be done until the first phase has been completed. Finally, questions remain regarding whether to use the same individuals or not for both phases.

4.2. Selection and Description of the Communities

As stated before, this study took place on the Pacific slope on both sides of the international frontier between Panama and Costa Rica. A general description of the study area was already presented in the previous chapter. More specifically, these investigations were focused on peasant communities which were selected using criterion sampling. According to this method all the research sites must comply with these criteria to then allow for comparison. The selected communities fitted the following criteria:

1. Situated within 10 kilometers from the La Amistad International Park.
2. Located above 900 meters above sea level and within the premontane forest life zone (CATIE 1987).
3. No more than 3 hours away from the international border by road.
4. Conformed by peasant (latino) colonists established in the area at least 35 years ago.
5. Historical reliance on local resources for livelihood and coffee cultivation as current main source of income.
6. Focus of some park related intervention at present or in the last 5 years.

Five communities fulfilling these criteria were selected for the study, three in Costa Rica and two in Panama. The three Costa Rican communities were Biolley, Altamira and Las Mellizas and the Panamanian communities were Piedra Candela and Santa Clara (Figure 3.1). In addition to the defined criteria, these communities share very similar levels of education and material wealth. In all of them there are public primary schools, access to electricity and potable water, recreation areas and small shops as well as public transport, though the state of the access roads varies. Catholic and Evangelic churches were present in all villages. All these communities have local organizations that work around development themes that are relevant to the communities and that often are a condition for government economic support. Among these, the most popular are the Juntas de Agua that administer and maintain local aqueducts. Other organizations work to promote road improvement, health and school services. As in other rural areas in Central America, these communities are experiencing high rates of mobility to urban centres and overseas.

All these communities are located in the so called coffee belt, between the 900 and 1200 meters above the sea level and therefore present favourable natural conditions for coffee production. As discussed in the environmental history chapter, coffee was introduced almost a hundred years ago to the border area, mainly by Costa Ricans and foreigners from the US and Europe and is nowadays the main agricultural cash crop in the study area.
Not surprisingly, international conservation organizations have been promoting the adoption of conservation coffee production practices in the region for more than a decade. Conservation coffee practices in this particular case refer to the production of coffee through use of environmentally friendly technologies and inputs, including the reduction or total elimination of inorganic fertilizers, herbicides and agrochemicals in general and their replacement by organic fertilizers and pest controls, the protection of watersheds, reforestation with natives tree species and the total prohibition of hunting. These technologies also include the correct treatment of waters and by-products in the coffee processing plants as well as the adoption of socially adequate conditions for the labourers, mainly Ngobe Indians from Panama who do the coffee picking on both sides of the border. Depending on the technology and measures adopted there is a wide variety of categories of conservation coffee that is being produced. The most common in the study area are shade-grown, organic, sustainable, bird-friendly and in-transition coffee (plantations that are in the process of becoming fully organic).

The promotion of conservation coffee techniques as a prime conservation strategy is supported on several grounds. First, most of the cultivated area is located between 900 meters and the borders of the park on the Pacific slope and, as was confirmed when the international coffee price plummeted 10 years ago, the alternative economic activity for those lands is cattle ranching, a far more environmentally damaging option. Second, the alternative of producing coffee under the shade of native trees provides well studied benefits for the local flora and fauna as well as soil and watershed protection (Roberts *et al.* 2000; Daily *et al.* 2001; Petit and Petit 2003). Third, the utilization of organic input and the reduction of agrochemicals contribute not only to improve the environment but the health conditions of the people who work and live in the area. Finally, coffee production is an important economic activity in the region and a key source of income for the studied communities.

Interestingly, the serious fall in the international price of conventional coffee during the late 1990's that represented great economic losses for local producers was taken by conservationists as an opportunity to introduce environmentally sound coffee production practices as an alternative. As part of the economic downturn, producers most affected were

small farmers who were dedicated almost exclusively to coffee production and depended on government credits, and many of them lost their properties, a situation that many still have to endure. Within this international situation, programs such as Fair Trade were proposed to provide an incentive to local people to adopt cheaper, environmentally and socially sound technologies in the production and processing of coffee in exchange for a better price. This initiative also took advantage of the fact that many producers had abandoned their coffee plantations for some years and, though their production had fallen dramatically, what was being produced was technically organic and therefore could be sold at a better price. This strategy facilitated enormously the transition from conventional to organic coffee that in most cases results in an important reduction in the level of production that is often not compensated by the price increase.

As part of these conservation initiatives, all the studied communities have received training in conservation coffee techniques which have been adopted by a number of farmers and is continuously promoted by local and regional groups. An important difference between the two countries exists, however, in the commercialization of environmentally friendly coffee. Costa Rica is far more advanced than Panama in accessing the international market for this commodity. As a result, local groups in two of the Costa Rican communities, Biolley and Altamira, have been successfully exporting their in-transition, sustainable and organic coffee to various European buyers. In the third Costa Rican community, Las Mellizas, environmentally friendly coffee is being bought directly by the owner of the large estate located near the community who processes it and exports it as his own. Meanwhile, Panamanian organizations are still negotiating their access to the environmentally friendly coffee market. This cross-country difference is important as Costa Rican organizations are getting a much higher price for the coffee they produce following conservation practices.

There follows a brief description of the communities selected for this research based on the criteria presented above. The location of these communities is presented in Figure 3.1.

1. **Biolley** is the westernmost Costa Rican community under study. According to the census data, Biolley has 329 inhabitants (Instituto Nacional de Estadística y Censos 2002). The community was established during the early 1970s on public lands that had been already subject to timber extraction. Most of its inhabitants came from the drier areas of Guanacaste in northern Costa Rica, though there are others who also migrated from Puntarenas, San Vito and Panama. More than three quarters of its population depends on agricultural activities, mainly coffee production, though cattle raising was also reported as an important economic activity. Cattle ranching occurs in the drier patches surrounding Biolley. ASOMOBI (Biolley

women's association) is the best known local organization in Biolley. Though it is mainly constituted by women, men also participate in its activities. Their main objective is to create income opportunities for their members through sustainable coffee production and provision of ecotourism services.

2. **Altamira**, also in Costa Rica, has 315 inhabitants (Instituto Nacional de Estadística y Censos 2002), the vast majority of whom are dedicated to coffee production. Most of the inhabitants of Altamira arrived in the area during the 1970s and invaded an abandoned private property belonging to a group of US investors. The invaded area was later acquired by the Land and Colonization Institute (ITCO), the government agency responsible for implementing agrarian reform. As a result, many of Altamira's inhabitants still do not have legal property documents for their lands, though this has not prevented some of them selling their lands to others. In contrast to Biolley, most of Altamira's inhabitants came from towns located in the region such as San Vito, Perez Zeledon and Buenos Aires, suggesting that this group was the result of a second migration wave. Altamira is the entrance point for the on-site park headquarters, located 20 minutes from the centre of the village. Though the Local Development Association has been active, ASOPROLA (La Amistad Producers Association) has a stronger representation within the community. ASOPROLA promotes a development model based on environmentally friendly activities such as ecotourism and organic coffee and vegetable production.
Members of both Biolley and Altamira take pride in their efforts to become an independent district. Until the 1980s these communities depended on Potrero Grande as government decision making centre. Potrero Grande or "Big Pasture" is one of the Costa Rican communities founded by Panamanian immigrants who entered the Coto Brus valley in search of land during the early 19th century (see chapter 2). Both ASOMOBI and ASOPROLA belong to a larger network of conservation and community development organizations called Red Quercus or Quercus Network. La Amistad International Park is famous for protecting upper mountain forests dominated by majestic oak species such as *Quercus costarricensis* and *Quercus copeyensis* (Kappelle and Juarez 2007).

3. Las Mellizas is a Costa Rican community of 531 inhabitants located only a couple of kilometres west from the international border. The village was founded by one of the influential coffee growers that entered the region encouraged by the unfulfilled promise of progress that the construction of the Pan American Highway would bring to the region. Don Jorge Zeledon selected families from another of his haciendas in the Costa Rican Central Plateau to colonize this isolated region. His original 10,000 hectares property has been divided several times, though one of his grandsons still administers a large luxurious hotel,

coffee plantations and processing facilities which until recently had been the centre of the town's economic activity. A good proportion of this community's inhabitants have close family ties. Community organizations are weak and there is only a small group of women called ASOMELA (Las Mellizas Women's Association) promoting reforestation and quilt making.

4. Piedra Candela is located just a couple of kilometres from Las Mellizas but on Panamanian territory. Though at first glance Piedra Candela appears to be a medium-size community, most of the buildings are "campamentos" or temporary facilities that host an important number of Ngobe Indians that arrive in the area during the coffee harvest. According to the census data, Piedra Candela has 168 non-indigenous people, mostly dependant on coffee activities. There are four coffee processing plants in this community that besides having their own plantations, compete among themselves for the locals' coffee harvest and manpower. At least three of them have absentee owners who live in Panama City and David, the province capital. Piedra Candela is a strategic location for the protection of the park as it offers access to pasture lands located within the park boundaries. Some of the original owners of those lands still live in Piedra Candela but, given the restrictions imposed by the park and their descendants' lack of interest in pursuing agricultural activities, they have sold their properties to regionally influential cattle ranchers. The government environmental agency has a park ranger facility up hill from Piedra Candela but monitoring by park authorities is irregular. There is also a small conservationist group in Piedra Candela, ADPAELA (Agro-ecologist producers of Piedra Candela) but this group is currently not very active. Piedra Candela started to be colonized during the early 1950's after the opening of the trail to build the Pan-American Highway. Most of its founders come from nearby towns south and west such as La Concepcion, and Volcán.

5. Santa Clara, in Panama, is located forty minutes east from the international border. It has 504 inhabitants according to the census data (Contraloría General de la República 2001c). As in the case of Las Mellizas and Piedra Candela, this community was established during the 1950's by peasant families attracted by the construction of the Pan-American Highway. Most of these families came from Volcán and Monte Lirio. There are several community groups in Santa Clara with different levels of action. Two of the most active organizations are APRE (Renacimiento Producers Association) and APASAC (Santa Clara Producers Association). APRE has a large area of influence, including the Renacimiento District and is constituted by medium to large coffee producers. APASAC on the other hand, consists of 21 small organic coffee and vegetable producers of Santa Clara. APRE, APASAC and ADPAELA belong to a larger network of organizations called ADATA (Highland Farmers Association) created with

the intention of influencing government and private sectors to promote environmentally friendly agriculture.

4.3. Quantitative Data Collection and Analysis

As comparisons of environmental attitudes the across international border were required to answer the research questions, a quantitative survey was developed and implemented as part of the first phase of this investigation. Surveys are characterised for producing a very structured set of data about the same variables from at least two cases that can be depicted in a data grid (Contraloría General de la República 2001b).

4.3.1. Survey sampling and data collection

As this research sought to quantitatively assess the way local populations appreciate their environment and compare those results across the international border, a statistically representative sample was pursued. A representative sample is one that mirrors the characteristics of the population it is designed to represent (Contraloría General de la República 2001a). The best way of ensuring that a sample is representative is to make sure that all people in the population have the same chance of being included in the sample. Obtaining a probability sample involves defining the population under study, finding an unbiased sample frame and selecting a sample by using probability sampling methods.
The population under study was defined at the outset in the research questions. The research questions in turn influenced the criteria established to select the communities on which this research was going to focus. This population is comprised by the peasant communities located on the Pacific slope of La Amistad International Park in both Panama and Costa Rica.

As complete and reliable lists of all the inhabitants of the communities were not available for either country, community maps used to conduct national population censuses were updated and the lists of inhabited households used as sample frames. The limits of each community and the location of key features were discussed and defined with members of the local organizations as well as independent community members. Young people from the communities were then hired as local guides based on recommendations from other local community members to assist in the process of updating the maps and conducting the survey interviews (see these maps in Appendix 4). Once the maps had been updated and redrawn, each household was given a number and this list of households was used as the sampling frame. A sample of the households was randomly drawn from the whole list and a person was interviewed in each selected household. This technique of obtaining a final sample that

involves drawing from a different sample first (households) is called multistage random sampling (De Vaus 2002).

Sample sizes were decided based on the total number of inhabited households and the total population of the communities. The latter was estimated based on the information found in the national censuses of both countries. Each sample size was estimated to include more than half of the total number of households and at least 10% of the total number of people in each community as is generally recommended for this type of sampling (Patton 1990; De Vaus 2002).

All selected households were visited and one person was interviewed. In most cases whoever was willing and available for interviewing was chosen, though an attempt was made to get representation from women and from the young and elderly. In cases where there were more than one volunteer, the person whose birthday was closest to the date of the interview was chosen. Households where no person was found were deleted from the sample and interviewing continued to the next available household in the list. Interviews were conducted from mid morning to early evening trying to avoid periods when people were busy. Interviews lasted between 20 minutes and an hour.

All the interviews were conducted in Spanish by the researcher. Interviews started with a general introduction to the researcher's background, the study objectives, a general overview of the content of the interview and an assurance of anonymity and confidentiality. No names were asked during the interview. At the end of the introduction, the researcher asked the potential informant if there were any questions or doubts and if she or he was willing to continue. Once permission was granted, the interview started.

4.3.2. Developing attitudinal scales

This phase started by transforming the definitions of environmental value orientations and attitudes found in the literature into a measuring instrument. According to socio-psychological theory, value orientations refer to general beliefs about the environment located at two ends of a continuum. These poles are identified as biocentricism and anthropocentricism and reflect a view of a world divided into protected spaces were human activities are banned and spaces inhabited by humans, where environmental exploitation is permitted. Attitudes, on the other hand, are positive or negative evaluations local people hold about something specific, such as the management of the park.

Environmental value orientations and attitudes were measured using Likert-scale. This scale involved providing a group of statements that reflected a particular attitude or opinion in this case biocentric and anthropocentric. Biocentric statements reflected the value of nature for its own sake and individuals supporting these items will considere that nature deserves protection for its own sake (Thompson *et al.* 1994). Anthropocentric statements, on the other hand, expressed the value of nature based on providing materials and services to enhance human life (Thompson and Barton 1994).

Respondents indicated their level of agreement or disagreement towards the presented statements based on alternatives that range from strongly disagree (1), disagree (2), neutral (3), agree (4) to strongly agree (5). The term "neutral" was used instead of "I don't know" as statements aimed to uncover attitudes or opinions instead of knowledge. Though it is recognized that knowledge is an important factor in creating opinions, it is also possible that people might have not thought about particular issues, neither agree nor disagree with the statements, or not wish to express an opinion.

It is important to remember that anthropocentric and biocentric statements are theoretical constructions that were presented to the participants with the goal of creating an attitudinal scale. However, it is not until factor analysis is conducted that the validity of these theoretical concepts, in these poorly studied communities, is confirmed. As will be seen below, a series of statistical tests were performed to ensure that the items were actually tapping the same underlying concept and that the scales were reliable.

A pilot survey containing value orientation statements was conducted in two communities, one in Panama (Piedra Candela) and one in Costa Rica (Biolley) (n=60) (Appendix 1). Based on these results, a more complete survey, called here main survey, was developed (Appendix 2). This main survery contains statements to assess environmental attitudes and attitudes towards the management of the park, as well as conservation behaviours. It was conducted in four communities, two in Panama (Piedra Candela and Santa Clara) and two in Costa Rica (Las Mellizas and Altamira) (n=165).

4.3.2.1. Value Orientations Scale

Statements were originally designed to represent biocentric and anthropocentric value orientations. The initial statements included in this pilot scale were obtained from the previous studies of Thompson *et al.* (1994), Reading *et al*. (1994), Stem (2001) and McFarlane and Boxall (2003). All the statements were translated into Spanish and pre-tested

with members of the communities to make sure that they were understandable and appropriate to the environmental and cultural setting.

After pre-testing it was decided to include four anthropocentric items referring to the provision of ecosystem services (watershed protection, spiritual values) and five referring to material benefits (timber, firewood and wild meat). Ecosystem services items are regarded here as anthropocentric, as their appreciation is based on the benefits that humans receive from them. Other studies consider these as biocentric items (Thompson *et al.* 1994; McFarlane *et al.* 2003). For the purpose of this study, biocentric statements represented only the intrinsic value of nature and the view of humans as part of nature. This was considered appropriate as the concept of value orientations implies two extreme poles. Following this definition, six biocentric items were included in the original scale.

The pilot survey includes a section on the participants' personal data and value orientation statements. It was conducted in two communities, one in Costa Rica (Biolley) and one in Panama (Piedra Candela) (n=60). This pilot survey is presented in Appendix 1.

A data base was created and periodically updated using SPSS 14.0 for Windows. The individual surveys were given a number that was introduced into the data base as the identification number for that respondent. Responses provided by the participants to the survey questions were classified and converted into numbers through the process of coding. Codes for fixed responses had already been defined before the application of the survey. Participants rated scale items on a 5-point scale (1= strongly disagree, 5= strongly agree). For open ended questions coding took place afterwards by developing a coding scheme based on the responses obtained by the respondents. Codes for missing data were also included. In all the analyses the "exclude cases pair wise" option in SPSS was selected, so the program excluded cases when required data were missing. This is the preferred way of dealing with missing values when preparing attitudinal scales (De Vaus 2002; Pallant 2003). The use of this option explains differences observed between the number of interviews conducted and the number of cases actually used in some analyses. A code book was prepared to keep a systematic record of all the codes and the decisions that supported them.

Before starting the analysis, the database was screened for errors. This was done by running simple statistical analyses such as frequencies for categorical variables and mean, minimum, maximum and standard deviation for continuous variables. Outliers were also checked. All identified errors were corrected by going back to the numbered survey sheet.

Factor analysis was the analytical tool used to identify the chief underlying dimensions of the set of responses provided by the respondents and create the final scale. Factor analysis is a mathematically complex method of reducing a large set of variables into a smaller number of more general factors that underlie the answers to individual statements (Oppenheim 2003). It is also the best method to test the dimensionality of a scale, that is to say, to explore how many constructs the scale is measuring (De Vaus 2002). There are four main steps in forming scales using factor analysis. These are: confirming that factor analysis is appropriate for the data, extracting an initial set of factors, extracting a final set of factors by "rotation" and constructing scales based on previous results (De Vaus 2002; Pallant 2003).

The first step was to check that the data was suitable for factor analysis. When selecting variables to be factor analyzed it is important to be able to assume that the correlations between the variables are produced by a third factor. For this purpose it is helpful to obtain the correlation matrix of all the potential variables to exclude those that do not correlate with any others in the analysis. There are several ways to assess whether a group of statements are suitable for factor analysis. In this case this involved calculating the Kaiser-Meyer-Olkin measure of sampling adecuacy (KMO) and the Barlett's test of sphericity both of which are available in SPSS. The Barlett's test of sphericity should be significant ($p<0.5$) for the factor analysis to be considered appropriate (De Vaus 2002). The KMO index ranges from 0 to 1, with 0.6 suggested as the minimum value for a good factor analysis (De Vaus 2002; Pallant 2003)

Once the suitability of the data for factor analysis was confirmed, exploratory factor analysis was conducted to identify the number and content of the factors. Two criteria were used: Kaiser's criterion and the scree test. The Kaiser's criterion or the eigenvalue rule indicates that only factors with an eigenvalue of 1.0 or more should be retained for further investigation. The eigenvalue of a factor represents the amount of the total variance explained by that factor (De Vaus 2002; Pallant 2003). The Catell's scree test involves plotting each of the eigenvalues of the factors and finding the point at which the shape of the curve changes direction and becomes horizontal. It is recommended all the factors above the elbow of the curve should be retained (Pallant 2003).
Once the number of factors was selected, the solution was rotated to facilitate its interpretation. During rotation the program makes a series of attempts to re-align the factor loadings in a way that produces a meaningful result. Factor loadings are a list of coefficients that come from the transformation of the correlation matrix into something that is simpler and more manageable, usually divided into the number of identified factors (Oppenheim 2003). The graphical representation is a plot with two lines crossing at right angles, each line

representing one factor in a two-factor solution. Factor loadings are plotted along these two factor axes.

There are two main approaches to rotation, orthogonal and oblique factor solutions (Pallant 2003). Orthogonal solutions are easier to interpret and report but assume that the underlying constructs are independent and therefore not correlated. Oblique approaches allow the factors to be correlated but they are more difficult to report. Within these two categories there are a number of different rotational techniques provided by SPSS. The most common orthogonal approach is varimax rotation and the most commonly used oblique technique is direct oblimin. In this case, both approaches were conducted. Factor analysis was conducted using the survey data base created in SPSS 14.0 for Windows. Based on these analyses, two factors were identified and therefore two sub-scales were created for each informant.

Once the number of underlying constructs was identified through factor analysis, a test to assess the reliability of these sub-scales was performed. A reliable scale is one on which individuals obtain more or less the same score on two different occasions (De Vaus 2002). If that is the case, the sub-scales hang together internally and measure the same construct. The Cronbach's alfa coefficient was performed to measure the overall reliability of each sub-scale. This coefficient ranges between 0 and 1, the higher the number the more reliable the scale. As a rule of thumb, alpha should be at least 0.5, for a scale with fewer than 10 items, to be reliable (Pallant 2003).

Having confirmed the dimensionality and the reliability of the scale, total scale scores were calculated using SPSS. This was done by first reversing the negatively worded items and adding together the scores for the individual items that make up the scale or sub-scale. In this case each informant was assigned a material and non-material values sub-scale.

4.3.2.2. Environmental attitudes scale

Results from the previous pilot scale showed that the biocentric - anthropocentric value orientations did not represent appropriately how these populations value nature. Though these findings will be discussed in greater detail later, it is important to introduce them here as they led to a conceptual change respecting what was being measured. It is key to remember that value orientations are general beliefs that represent two ends of a continuum, such as liberalism and conservatism (Vaske *et al.* 1999), while environmental attitudes represent positive or negative evaluations of the environment (Schultz *et al.* 2004; Dietz *et al.* 2005). From the park management perspective, a person will hold a positive attitude to the

environment if she or he appreciates the protected area for its intangible values as well as the ecosystem services it provides. Based on these considerations, the concept of value orientations was changed to environmental attitudes from this point forward.

With this in mind, to the ten items selected from the pilot scale (the selection of these items will be discussed in the quantitative results chapter), five new items were added to construct the environmental attitudes scale. Again these five items were pre-tested with local community members to check for understanding and content validity.

Of these fifteen items (ten of the pilot study plus five new ones) four represented biocentricism, six material benefits and five ecosystem services and bequest values. Though biocentricism did not emerge as a relevant factor in the value orientation scale, the fact that only four biocentric items were included could have introduced a bias in the responses. This new environmental attitudes scale is included in Section B of the main survey that is presented in Appendix 2. This survey was conducted in four communities, two in Panama (Piedra Candela and Santa Clara) and two in Costa Rica (Altamira and Las Mellizas) (n=165). It is important to clarify that items from both the value orientation scale and the environmental attitudes scale, were presented to the same 35 informants in the Panamanian community of Piedra Candela.

The data analysis procedure followed to develop this environmental attitude scale was the same as the one performed to create the value orientation scale (pilot study). Survey results were coded and added to the already existing data base using SPSS 14.0 for Windows. Data were checked for errors before starting further analysis.The suitability of the data for factor analysis was first assessed. KMO value was 0.602 and Bartlett's p= 0.000, therefore confirming the factoriability of the data. Exploratory factor analysis was then conducted to identify correlations among the items of the new scale, select the number and interpret the content of the underlying factors. As the factors were not related, varimax rotation with Kaiser normalization was the rotation method employed. Cronbach's alfa analysis was performed to check the internal reliability of the subscales.

Two factors were identified as corresponding to material and non-material values of nature, the latter including ecosystem services and bequest values. Items that loaded negatively were reverse coded and two scores were created for each individual by summing the responses for each item that loaded on the corresponding factors. Finally, to examine the influence of socio-structural factors on environmental attitudes a regression model was created for each scale after checking for multicollinearity (high correlations among the independent variables)

and outliers (very high or very low scores). The pairwise deletion option was selected, so SPSS excluded the cases that were missing data required for this analysis.

4.3.2.3. Attitudes towards park management scale

According to the cognitive model, environmental values have an influence on what people think is environmentally desirable in specific situations. In order to explore this influence, an eight item-scale to measure local people's attitudes towards the park administration was included as part of the main survey (see section C in the Appendix 2). This section of the main survey was also conducted in four communities, two in Panama (Piedra Candela and Santa Clara) and two in Costa Rica (Altamira and Las Mellizas) (n=165). The phrase "considering local people's opinions", wasincluded in the scale in order to assess whether local people thought that the management of the park was participatory or not.

The same factor analysis procedure described to construct the previous scales was used here. Cronbach's alfa analysis was performed to check the reliability of the scale. As only one factor was identified a single attitudinal score was computed for each respondent. To explore the influence of socio-economic factors and general environmental attitudes on how people perceive the park administration a regression model was created. To run this analysis, the pairwise deletion option in SPSS was selected, so the program excluded the cases that were missing required data.

4.3.3. Measuring pro-environmental behaviour

The establishment of a national park involves the adoption of new ways of seeing nature but above all the acceptance of new rules regarding the relationship of humans with it. As is typical in park management, government regulations ban extractive activities such as logging and hunting but also other actions that are associated with the preparation of the land for agricultural purposes such as forest clearance and burning, while encouraging other less known activities such as ecotourism, environmental education and research. Though in the Panamanian sector human presence was still allowed, the expansion of all development activities for commercial purposes was also banned.

Given these circumstances, asking local people whether they comply with the park regulations or not, was not feasible. Instead, three proxies of conservation behaviour were included in the survey. The first one was the dichotomous answer to the simple question: In the last six months, have you done something in favour of the environment in your

community? The second one was the response to the follow up question: What? The answer to this question was later rated according to the level of difficulty to carry out the indicated activity. These questions are included in section E of the main survey (Appendix 2) and were asked in two Costa Rican (Altamira and Las Mellizas) and two Panamanian communities (Piedra Candela and Santa Clara).

A third proxy measure was the adoption or not of conservation practices by local coffee growers promoted in the area under study by local and international conservation organizations. Conservation coffee practices include the adoption of shade grown coffee and organic coffee, but also the implementation of techniques to improve soil condition and watershed protection as well as the gradual reduction of agrochemical use. This section included questions regarding the type of coffee grown, number of hectares, reasons to change or not their agricultural practices. These questions are in section G of the main survey (Appendix 2) and were only asked to those interviewees in Las Mellizas (Costa Rica) and Santa Clara (Panama) who reported being coffee producers. In consequence, this proxy measure was only applied to a subset of the sample for these two communities (n=69) where a total of 105 interviews were conducted.

The survey also included a group of 10 true and false statements to assess producers' general knowledge on the differences between conventional and conservation coffee production. These statements are in section H of the main survey (Appendix 2). These statements were taken from phrases used by local producers and organizations to describe the advantages and disadvantages of the different varieties of coffee and styles of production and were easy to understand by farmers. This section was only applied to the same 69 coffee producers who were interviewed in Las Mellizas (Costa Rica) and Piedra Candela (Panama). Opinions of local coffee farmers regarding what will need to change to increase the number of local producers implementing environmental practices were also recorded.

Using the dichotomous answer to the question: have you done something in favour of the environment in your community? as dummy dependent variable, a binary logistic regression was conducted to understand the contribution of socio-structural and psychological independent variables. Outliers were identified and extracted from the analysis. To run this analysis, the pairwise deletion option in SPSS was selected, so the program excluded the cases that were missing required data.

Once the informants had responded affirmatively to whether they thought they had done something for the environment in their community, they were asked to indicate what they had done. The answers were classified into four categories:

1. Environmentally friendly agriculture that includes not only cultivating coffee following conservation practices but also growing vegetables, grains and fruits using organic practices for both household consumption and commercialization.

2. Garbage management here refers to the collection of household waste and its subsequent on-site burning.

3. Watershed and forest protection means leaving a piece of land to recover its original vegetation. This practice is often related to the failure of or change in the production of a particular crop, the reduction of the area of agriculture and cattle ranching or the abandonment of areas were the soil is highly degraded.

4. The category of participation in an environmental project refers to the implementation of actions that are promoted and financed usually by government agencies and local organizations with the objective of increasing environmental awareness and appreciation for the park.

These different types of environmental behaviour were then scored based on the level of effort required from the informant, the benefits forgone and the potential of the action to have a positive impact on environment. Thus environmentally friendly agriculture was given 4 points, forest and watershed protection 3 points, participation in conservation projects 2 points and garbage management 1 point. To explore the predictive power of psychological and socio-structural variables on this behaviour score, a multiple regression model was run.

A binary logistic regression was also run to explore the influence of socio-structural, psychological and knowledge variables on the adoption or not of conservation coffee practices. Cases that had missing data were excluded from the analysis.

4.3.4. Cross country comparisons

After developing valid and reliable instruments to measure culture - nature relationships in these communities, further analysis was conducted to address the second research question. This asked whether there were any cross-country differences given Costa Rica’s adoption and

implementation of a people - park dualism (research question 2). Up to this point analysis has been conducted using the sample as a whole, in this section the sample was split by country in the SPSS database.

Before proceeding to make country comparisons, an independent T-test was run to identify whether the two samples were indeed comparable. This test compared the samples of the two countries based on their socio-economic characteristics such as gender, age, education, economic wealth and organization membership. In addition, the reliability of the scales at the country level was also checked to ensure that comparisons were possible. Cross country comparisons were done by running T-test. Also multiple regression analysis was performed to understand the contribution of socio-economic variables on attitudinal scores. Multicollinearity (when independent variables are highly correlated) and outliers (very high or very low scores) were checked beforehand. Again, to run these analyses, the pairwise deletion option in SPSS was selected, so the program excluded the cases that were missing required data.

4.4. Qualitative Data Collection and Analysis

Qualitative interviews were conducted to first confirm that local people did not perceive their environment along a biocentric/anthropocentric continuum as suggested by the previous quantitative findings. Secondly, given the poor predictive ability of socio-economic factors in explaining environmental attitudes, data from qualitative interviews was analyzed to identify other societal and cultural elements that could have an influence on how local people relate to their natural surroundings (Research question 3).

4.4.1. Sampling

Qualitative research often uses non-probability sampling to select the study population. In these cases the sample is not intended to be statistically representative, as in the previous quantitative study, but certain characteristics of the population are used as the basis for selection. In this case, purposive sampling was used to choose the interviewees. In purposive sampling the members of a sample are selected with a “purpose” to ensure that key representatives of the population are covered (Ritchie *et al.* 2006a). This feature is relevant for qualitative interviews as it enables the researcher to conduct detailed exploration and understanding of the central themes. In this study gender, age and nationality were the key criteria used to select the sample for interviewing.

Qualitative samples also tend to be small. This is because when analyzing rich qualitative data it is relatively easy to reach the point when increasing the sample size no longer brings new evidence (Ritchie *et al.* 2006a). Also incidence and occurrence, contrary to quantitative surveys, is not relevant for qualitative studies. Finally, given the rich detail involved in qualitative interviews and the intensity of the work that it requires, handling large samples could easily become unmanageable. In this study fifteen in-depth semi-structured interviews were carried out. The results of these are discussed in Chapter 6.

4.4.2. Interview guide

In-depth, semi-structured interviews are appropriate to offer the participants the opportunity to describe their own experiences and the meanings they attach to them (Patton 1990). This was particularly important in order to expand quantitative findings and further explore how local people structure their relationship with nature and the park, identify what societal factors influence this relationship and the management implications (research questions 1, 3 and 4).

A general interview guide was used, including a list of key issues to discuss (see appendix 3). This ensured that certain topics were addressed by all participants, which was essential if comparisons were to be made. At the same time, using this format permitted certain flexibility and the option of introducing additional questions to topics brought up by the participants. Questions were general and asked in a conversation-like fashion. They aimed to explore the meaning of nature and the role of humans in it. Also questions about the park, its costs and benefits were asked. None of the interviewees expressed difficulties understanding the questions. Though the key questions were few, many probing and follow up questions emerged during the interviews.

Interviews took place in different locations but typically in the interviewees' home or work place. Although some interviews took place in circumstances that were not always ideal for the researcher, particularly due to the presence of other members of the family, these places were chosen for the convenience of the interviewee.

Interviews were digitally recorded after explaining to the participants their value for the research, reassuring confidentiality and explaining that the transcripts would be used only for the purposes of this study. Once permission from the participants was granted the interview started. Recording was preferred to note-taking so the researcher could pay full attention to listening to the interviewee and ask probing questions. Also, recording facilitated capturing

the content and meanings in far more detail that would be possible with only note-taking (Quinn 2005). The interviews lasted between 30 minutes and an hour and were fully transcribed by the researcher in Spanish using a word processor.

4.4.3. Thematic framework analysis

Qualitative analytical approaches tend to vary according to the basic epistemological assumptions, the main focus and aims of the research (Spencer *et al.* 2006). In this sense, this research focuses on the content of the responses as well as the meanings participants attach to their natural world. From this perspective, these investigations followed similar traits to those of narrative and content analysis. In the first case, a basic story is identified, focusing on how the narrative is told and the meaning it conveys. In the second case, themes are identified and linked to socio-economic variables such as gender, age and nationality.

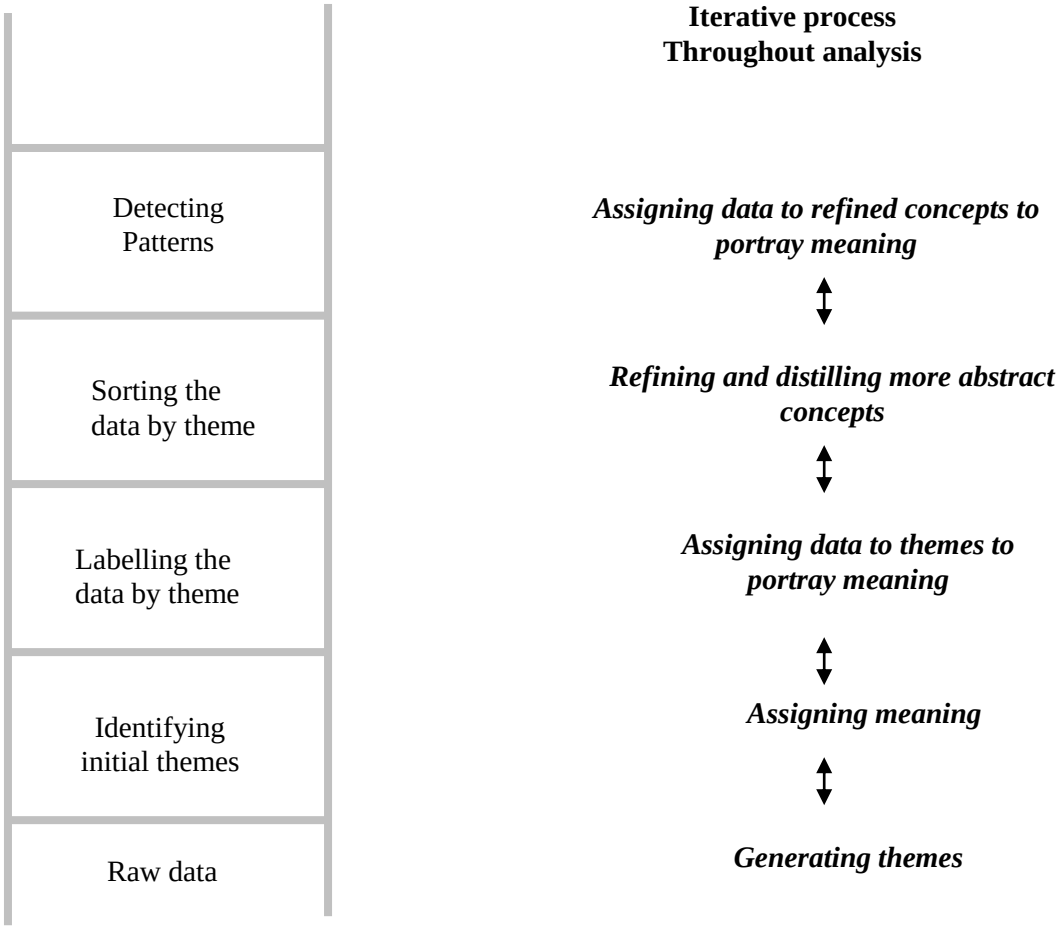


Figure 4.2. Stages and processes of the analytic hierarchy framework.
Modified from Spencer *et al.* (2006).

As qualitative data are usually voluminous, one central part of the analysis is the reduction of the data (Spencer *et al.* 2006). Data can be reduced by pairing down statements to their core meaning, identifying an overall structure in the data, synthesising the data or by making thematic summaries. The concepts that are generated when the data is reduced also vary in their source and level of abstraction. In some cases, the concepts are based on the interviewees' own language but in other cases the terms are selected by the researcher. Some investigators argue that at least the initial labels should use participants' own words.

In order to analyse the qualitative data, the thematic framework approach presented in Ritchie *et al.* (2006b) was used. This framework classifies and organises data according to key themes, concepts and emergent categories. This analytic structure develops an analytic hierarchy of concepts that allows the researcher to have an overview and make sense of the data. This process involves the identification of initial themes, labelling the data, sorting the data by theme, summarizing the data and finally locating patterns according to particular subgroups. This analytic process is not linear and that is the reason why its diagrammatic form is shown with ladders linking platforms that enable the researcher to move up and down the structure until final refinement is attained (Figure 4.2).

Using the analytic structure presented above, recurring ideas or themes were identified in the data and used to devise a conceptual framework for the answers provided to each question. These themes were originally labelled using the respondents' own words. Once these themes where identified, responses were assigned to them according to their content. A thematic chart summarizing the key points was then prepared for each topic. Finally, connections and contradictions among the answers given to different questions as well as associations between the content of the answers and other variables such as country of residence, age and gender were also investigated.

4.5. Ethical Considerations and Reflexivity

All potential participants of both the survey and the qualitative interviews were approached in a professional and courteous manner. A local guide was hired to initiate contact with the potential interviewees but this person retired as soon as the researcher started to introduce the purpose of the investigations, so the person could feel free to express her or his consent and opinions.

During the introduction of both the survey and the qualitative interviews, besides explaining the background of the researcher and the purpose of the study, interviewees were ensured

anonymity and confidentiality. Anonymity meant that the researcher will not identify the respondent and confidentiality meant that no-one but the researcher will match names with responses. After these explanations, potential participants were asked directly whether they wanted to participate or not in the survey and whether they had further questions. Once oral consent was granted, the researcher proceeded with the interview or the recording, in the case of the qualitative study. The use of consent forms was not considered appropriate in this research setting as participants might feel threatened rather than protected by signing a document. Furthermore, literacy can not always be assumed in these remote communities.

No names were asked during the quantitative survey and participants were identified in the database with a number. Though names were recorded in the qualitative study, these names have been replaced by pseudonyms in all public documents. Also unprocessed data from the survey have not been distributed. Only transcripts of qualitative interviews have been returned on paper upon request from some of the interviewees. This has been taken by the researcher as a way to express gratitude.

As not having the opportunity to assess the consistency between the researcher's beliefs and the research practices used makes it impossible to evaluate the quality of the research (Snape *et al*. 2006 page 19), I have included here two aspects of my background that I consider relevant in shaping these investigations. Before starting this research most of my experience focused on quantitative approaches to nature conservation in Panama and Central America. My initial academic formation as a biologist and my master's degree in conservation biology reaffirmed this background. But at the same time my on-the-ground experience, working with diverse groups of actors with often divergent interests, showed me that different perspectives about one issue were possible and that at least some of those visions needed to be negotiated if nature conservation was to be successful. Hence, when quantitative approaches to the problem were insufficient to understand the complexity of human - nature interactions, qualitative methods were seen as an opportunity to explore new grounds, create alternative views and develop innovative tools to deal with conservation problems, in both theory and practice.

In addition, before conducting this research I had visited the study area as a representative of an international conservation organization that financially supported some of the local groups, a factor that might have influenced their perception of the research and the researcher. Though some of the members of these local groups served as my first contact with the communities and I was aware of their conservation perspectives, I remained committed to the research tools that ensured the rigour and quality of this investigation. These tools

included criterion sampling for the selection of the communities, a randomly selected sample of 10% of the studied population, informed consent and a guarantee of anonymity and confidentiality. Also though I mostly stayed in the accommodation facilities built as part of the eco-tourism projects we funded, in most cases no other facilities were available.

4.6. Summary

This chapter describes in detail the mixed method interactive approach to the thesis. It starts by discussing the philosophical foundation and theoretical definitions to then focus on the explanatory sequential research design. It also describes the process of community selection followed by a description of the main characteristics of these localities.

Both qualitative and quantitative methods are explained at length. The quantitative section includes a description of the sampling and data collection methods as well as the process of developing an instrument to measure environmental attitudes. Data management and analysis, including the use of diverse statistical techniques are also presented. The qualitative section discusses the selection of the sample, the research instrument and the thematic framework for data analysis. Finally ethical and reflexivity issues are discussed.

CHAPTER FIVE: MEASURING PEOPLE'S RELATIONSHIP WITH NATURE

A total of two hundred interviews 120 in Costa Rica and 80 in Panama, were administered as part of the quantitative study. There was only one rejection to participate in the survey that came from an old couple who did not feel competent to respond appropriately. The total population and number of inhabited households per community can be seen in Table 5.1 as well as the sample size and the percentage it represented from the total population.

Table 5.1. Population, number of inhabited houses and sample size per community

Community	Number of inhabited houses	Total population*	Population Sample size	Proportion (%)
Biolley	70	329	35	10.64
Altamira	67	315	35	11.11
Las Mellizas	113	531	50	9.42
Piedra Candela	40	168	25	14.88
Santa Clara	120	504	55	10.91

*According to government census data (Contraloría General de la República 2001c; Instituto Nacional de Estadística y Censos 2002).

Results of this quantitative research are presented in four parts. The first part discusses the results of developing the appropriate scales to measure first value orientation and then environmental attitudes. It also examines the influence of socio-economic factors in explaining these results. The second part is dedicated to the examination of three proxy measures of pro-environmental behaviour and their association with both psychological and socio-economic variables. The third section analyzes in detail the results of cross-country comparisons and the fourth part presents a general discussion of the quantitative findings.

5.1. Measuring Environmental Attitudes

This study started by operationalizing the theoretical definitions of environmental value orientations. As explained before, value orientations refer to general beliefs that represent two ends of a continuum and are theoretically represented in the literature as biocentricism and anthropocentricism. A biocentric person will think that nature has an intrinsic value and an anthropocentric person will think that nature is of value because of its contribution to the maintenance and enhancement of human life (Thompson *et al.* 1994). These constructs are adopted in this study mainly because they reflect well the people – park dichotomy that it aims to investigate.

However, based on the results obtained during the development of this value orientations scale, it became apparent that a change in the working definition was required. Therefore the concept of environmental attitudes, that indicate positive or negative evaluations people hold about something specific, was adopted.

5.1.1. Value Orientations Scale

A total of 60 semi-structured interviews were carried out in two communities, one in Costa Rica (Biolley) and one in Panama (Piedra Candela). The sampling method used is described in section 4.3.1.1. in the previous chapter.

The main objective of this pilot scale was to explore whether the studied communities adhere to the theoretical construct of value orientations or not. As a consequence, fifteen items were designed to represent biocentric and anthropocentric value orientations. However, after pre-testing these statements with local people, it became apparent that modifications in the content of the statements were required to better tap people's appreciation for nature. Based on the pre-testing and qualitative interviews conducted, nine anthropocentric items were designed to include two different sets of benefits from nature: material products (timber, firewood, wild meat and plants) and ecosystem services (soil fertility, watershed protection). This scale also included six biocentric statements (see Appendix 1).

In order to understand whether the theoretical concepts of biocentricism and anthropocentricism hold in these border communities, factor analysis was conducted. The first step in this analytical process is to confirm the factoriability of the scale. Both the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and the Barlett's test of sphericity were calculated. The KMO was 0.538 and as 0.5 or above is required (De Vaus 2002), this result was considered acceptable. The Barlett's test on the other hand, was significant at $p=0.001$, smaller than $p<0.05$ which is the suggested value (Pallant 2003). These tests indicated that factor analysis was appropriate for the data.

As the suitability of the data for factor analysis was confirmed, the second step was to conduct exploratory factor analysis to identify the number of the factors underlying the responses. This identification called factor extraction was done based on Kaiser's criterion and the scree plot. According to Kaiser's criterion, only factors that present eigenvalues higher than 1.0 should be kept. In this case, only four factors met this criterion explaining 62.514% of the variance as presented below.

Table 5.2. Eigenvalues and total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.174	21.740	21.740	2.174	21.740	21.740
2	1.705	17.053	38.793	1.705	17.053	38.793
3	1.278	12.781	51.574	1.278	12.781	51.574
4	1.094	10.939	62.514	1.094	10.939	62.514
5	.952	9.518	72.031			
6	.768	7.680	79.712			
7	.715	7.147	86.859			
8	.493	4.932	91.790			
9	.456	4.560	96.350			
10	.365	3.650	100.000			

Looking at the scree plot however, only two factors were found above the elbow of the curve, suggesting that only two factors should be retained (see Figure 5.1). These two factors explained 38.79% of the variance, as indicated in Table 5.2.

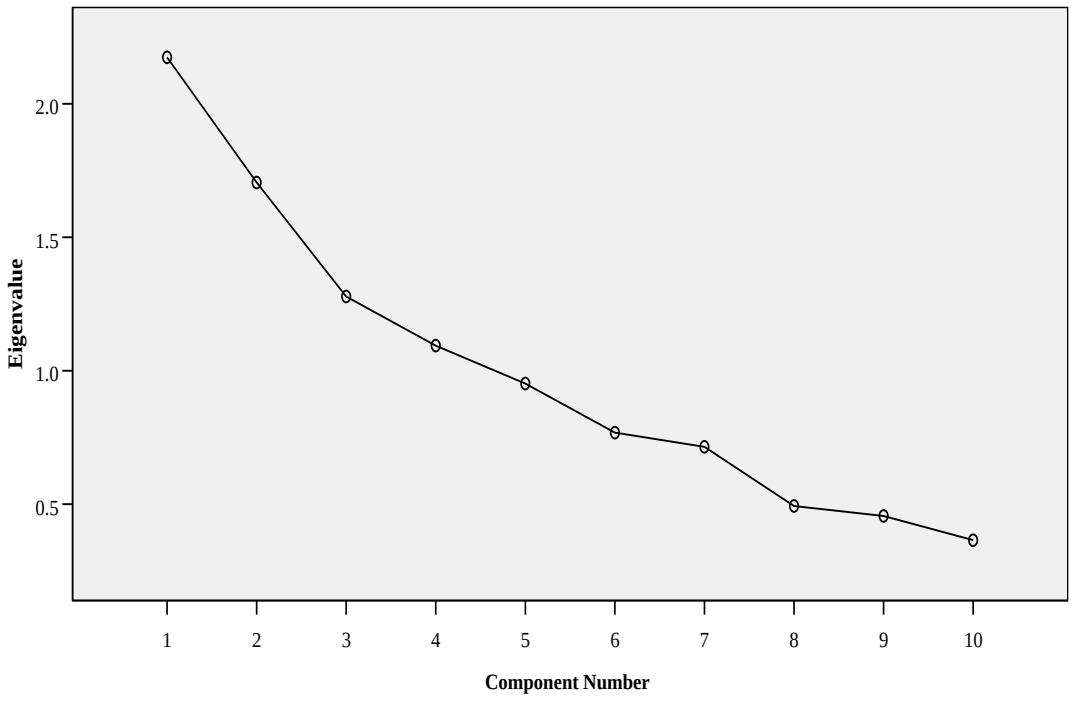


Figure 5.1. Scree plot value orientations scale

Once the number of factors was determined, the third step consisted in identifying which items of the scale belong to each of these two identified factors. In order to do so and to make these results interpretable, the factors were rotated. Initially, the rotation method used was orthogonal rotation, but the component transformation matrix resulting from the varimax rotation showed that the two factors were correlated (r= 0.62) and therefore, a more complex oblique rotation was required. Once rotated, the factors underlying the responses to the ten items started to emerge as it is shown in table 5.3., below. Only ten of the fifteen original items were identified as related to the identified factors and therefore kept for further analysis.

Table 5.3. Factor loadings on the two identified factors (structure matrix).

Statements	Component 1	Component 2
Enval 7 Forests give us peace and well-being	0.664	
Enval 4 It is important that our children have the opportunity to know the plants and animals	0.664	
Enval 12 Young people should look after the forests because they are their future	0.642	
Enval 11 People should have more respect and admiration for the forests	0.587	-0.353
Enval 14 The economic benefit of the communities is more important than the protection of the forests	-0.517	
Enval 9 The main purpose of the park should be to benefit local communities		0.741
Enval 6 Forests should exist only to satisfy human needs		0.630
Enval 3 It does not matter to cut trees if they are replanted		0.571
Enval 2 Plants and animals have as much right to live as humans		-0.500
Enval 10 The main objective of the park should be to protect plants and animals only		0.312

The graphic representation of the rotated factors can be found below.

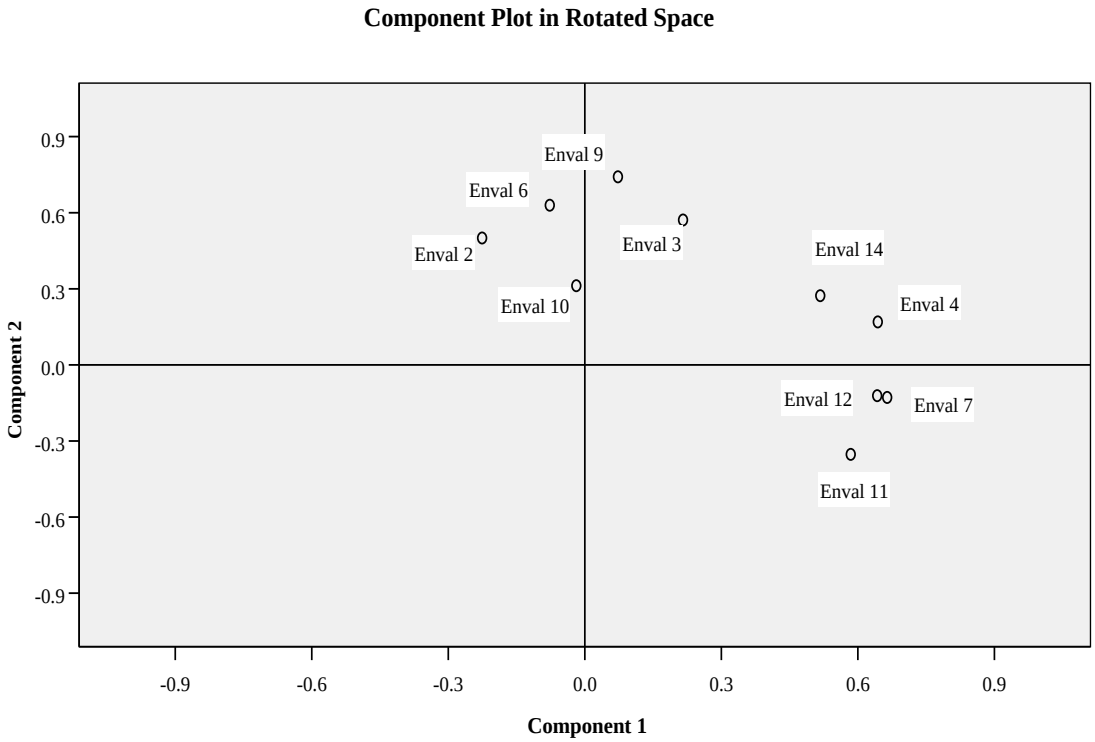


Figure 5.2. Structure of environmental value orientations

Looking at the distribution of the structure matrix of the oblimin rotation procedure, it appears that the concept of value orientations with biocentric - anthropocentric perspectives located on opposite poles of a continuum did not appropriately represent how people in these communities value nature. This is so as most of the biocentric value orientations items loaded negative, low or not at all on the two scales, suggesting that this value orientation is not relevant in these communities.

Furthermore, looking at the content of the statements grouped in two identified factors it seems that these communities appreciate nature based on the benefits they receive from it. These benefits can be described as material, direct benefits to cover basic needs or produce economic gains (component 2) and intergenerational values and ecosystem services (component 1). Thus, two sub-scales representing these two factors were created.

In order to test whether the items belonging to these two sub-scales measure their respective construct, the Cronbach's alpha reliability analysis was performed. The alpha value for the ecosystem services and bequest values sub-scale was 0.6 while the alpha value for the material sub-scale was 0.5 showing a poor to moderate internal consistency in both sub-scales. These results show that further improvement of both scales was required.

5.1.2. Environmental Attitudes Scale

Based on the previous findings, some important conceptual modifications were introduced for the preparation of this new scale. As the concept of value orientations did not hold for the studied population, the concept of general environmental attitudes, that describe people's positive or negative evaluations about the environment, was adopted from this point forward to better represent what is being measured. From this perspective, a person will have a positive environmental attitude if she or he appreciates nature for the ecosystem services and values for future generations it provides. This person will favor conservation of the forests in their natural state. Conversely, a person with a negative attitude towards nature would only appreciate its direct, material benefits. These people will support extractive activities such as logging or hunting. These conceptual changes are still in agreement with the cognitive model and it is expected that general environmental attitudes influence more specific attitudes such as those about the effectiveness of the park administration.

The development of the environmental attitudes scale sought to further explore the inadequacy of the concept of value orientations resulting from the previous section and to improve the internal reliability of the sub-scales and the variance explained. With this in mind, five new items were added to the original ten item pool. Therefore, theoretically there were four items representing biocentricism and eleven items representing anthropocentricism (six representing material benefits from nature and five items representing spiritual values and ecosystems services for human wellbeing). Though this scale was constructed based on the previous identification of material benefits (6) and ecosystems services (5) as factors influencing people's attitudes towards nature, a more balanced scale with a similar number of biocentric and anthropocentric items would have been more theoretically sound.

This environmental attitudes scale was applied to a larger sample of 165 informants in four communities, two in Costa Rica (Altamira and Las Mellizas) and two in Panama (Piedra Candela and Santa Clara). The community of Piedra Candela (n= 25) had already been included in the value orientations pilot study. All these informants were randomly selected following the sampling procedure described in section 4.3.1.1 in the previous chapter. This environmental attitudes scale is presented in section B of the main survey (Appendix 2).

As in the previous scale, the first step was to assess the suitability of the data for factor analysis. The KMO value was 0.602 and Bartlett's p= 0.000, therefore confirming the factoriability of the data. In the second step, exploratory factor analysis was conducted to identify the number and interpret the content of the underlying factors. Two factors were

identified as corresponding to material benefits and ecosystem services and bequest values of nature. The correlation matrix, the variance explained and the scree plot that serve to determine the number of factors are presented in Tables 5.4 and 5.5 and Figure 5.3, below.

Table 5. 4. Correlation Matrix

		Enval 3	Enval 4	Enval 5	Enval 7	Enval 8	Enval 9	Enval 11	Enval 13	Enval 15
Correlation	Enval 3	1.000	.133	.387	-.034	.208	.229	.249	.074	.014
	Enval 4	.133	1.000	.031	.098	.029	.037	.112	.653	.204
	Enval 5	.387	.031	1.000	-.005	.293	.330	.328	.067	-.014
	Enval 7	-.034	.098	-.005	1.000	-.007	-.061	-.105	.091	.473
	Enval 8	.208	.029	.293	-.007	1.000	.348	.714	.059	-.107
	Enval 9	.229	.037	.330	-.061	.348	1.000	.362	.021	-.033
	Enval 11	.249	.112	.328	-.105	.714	.362	1.000	.012	-.070
	Enval 13	.074	.653	.067	.091	.059	.021	.012	1.000	.238
	Enval 15	.014	.204	-.014	.473	-.107	-.033	-.070	.238	1.000

Table 5. 5. Eigenvalues and total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.455	27.276	27.276	2.455	27.276	27.276
2	1.906	21.175	48.451	1.906	21.175	48.451
3	1.211	13.451	61.902	1.211	13.451	61.902
4	.988	10.975	72.877			
5	.722	8.019	80.896			
6	.600	6.669	87.564			
7	.516	5.738	93.302			
8	.377	4.192	97.494			
9	.226	2.506	100.000			

Extraction Method: Principal Component Analysis.

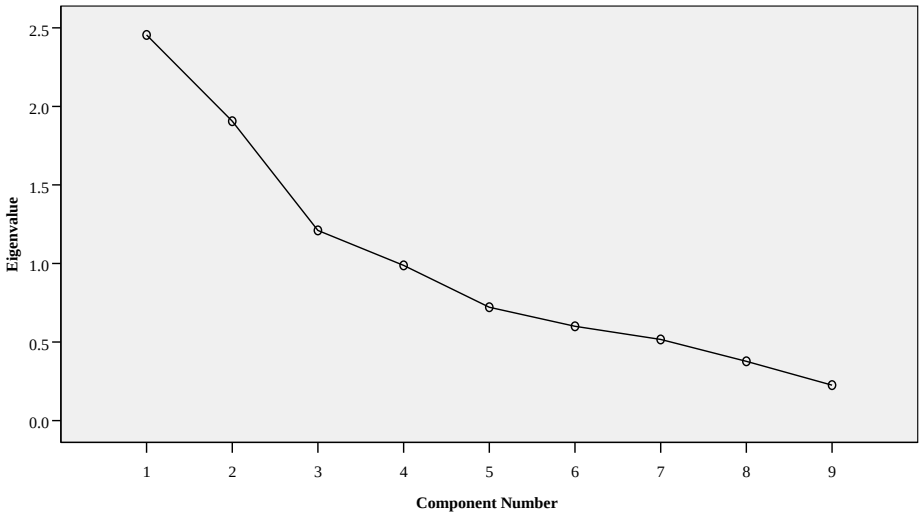


Figure 5.3. Scree plot environmental attitudes scale

The third step of the analysis indicated that the factors were not related, varimax rotation with Kaiser normalization was the rotation method employed. Table 5.6 shows the rotation results.

Table 5.6. Factor loadings on the two general environmental attitudes

Statements	Ecosystem services/ bequest values	Material benefits
11. To walk the park's trails reduces stress	0.809	
8. People should have more respect and admiration for the forests	0.776	
9. Young people should look after the forests because they are their future	0.641	
5. Forests give us peace and well-being	0.640	
3. It is important for our children to get to know the forest and its animals	0.546	
13. If people do not use the forest, its natural resources are wasted		0.770
4. Forests should exist only to satisfy human needs		0.758
15. Forests should be used mainly to improve people's economic income		0.664
7. The main objective of the park should be to protect plants and animals only		- 0.521
6. The main purpose of the park should be to benefit local communities	--	--
1. Animals and plants have as much right to live as humans	--	--
2. It does not matter to cut trees if they are replanted	--	--
10. The economic benefit of the communities should be more important than the protection of the forests	--	--
12. Forests are important because they protect water sources in our community	--	--
14. Human beings are part of the ecosystem	--	--

These are the numbers of the statement before the analysis was conducted.

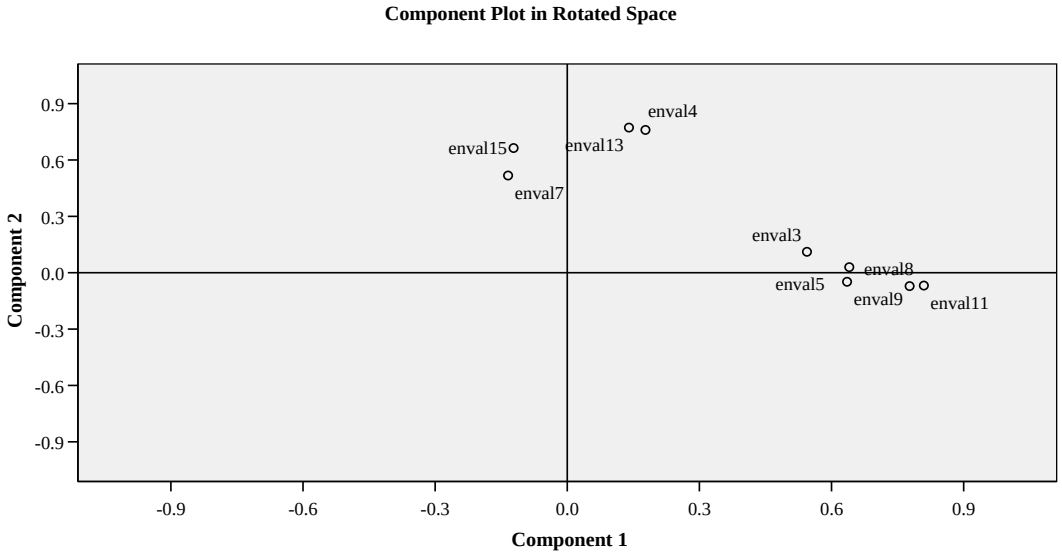
Table 5.6 shows the 15 items included in this environmental attitudes scale and the factor loadings of the statements into the two factors. Statements with the higher loadings are considered as markers which are good representations of the underlying dimension that the sub-scale assesses (Pallant 2003). Only nine statements that loaded on either of these two factors were finally selected to be part of the sub-scales. As in the value orientations scale, strict biocentric items loaded either negative (see item 7) or not at all in either of the two factors (items 1 and 14). These results confirmed that the concepts of value orientations in general and biocentricism (valuing nature for its own sake) in particular are not relevant in these frontier locations.

Another interesting finding shows that environmental attitudes in these communities are not unidimensional or a single concept. Instead the two identified factors are independent or unrelated, meaning that a person could score high or low in the first factor but this does not forecast whether this person is likely to score high or low on the other factor. In this case, according to Oppenheim (2003), the two dimensions can not be added together to give each participant a single score representing his or her attitude towards the environment as some similar investigations have done (see Thompson *et al.* 1994; Vaske *et al.* 1999). Instead two scores, one for each sub-scale, needed to be calculated for each respondent. This is a significant finding as it means that both dimensions co-exist within one person, that is to say, that local people appreciate their natural surroundings not only on account of the traditional benefits they receive from it such as timber, firewood, construction material or wild meat but also value other services from the forests in maintaining local temperatures, water courses and soil fertility. These results provide answers to the first research question as these communities structure their relationship with their natural surroundings in a more complex way that can not be explained by a simplistic one dimensional construct. These sub-scales present a higher internal reliability than the sub-scales for value orientations as indicated by their higher alpha values. Table 5.3 shows these improvements.

Table 5.7. Variance explained and Alpha values

	Factor 1 (Ecosystem services/bequest values)	**Factor 2 (Material benefits)**	**Total Variance explained**
Value orientations scale	Variance explained = 21.74% Alpha= 0.6	Variance explained = 17.05% Alpha= 0.5	Can not be summed up. As factors are related.
Environmental attitudes scale	Variance explained= 27.28% Alpha= 0.7	Variance explained = 21.18% Alpha= 0.6	48.45%

To facilitate the interpretation of these results, the plot of the loadings of the two identified components on rotated space is presented below. As it can be seen statements appear in two clusters ordered along the two axes representing the two identified factors: environmental services/bequest values and material benefits.



Component 1: Ecosystem services/bequest values	**Component 2: Material benefits**
Enval 11. To walk the park's trails reduces stress	Enval 13. If people do not use the forest, its natural resources are wasted
Enval 8. People should have more respect and admiration for the forests	Enval 4. Forests should exist only to satisfy human needs
Enval 9. Young people should look after the forests because they are their future	Enval 15. Forests should be used mainly to improve people's economic income
Enval 5. Forests give us peace and well-being	Enval 7. The main objective of the park should be to protect plants and animals only*
Enval 3. It is important for our children to get to know the forest and its animals	

* Reversed coded.

Figure 5.4. Structure of environmental attitudes for the whole sample.

Now that the scale has been developed based on data from the survey a descriptive statistic can be run with the whole sample. At this point it is important to remember that though the construction of an attitudinal scale is originally based on theoretical concepts, it is not until

factor analysis is conducted that these concepts are validated for the population under study and the scale can be finally developed. Now, basic descriptive analysis of the two identified scales can be performed.

As presented in Table 5.8. below, descriptive statistical analysis shows that on average, interviewees presented a positive environmental attitude that gives importance to the ecosystem services and bequest values that forest provides (mean = 4.22; agree = 4 and strongly agree = 5). This analysis also shows that there was more general agreement among the interviewees regarding ecosystem services, reflected in the smaller standard deviation, compared to material values of nature. The higher standard deviation shows that attitudes favouring the use of nature for its material benefits are less widely shared than the appreciation for ecosystem services. Table 5.8 shows the obtained results. It is important to remember that though 165 interviews were conducted only 149 were included in the descriptive statistic and the regression analysis (Table 5.10) as SPSS was programmed to exclude cases with missing data.

Table 5.8. Environmental attitudes descriptive statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Ecosystem services and bequest values	149	3.60	5.00	4.22	0.31
Material benefits	149	1.00	4.00	2.71	0.76

Looking at the distribution of the responses presented in Table 5.9 also shows that people tend to agree more with statements reflecting the appreciation of ecosystem services and bequest values of nature than with the use of its material values. About ninety percent of the responses valuing ecosystem services lay on the agreement side but only about sixty percent of the responses reflect disagreement with the material use of nature. A third of the responses supported the use of nature for material and economic benefits. These results show that though most people recognize the ecological benefits that forests provide to local communities, some also distinguish the value of the direct use of the forests to satisfy basic and economic needs. This is probably due to their history of dependence on the use of natural resources.

Table 5.9. Frequency of the responses to each statement

Statements	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
Ecosystem services and bequest values					
1. To walk the park's trails reduces stress	--	--	2.01	75.84	22.15
2. People should have more respect and admiration for the forests	--	--	0.67	75.17	24.16
3. Young people should look after the forests because they are their future	--	0.54	1.63	84.78	13.04
4. Forests give us peace and well-being	--	0.67	0.67	69.80	28.86
5. It is important for our children to get to know the forest and its animals	0.54	--	--	55.43	44.02
Material benefits					
6. If people do not use the forest, its natural resources are wasted	5.37	50.34	6.04	38.26	--
7. Forests should exist only to satisfy human needs	4.03	55.70	4.70	35.57	--
8. Forests should be used mainly to improve people's economic income	2.68	61.07	6.04	28.86	1.34
9. The main objective of the park should be to protect plants and animals (reversed coded)	3.80	59.24	12.50	21.74	2.72

Finally, to explore the contributions of socio-structural variables on environmental attitudes, two linear regression models were created for each sub-scale. Table 5.10 presents the regression results.

Table 5. 10. Standardized regression coefficients of socio-economic variables as predictors of environmental attitudes

	Environmental attitudes (ß standardized coefficients)	
	Ecosystem services	**Material benefts**
	-0.019	0.031
Socio-structural variables		
Age	-0.016	-0.042
Gender	0.026	0.050
Education	0.049	-0.330*
Economic wealth	0.052	0.018
Member of a local organization	- 0.221**	0.115
N	149	149
R^2	0.061	0.125
Sig.	0.174	0.004
F value	1.526	3.379

**p<0.01; *p<0.001

The models explained 12.5% of the variance in the material benefits score and only 6% in the ecosystem services score as indicated by the R^2 values. Also the material benefits model was statistically more significant than the model for ecosystem services as shown by the Sig. values. These results indicate that socio-structural variables in these communities have a small influence on how people appreciate their natural surroundings.

Even though the models had very poor predictive ability it is worth mentioning that, looking at the predictor variables, only education and being member of a local organization presented a significant contribution as shown by their low ß values. Education was negatively associated to the appreciation of direct benefits from nature while being a member of a local organization was negatively associated to the appreciation of ecosystem services and bequest values.

5.1.3. Attitudes Towards Park Management Scale

According to the cognitive model, general environmental attitudes have an influence on what people think is environmentally desirable in more specific cases such as the management of the park. To explore local people's attitudes towards the administration of the park, eight items describing the effectiveness of the government institution were included as part of the survey.

First, the suitability of the data for factor analysis was confirmed as the KMO value was 0.63 and Bartlett's test was 0.000. Second, according to Kaiser's criterion and the scree plot, all the items loaded only on one factor. The variance explained by this factor was 30.25. Originally, eight items were subjected to factor analysis but only five presented correlations higher than 0.3. Table 5.11 shows the retained items and their factor loadings. The internal reliability of the scale was reasonable with a Cronbach's alpha value of 0.643 (n=93).

Table 5.11. Factor loadings on the attitudes towards the management of the park scale

	Loading
The park is being well managed for the benefit of future generations	0.824
The park is being well managed to conserve plants, animals and water sources	0.794
The park administration is doing a good job considering local people's opinions	0.605
Hunters do not often get into the park due to the park rangers' good work	0.477
Park regulations are applied fairly	0.380

Based on the above results an attitudinal score was created by summing individuals' responses to these five items. These findings show that people in these communities tend to provide a "neutral" response regarding the management of park by government agencies (mean= 3.03, minimum=1.40, maximum= 4.00 and standard deviation= 0.58). This will be discussed further later in this chapter.To explore the contribution of socio-structural and psychological variables on the attitude of these local communities regarding the management of the park a regression model was created. Table 5.12 summarizes these findings.

Table 5.12. Standardized regression coefficients of predictors of attitudes towards park management

Socio-structural variables	**ß standardized coefficients**
Age	- 0.125
Gender	- 0.024
Education	- 0.459 *
Economic wealth	0.028
Member of a local organization	- 0.202**
Socio-psychological variables	
Non-material values	0.007
Material values	0. 301 ***
N	149
R^2	0.325
Sig.	0.000
F value	5.508

*p<0.001;**p<0.01; ***p<0.05

Contrary to the regression model of the general environmental attitudes that presented poor predictive power (12.5%), the park attitude model explained 32.5% of the variance and it was statistically significant. Again, as with general environmental attitudes, only formal education and being member of an organization made a statistically significant contribution. In this case, educated people and members of local organizations tend to have a negative attitude to the way the park is being managed by the government. Of the socio-psychological variables only people with higher appreciation of direct material benefits have favourable opinions on how the park is being administered. This supports the decision of having two scales for environmental values instead of one as many studies have, as the two dimensions have different contributions to park management attitude (McFarlane *et al.* 2003). Using two scales instead of one presents a more subtle picture of how general environmental values influence specific attitudes such as those held towards the management of the park.

5.2. Measuring Pro-Environmental Behaviours

As asking the interviewees whether they were complying or not with park regulations was not feasible giving the illegality of non-compliance, three proxy measures were developed to assess pro-environmental behaviour. These measures comprise self-reported environmental

behaviour, a pro-environmental behaviour score and the adoption of conservation coffee practices.

5.2.1. Self-reported pro-environmental behaviour

Sixty four percent of the interviewees responded affirmatively when asked whether they have done something in favour of the environment in their community in the last six months (n=145). Again, though 165 interviews were conducted, some were discarded when data required for this analysis was missing.

Using self reported behaviour as a dummy dependant variable, a binary logistic regression analysis, that is appropriate when the dependant variable is dichotomous as in this case, was conducted to understand the contribution of socio structural and psychological independent variables. Four outliers identified by the program were excluded from this analysis.

As with multiple regression, both the statistical significance of the overall model and the individual predictors need to be assessed. The logistic regression model created by the program is evaluated against the so- called null-model, which is a baseline that does not include any of the independent variables. The logistic model provides a better fit to the data if it shows an improvement over the null-model. To assess the model fit, the Omnibus test of model coefficients was used. In this case the value of Sig. was 0.000 or $p< 0.0005$, therefore it is concluded that the logistic model is better than the null model. The Chi-square value is 57.154 with 6 degrees of freedom.

Results shown by the Hosmer and Lemeshow test also support the logistic model predictive capacity. Contrary to the Omnibus test, for this test, the good fit is indicated by a Sig. value greater than 0.05 (Pallant 2003). In this case the Chi-square value is 2.479 with a Sig. value of 0.983 and 8 df. The model also explains a reasonably good percentage of variance between 32.6% and 46.3% as indicated by the Cox & Snell R^2 and the Nagelkerke R^2, respectively. In conclusion, based on the Omnibus test, the Hosmer and Lemeshow test and the Cox & Snell R^2 and the Nagelkerke R^2, both socio-structural and psychological variables taken as a whole predict the individual's inclination to report some type of pro-environmental behaviour.

The second type of assessment provided by logistic regression shows which one of the independent variables influences most strongly the propensity to report pro-environmental behaviours. This statistical significance is tested using the Wald chi-square statistic shown in Table 5.13. Of the dependent variables, only age (Wald 7.770 at $p<0.005$) and appreciation

for ecosystem services and values for future generations (Wald 9.936 at p<0.005) were statistically significant.

Table 5.13. ß, Wald and Sig. values of the predictors of self reported environmental behaviour

Socio-structural variables	**ß**	**Wald**	**Sig.**
Age	0.045	7.770*	0.005
Education	-0.020	0.073	0.787
Economic wealth	1.612	1.840	0.175
Member of a local organization	20.608	0.000	0.997
Socio-psychological variables			
Ecosystem services and bequest values	3.008	9.936*	0.002
Material benefits	-0.331	0.975	0.323
N	145	145	

In logistic regression, the ß values are equivalent to the ß values of multiple regression and show the direction of the association between variables. As in both cases the ß value for these variables was positive, older people with high appreciation for ecosystem services are more likely to respond positively to the question of taking some sort of environmentally friendly action.

5.2.2. Pro-environmental behaviour score

Once the informants had responded affirmatively to whether they thought they had done something for the environment in their community, they were asked to indicate what they had done. Based on the responses five categories of pro-environmental behaviours were identified. These were: environmentally friendly agriculture, garbage management (collection of household waste and its subsequent on-site burning), watershed and forest protection (leaving a piece of land to recover its original vegetation) and participation in an environmental project promoted by government agencies and local organizations. Three percent did not fall intro these categories. The following figure 5.14.shows the percentages of each of these response categories.

These different types of environmental behaviour were then scored based on the level of effort required from the informant, the forgone benefits and the positive impact on environment. With these criteria in mind, environmentally friendly agriculture was given 4 points, forest and watershed protection 3 points, participation in conservation projects 2

points and garbage management 1 point. The average environmental behaviour score was 2.76 for the total interviewed population (n=135; SD=1.33).

To explore the joint predictive power of psychological and socio-structural variables on behaviour score, a multiple regression model was run. Gender was not included as a predictor in this regression model as the social responsibilities of men and women are culturally defined in these communities. In general, men are responsible for making decisions regarding productive activities such as agriculture and cattle ranching, while women are dedicated to raising the children and managing the household. Figure 5.15. illustrates this point. Including gender in the model while giving higher scores to activities typically decided by men will lead to the conclusion that women are less environmentally active than men, which is not necessarily the case.

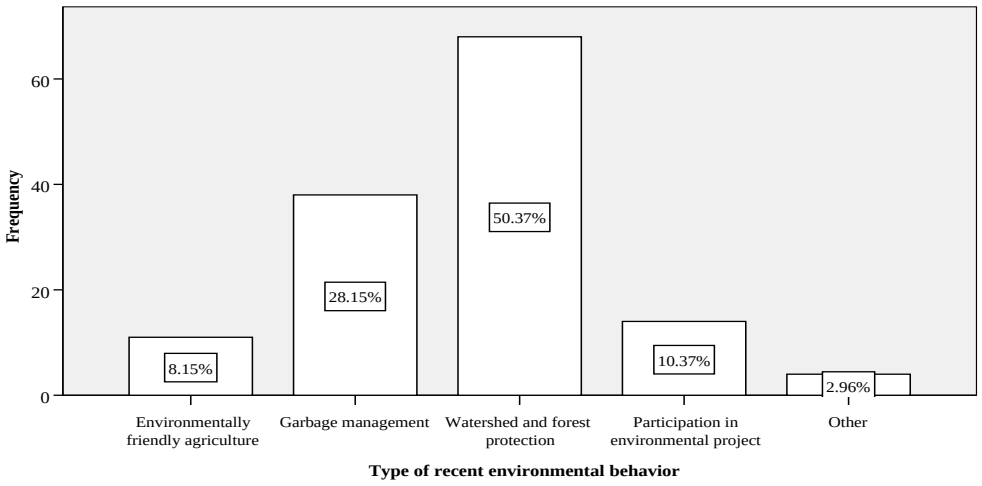


Figure 5.5. Types of recent pro-environmental behaviours

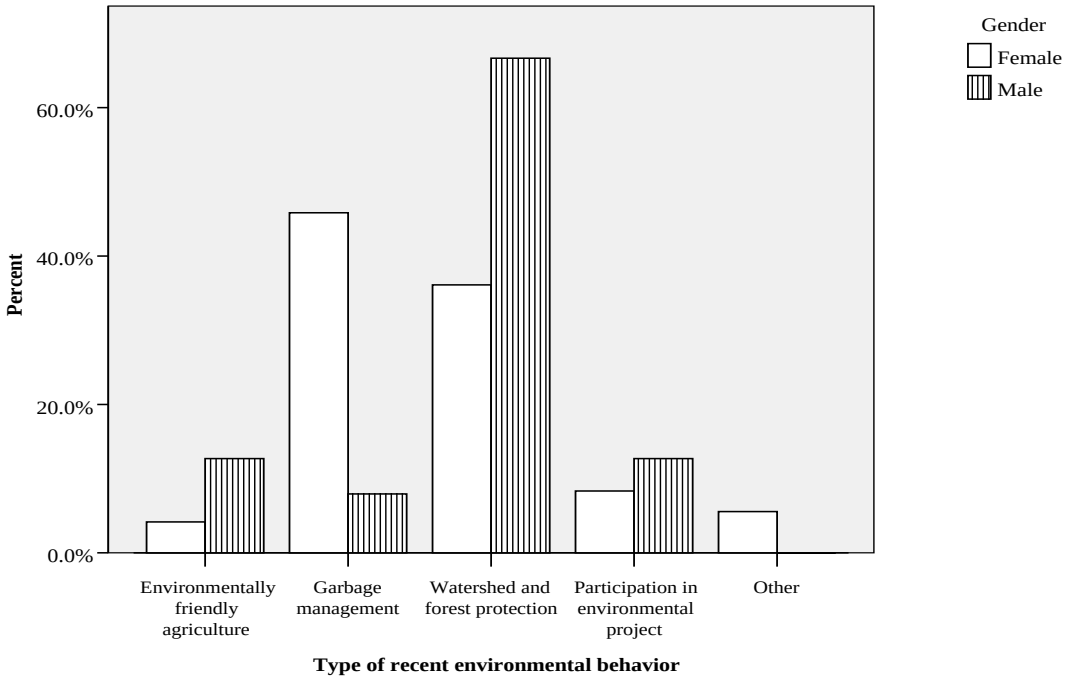


Figure 5.6. Comparing reported environmental behaviours by females and males

Contrary to the first proxy behavioural measure, the model using a pro- environmental behaviour score showed the poor explanatory power of both socio-structural and attitudinal variables. The lack of predictive power of the model is shown in the table above by the low R^2 values and the lack of statistical significance. Table 5.14. shows the results of this regression analysis.

Table 5.14 . Standardized regression coefficients of predictors of pro- environmental behaviour scores

Socio-structural variables	**ß standardized coefficients**
Age	0.155
Education	0.064
Economic wealth	0.028
Member of a local organization	- 0.013
Socio-psychological variables	
Non-material values	-.158
Material values	-.097
Attitudes towards the management of the park	0.166
N	135
R^2	0.067
Sig.	0.844
F value	0.480

Similarly the low ß coefficients of the independent variables indicate the small contribution of the individual predictors, none of which was significant. As can be seen, the ß values have been standardized to allow for comparison. These findings suggest that when the costs and the impact of what is being done are incorporated into the equation, the psychological and socio-structural characteristics of the individual have poor influence in the adoption of these behaviours.

5.2.3. Adoption of conservation coffee practices

When interviews were conducted in Santa Clara (Panama) and Las Mellizas (Costa Rica) an additional section was included in the survey to explore the adoption of conservation coffee among local producers (see section G in Appendix 2). This section included questions about the type of coffee grown, number of hectares, reasons to change or not their agricultural practices. Also a group of 10 true and false statements (section H in Appendix 2) was added to assess their general knowledge on the differences between conventional and conservation coffee production.

Those who reported themselves as coffee growers were asked to respond to these additional sections. Of the total randomly selected interviewed population in these two communities (n = 105, see table 5.1 at the beginning of this chapter), sixty nine interviewees considered themselves as coffee farmers. Of the sixty nine local producers, 47.8% reported the adoption of some type of environmentally friendly practice in their coffee plots though only 17.6% reported to have adopted organic production fully. Though this sample is representative of the communities of Santa Clara and Las Mellizas, it is important to note that this sample does not statistically represent the coffee producers' population in these communities.

Knowledge scores were calculated based on percentages of correct responses to the 10 statements and were included in order to understand whether this variable has an influence or not on the adoption of conservation practices by coffee producers. These statements were constructed based on phrases provided by coffee farmers during previous interviews. The next table 5.15.shows the percentages of responses to each of these statements.

Table 5.15 Frequency of responses about conservation coffee production

	True (%)	False (%)	I do not know (%)
1. Shade grown coffee produces less and pests develop more	79.37*	20.63	--
2. Changing from conventional coffee to organic coffee has to be done all at the same time	25.40	66.67*	7.94
3. People change to organic coffee mainly because they spend less money in agrochemicals	81.95*	15.87	3.17
4. Organic manure is cheaper than chemical fertilizers but producers need to put more	90.48*	3.17	6.35
5. Producers always have to buy organic manure	22.22	76.19*	1.59
6. Producers can negotiate better prices with organic coffee	95.24*	1.59	3.17
7. The fruit of shade grown coffee is smaller than that of the coffee grown under the sun	9.52	88.89*	1.59
8. Trees need to be pruned regularly so the pests do not infect the shade grown coffee	96.83*	3.17	--
9. People change to organic coffee mainly because it helps to protect local animals	38.10	61.90*	--
10. Conventional coffee is of better quality than organic coffee	6.35	85.71*	7.94

*Correct response.

The average knowledge score was 80% which seems to indicate that there is a good knowledge level among the farmers regarding conservation coffee practices. However, a closer look at the responses to individual statements makes evident the presence of two beliefs that might be hampering the adoption of conservation practices among some coffee farmers. For instance, a quarter of the interviewed local producers believed that the change from conventional to organic needs to be done all at the same time (statement 2), when actually this transformation could be done gradually. Similarly, almost a quarter of the respondents thought that they always have to buy organic manure (statement 5) when there have been multiple training courses in the region to teach producers how to make organic manure based on organic waste. It is important to note, though, that recently there has been a shortage of rice husks used to make *bocashi*, the most popular organic manure type in the region, a factor that might be conditioning the response to this statement.

Though previous analysis shows that producers hold a number of false beliefs that might be hindering the adoption of conservation practices, the influence of the knowledge score was not demonstrated in the regression analysis. A binary logistic regression was run in order to explore the influence of socio-structural, psychological and knowledge variables on the adoption of conservation coffee practices. Only 51 cases of the 69 interviews provided all the data required for this analysis (see Table 5.16), which reduces the reliability of this examination.

Though the Hosmer and Lemeshow test indicates some level of significance (Chi-square= 5.755, Sig. 0.675 and 8 df), results from both the Omnibus test (Chi-square= 5.515, Sig. 0.597 and 7 df) and the Cox and Snell and Nagelkerke R^2 (0.089 and 0.119, respectively) show that the overall model was not statistically significant. It is then concluded that the socio-structural, psychological and knowledge variables considered in the model poorly predict the adoption of conservation coffee practices among the interviewed farmers. Also the ß, Wald and Sig. values presented below show the poor performance of the independent variables in explaining the adoption of new conservation oriented agricultural practices among local producers (Table 5.16.).

Table 5.16 ß, Wald and Sig. values of predictors of the adoption of conservation coffee practices

Socio-structural variables	**ß**	**Wald (x^2)**	**Sig.**
Age	-0.011	0.163	0.687
Education	0.016	0.028	0.866
Economic wealth	- 1.353	0.548	0.459
Member of a local organization	0.725	1.040	0.308
Number of hectares of coffee	0.039	1.373	0.241
Psychological variables			
Ecosystem services/bequest values	-2.661	3.141	0.076
Material benefits	0.222	0.149	0.700
Knowledge of conservation coffee practices	-0.025	0.924	0.337
N	51		

These results indicate that the environmental values of coffee producers who have adopted conservation practices are not different from those who still practice conventional coffee production. Also, knowledge does not seem to contribute to the implementation of conservation practices. These findings are relevant as most of current conservation actions in the region still focus on providing information to the producers regarding the advantages of environmentally friendly production.

But if the individual's socio-economic and psychological variables can not explain why local coffee growers adopt or not conservation practices, what other factors are influencing this decision? To further investigate this question, farmers were asked to indicate what has been the main contextual factor that made them change or not and what they thought would be required for other producers to adopt conservation practices. The next three figures depict their answers.

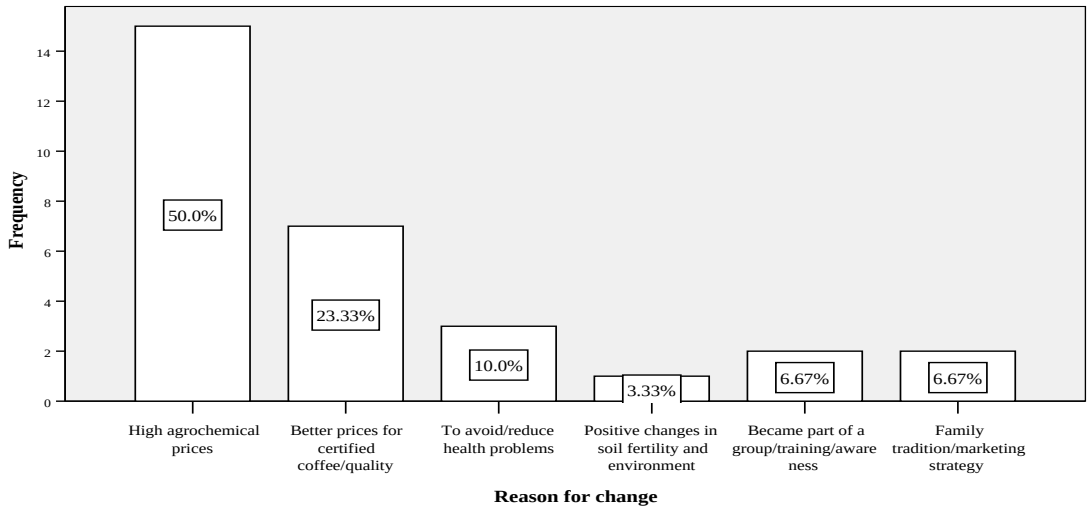


Figure 5.7. Reasons provided by coffee producers to adopt environmentally friendly practices

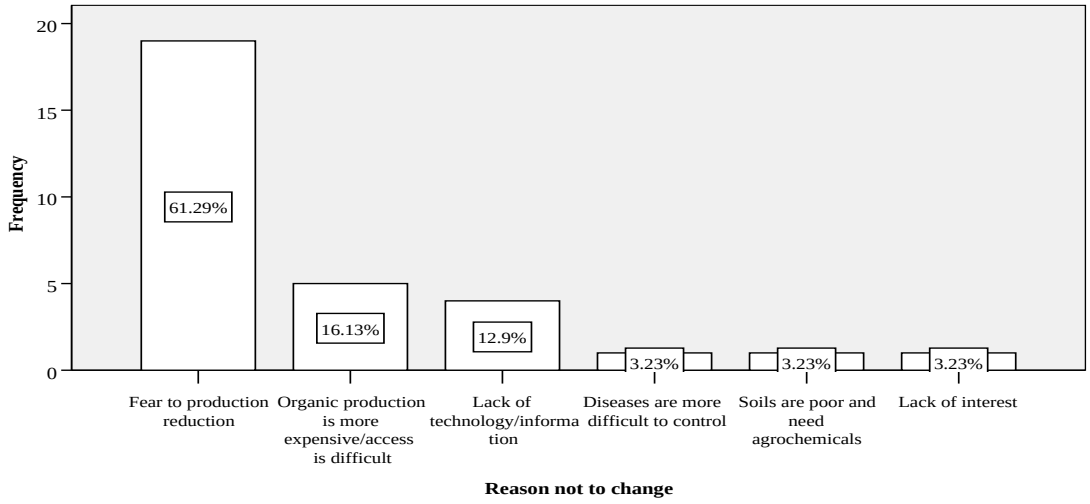


Figure 5.8. Reasons provided by coffee producers to NOT adopt environmentally friendly practices

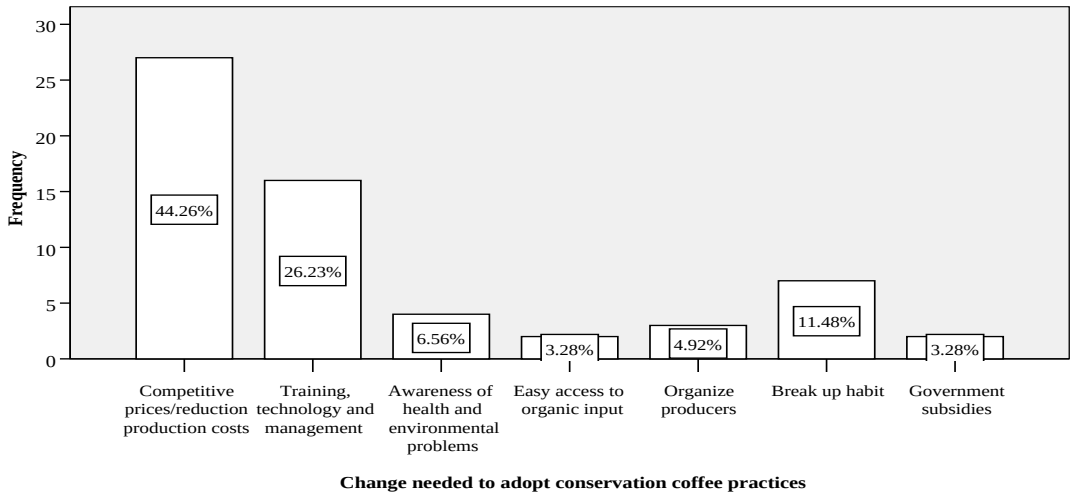


Figure 5.9. Required changes to adopt environmentally friendly coffee practices from farmers' perspective

From the farmer's perspectives, economic reasons and access to environmentally sound technology and input are the main contextual factors supporting or restricting the implementation of conservation coffee practices. In this sense, the general increase in the prices of agrochemicals experienced during 2007 and 2008 linked to the increase of international oil prices, seem to have been an important factor for some farmers to turn from conventional to organic alternatives. On the other hand, fear of a dramatic reduction of the farm's productivity, and therefore in earnings, was reported as the main factor keeping producers under conventional coffee production followed by the prices and accessibility of organic inputs. Though an initial reduction in the productivity of the farm has been observed when changing from conventional to organic production, the belief that this conversion needs to be done all at once, as indicated in the previous analysis, it is likely to further exacerbate farmers' apprehension of potential economic losses. In accordance with the expressed reason to change or not, economic incentives were seen by producers as the key elements that need to be modified in order to promote environmentally friendly practices. Two broad categories were brought into light. On the one hand, a more attractive and competitive price for environmentally friendly coffee and on the other, the reduction of its production costs. Most farmers have reported that the reduction or complete elimination of herbicides in environmentally-friendly coffee plantations leads to an increase in the production costs, as local manpower needs to be hired to manually remove the competing vegetation.

5.3. Cross Country Comparisons

After developing a reliable instrument to measure culture - nature relationships and attaining a better understanding of how this association works in these communities, further analysis can be conducted to address the second research question. This question asks whether there were any cross-boundary differences in environmental attitudes and behaviours. Up to this point analysis has been conducted using the sample as a whole, in this section the sample was split by country.

Before proceeding to make country comparisons, it is important to check whether the samples are indeed comparable based on the information available. In order to do so, an independent t-test was run to identify any possible differences in the socio-economic variables of the samples per country that might influence the comparison. As presented in Table 5.17, the evaluation indicates that only age was statistically different, with people in the Panamanian sample tending to be older on average than in the Costa Rican sample (Sig. < 0.0001). However, in the previous analysis of the whole sample, age was not shown to have a significant effect on people's attitudes, so comparison could proceed.

Table 5.17 Comparison of socio-economic variables per country

		N	Mean	SD	Sig. (2-tailed)
Gender	Costa Rica	85	0.44	0.50	0.977 Not Significant
	Panama	80	0.44	0.50	
Age	Costa Rica	85	39.81	14.57	0.000 Significant
	Panama	80	49.81	18.17	
Education	Costa Rica	85	6.32	3.54	0.68 Not significant
	Panama	80	7.49	4.53	
Economic wealth	Costa Rica	85	0.63	0.19	0.749 Not significant
	Panama	80	0.64	0.21	
Member of an organization	Costa Rica	85	0.28	0.45	0.152 Not significant
	Panama	80	0.19	0.39	

In addition, to check whether the instruments to measure environmental attitudes are comparable, the total variance explained and the alpha values of both sub-scales were calculated per country. These results are presented in Table 5.18 and show that the scales are robust and applicable to the country samples.

Table 5.18 Total variance explained and Alpha values of environmental attitude scales per country

	Total variance explained	Alpha ecosystem services/ bequest values scale	Alpha material benefits scale
Costa Rica	48.55%	0.7	0.6
Panama	54.48%	0.7	0.6

After confirming that the socio-economic characteristics of the interviewees in both samples are similar, and that the instrument is applicable to both countries, it is possible to address the second research question. This question asks whether there were any cross-border variations that support the idea that Costa Ricans have a higher appreciation for nature and the park that Panamanians.

5.3.1. Comparing environmental attitudes scores

To compare environmental attitudes, an independent sample t-test was performed. As shown in Table 5.10, results indicated that there are no statistically significant differences in these measurements across the international frontier.

Table 5.19 Cross country comparisons of environmental attitudes scores

	Country	**N**	**Mean**	**SD**	**Sig. (2-tailed)**
Ecosystem services/bequest values	Costa Rica	80	4.24	0.31	0.648 Not significant
	Panama	69	4.21	0.31	
Material benefits	Costa Rica	80	2.73	0.82	0.790 Not significant
	Panama	69	2.70	0.69	

This lack of differences is also observed when the distribution and direction of the responses to individual statements of both environmental attitudes and attitudes to the park are divided by country as shown in Table 5.20.

Table 5.20 Frequencies of responses to environmental attitude statements in each country

		SD (%)	D (%)	N (%)	A (%)	SA (%)
Environmental services/bequest values						
11. To walk the park's trails reduces stress	Panama	--	--	1.45	73.91	24.64
	Costa Rica	--	--	2.50	77.50	20.00
8. People should have more respect and admiration for the forests	Panama	--	--	--	71.01	29.99
	Costa Rica	--	--	1.30	78.75	20.00
9. Young people should look after the forests because they are their future	Panama	--	--	--	91.30	8.70
	Costa Rica	--	0.87	2.61	80.87	15.65
5. Forests give us peace and well-being	Panama	--	--	--	73.91	26.09
	Costa Rica	--	1.25	1.25	66.25	31.25
3. It is important for our children to get to know the forest and its animals	Panama	1.45	--	--	75.36	23.19
	Costa Rica	--	--	--	43.48	56.52
Material benefits						
13. If people do not use the forest, its natural resources are wasted	Panama	2.90	56.52	2.90	37.68	--
	Costa Rica	7.50	45.00	8.75	38.75	--
4. Forests should exist only to satisfy human needs	Panama	--	65.22	2.90	31.88	--
	Costa Rica	7.50	47.50	6.25	38.75	--
15. Forests should be used mainly to improve people's economic income	Panama	1.45	60.87	7.25	30.43	--
	Costa Rica	3.75	61.25	5.00	27.50	2.50
7.* The main objective of the park should be to protect plants and animals	Panama	1.40	43.48	24.64	30.43	--
	Costa Rica	5.22	68.70	5.22	16.52	4.30

SD= strongly disagree; D=disagree; N=neutral; A= agree; SA= strongly agree.

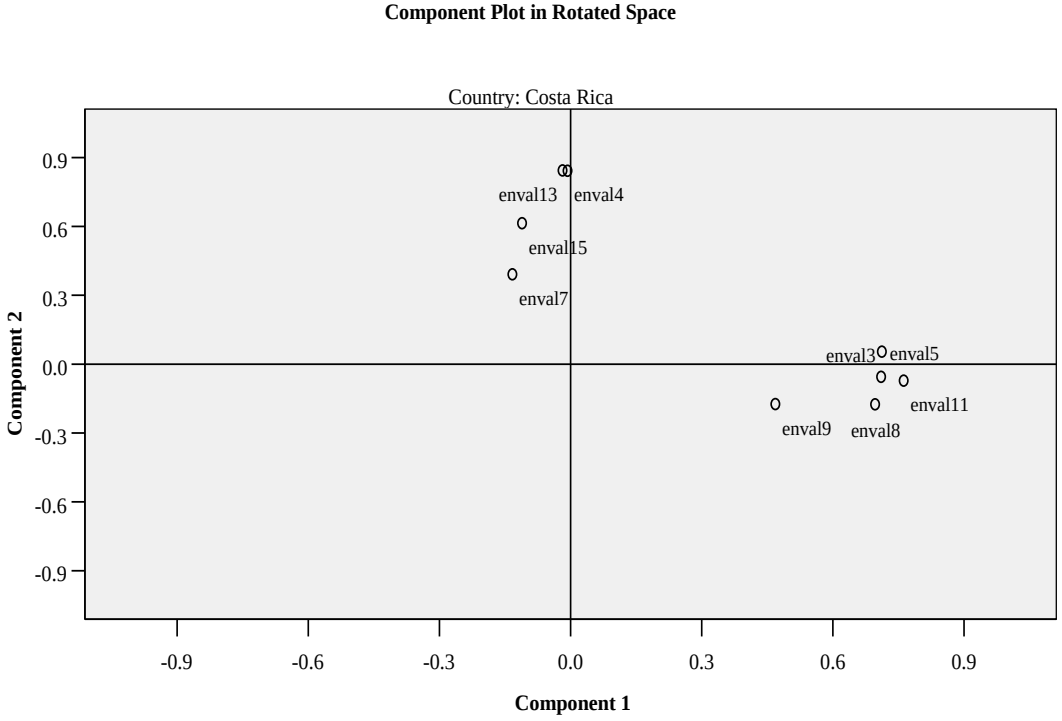
Despite the lack of differences, it is interesting to note that in response to statement 7 *the main objective of the park should be to protect plants and animals*, a high percentage of Panamanian interviewees (24.6 %) selected the neutral response, in contrast to only 5.2% of the Costa Rican interviewees. Also most Costa Ricans showed agreement with this statement indicating the preeminence of bio-centric objectives of the park, while Panamanians seem to have divided opinions. It is important to keep in mind that responses to statement 7 were reverse coded following factor analysis findings.

5.3.2. Comparing environmental attitudes structures

As indicated before, when investigating the whole sample, the structure of the respondents' attitudes to nature was not divided along a continuum with biocentric and anthropocentric

poles. Instead, two factors associated to material values and ecosystem and bequest values of nature explained approximately half of the responses. These two factors seem to be present within each individual, indicating an appreciation for both types of values among the studied population. This provides answers to the first research question that asks whether these communities present more complex nature - culture associations that are not appropriately described by a dualistic model.

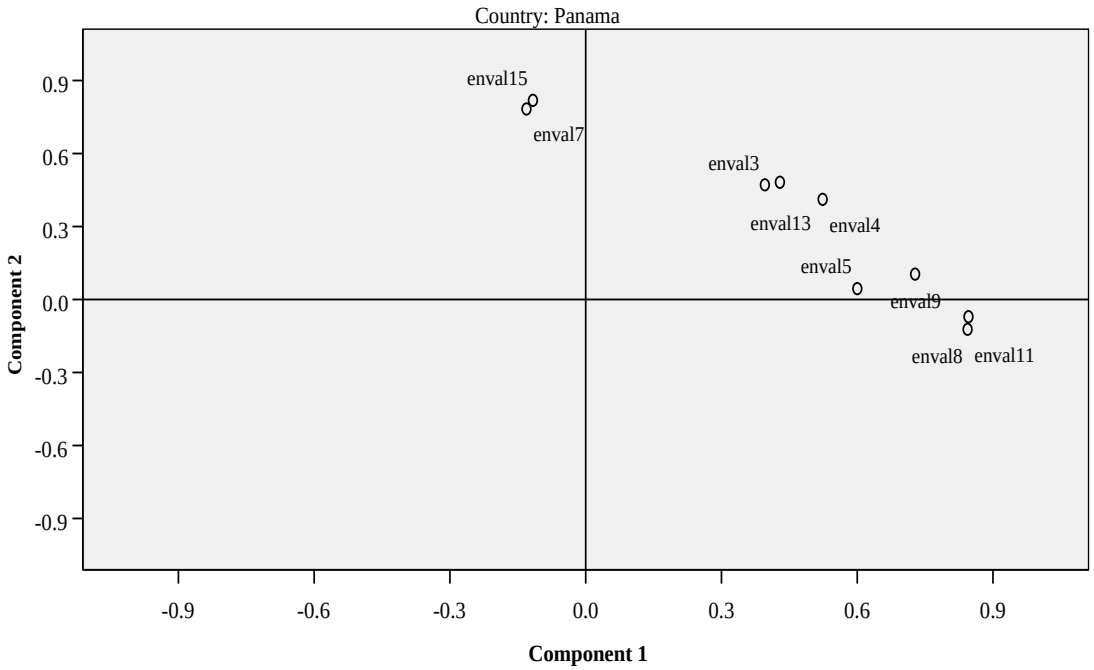
These results still hold when responses are factor analyzed by country. However, the distribution of the factor loadings along the two axes (identified factors) is different in both countries as the following plots illustrate.



Ecosystem services/bequest values
Enval 11. To walk the park's trails reduces stress
Enval 8. People should have more respect and admiration for the forests
Enval 9. Young people should look after the forests because they are their future
Enval 5. Forests give us peace and well-being
Enval 3. It is important for our children to get to know the forest and its animals

Material benefits
Enval 13. If people do not use the forest, its natural resources are wasted
Enval 4. Forests should exist only to satisfy human needs
Enval 15. Forests should be used mainly to improve people's economic income
Enval 7. The main objective of the park should be to protect plants and animals*

Figure 5.10. Structure of environmental attitudes in Costa Rican communities



Ecosystem services, bequest values and resources extraction for subsistence

Enval 11. To walk the park's trails reduces stress
Enval 8. People should have more respect and admiration for the forests
Enval 9. Young people should look after the forests because they are their future
Enval 5. Forests give us peace and well-being
Enval 3. It is important for our children to get to know the forest and its animals
Enval 13. If people do not use the forest, its natural resources are wasted
Enval 4. Forests should exist only to satisfy human needs

Economic benefits

Enval 15. Forests should be used mainly to improve people's economic income
Enval 7. The main objective of the park should be to protect plants and animals*

*Reversed coded

Figure 5.11. Structure of environmental attitudes in Panamanian communities

As shown in Figures 5.19 and 5.20, the Costa Rican responses to material values (Enval 4,7,13,15) and ecosystem services and bequest values (Enval 3,5,8,9,11) are clearly clustered around two axes, suggesting that Costa Ricans make a clear distinction between the two concepts. In the Panamanian sample on the other hand (Figure 5.20), the difference is not as sharp. Statements 4 *forests should exist only to satisfy human needs* and 13 *if people do not use the forest, its natural resources are wasted* that are considered by the Costa Ricans as belonging to materialistic values of nature (vertical axis) are considered somewhere in the middle or even leaning towards non-material values of nature by Panamanians.

Conversely, statements 15 and 7, *forests should be used mainly to improve people's economic income* and the reverse coded version of *the main objective of the park should be to protect plants and animals* are considered by Panamanians as completely different to the rest of the provided statements. This seems to indicate that among Panamanians, the economic factor might be a clearer parameter of differentiation of the value categories held. If this is the case, Panamanians will tend to cluster together environmental services, bequest and subsistence values from nature while keeping economic benefits from nature as a separate category.

Costa Ricans, on the other hand, seem to be considering environmental services and bequest values as separate from short term benefits. This interpretation would be in agreement with findings of similar studies conducted in Northern latitudes (Vaske *et al.* 1999; McFarlane *et al.* 2000; McFarlane *et al.* 2003; McFarlane *et al.* 2006).

Despite these observed cross country distinctions, the quantitative analysis suggests that these peculiarities might not be strong enough to influence attitudinal scores. In order to further investigate these assertions, comparative longitudinal studies or an inter-generational factor analysis of both countries are required. These comparisons are not feasible in this study given the small size of the age sub-samples.

Though this study has strived to reduce as much as possible the variability of the samples by for example, selecting similar communities, and the socio-economic characteristics of the interviewees per country have proved to be very similar, it is important to remember that other undetected factors might be at play given the complexity found in environmental attitudes in these poorly studied settings. Some of these factors will emerge during the in-depth interviews discussed in detail in the next chapter.

Finally, it is also important to remember that samples per country are smaller than the whole sample and these reduced sample sizes might reduce the reliability of sophisticated statistical techniques such as factor and regression analyses.

5.3.3. Socio-economic factors influencing general environmental attitudes per country

These results suggesting structural similarities between the environmental attitudes of Costa Rican and Northern populations reported in other studies (Thompson *et al.* 1994; Vaske *et al.* 1999; Schultz *et al.* 1999; McFarlane *et al.* 2000; McFarlane *et al.* 2003; Scott *et al.* 2004a; McFarlane *et al.* 2006; Voorhies-Holloway 2009) is further supported when studying the explanatory power of the socio-economic factors influencing environmental attitudes. A multiple regression analysis controlling for age was run to explore these influences in both countries independently as Table 5.21. shows.

Table 5.21. Comparison of the multiple regression results per country

	Costa Rica		**Panama**	
Dependent variables	**Model R^2**	**Significant predictor**	**Model R^2**	**Significant predictor**
Ecosystem services/bequest values	**0.07** Not significant	---	**0.05** Not significant	---
Material benefits	**0.26** Sig. ($p< 0.001$)	Education (-) ($p< 0.001$)	**0.04** Not significant	---

Though the R^2 values are low, the model of socio-structural variables as predictors of environmental attitudes has higher explanatory power in Costa Rica than in Panama. Furthermore, when predictors are considered independently, statistically significant variables seem to better explain Costa Rican than Panamanian responses. In this case, Costa Ricans with higher education levels tend to value less the material benefits of the forests similar to findings in northern latitudes.

It is interesting to note, though, that education was not related to higher appreciation for ecosystems services and bequest values but to low appreciation of material values. This seem to indicate that well educated people tend to disagree with activities such as logging or hunting but not necessarily have a higher appreciation for long term benefits from nature such as ecosystem services or bequest values.

Other variables such as gender (women) and age (young) frequently associated with higher appreciation for nature's non-consumptive values in northern latitudes (Thompson *et al.*

1994; McFarlane *et al.* 2000; Voorhies-Holloway 2009) seem to have no influence on how Costa Rican communities appreciate their natural surroundings. None of the socio-economic variables considered in this study showed a statistical influence on the environmental attitudes of the Panamanian sample.

5.3.4. Comparing park conservation and environmental action

An independent sample t-test was performed to compare attitudes towards the park, pro-environmental behaviour and conservation knowledge scores. As it is shown in Table 5.22 results indicated that there are no statistically significant differences in three these measurements across the international border.

Table 5.22 Cross country comparisons of park attitudes, behaviour and knowledge scores

	Country	N	Mean	SD	Sig. (2-tailed)
Attitudes towards the park	Costa Rica	47	3.13	0.57	0.121 Not significant
	Panama	46	2.94	0.59	
Pro-environmental behaviour score	Costa Rica	84	2.62	1.33	0.106 Not significant
	Panama	51	3.00	1.30	
Conservation coffee knowledge score	Costa Rica	35	80.86	11.72	0.655 Not significant
	Panama	35	79.43	14.74	

Also, cross-country differences in terms of behavioural intentions and adoption of conservation coffee practices were explored. As both are dichotomous variables, chi-square tests were conducted. Results are presented in the Table 5.23 below. No statistically significant differences between the two countries were found either.

Table 5.23 Frequencies of responses to pro-environmental behaviour questions and Chi-square test results

Self-reported simple behaviour	Yes	No	Sig. 2-tailed
Costa Rica	71.18 %	28.81 %	0.344 Not significant
Panama	63.75 %	36.25 %	
Adoption of conservation coffee practices			
Costa Rica	38.25 %	61.76 %	0.330 Not significant
Panama	52.94 %	47.05 %	

These results suggest that the adoption of eviction and zoning as management strategies have not had an impact on how these cross border communities regard the management of the park. In both countries interviewees expressed neutral opinions about the administration of the park. Furthermore, these attitudes seem to be similarly shared within the two studied populations as indicated by the comparable standard deviations.

Also surprising are the similarities found in pro-environmental behaviour scores and knowledge of conservation coffee techniques. These results show that the wide spread belief of Costa Rica as a more environmentally friendly nation might not be applicable in these frontier communities. The alternative explanation of whether the Panamanian communities under study present higher levels of appreciation for park management and conservation behaviours that the rest of Panama requires further investigation.

A closer look at the frequencies and distribution of the responses to the individual statements of park attitudes further supports a general lack of cross border differences (see table 5.24). However, though the distribution of the responses to the park attitudinal statements were very similar in both countries, 26% of the total Panamanian opinions were neutral in contrast with only 9% among Costa Ricans. Of special interest are the statements: 1. *The park is being well managed for the benefit of future generations* and 3. *The park administration is doing a good job considering local people's opinions* which triggered neutral responses among more than 35% of the Panamanian interviewees. This tendency among Panamanians to choose the neutral response was also observed for general environmental attitudes. Though potential explanations for these patterns are difficult to infer from the available data, it is possible that Panamanians, contrary to Costa Ricans, might not think that they know enough about conservation in general and management of the park in particular to express an informed opinion. Also, Panamanians might simply be more reluctant to express a negative opinion about the park or the park is so unimportant from their perspective that they have not thought about its management. This potential people – park disconnection also emerged during qualitative interviews (see section 6.2. in the next chapter).

Table 5.24 Frequencies of responses to park attitude statements in each country

		SD (%)	D (%)	N (%)	A (%)	SA (%)
1. The park is being well managed for the benefit of future generations	Panama	6.52	26.09	39.13	28.26	--
	Costa Rica	2.13	23.40	10.64	61.70	2.13
2. The park is being well managed to conserve plants, animals and water sources	Panama	--	45.65	13.04	41.30	--
	Costa Rica	--	57.45	4.26	36.17	2.13
3. The park administration is doing a good job considering local people's opinions	Panama	--	19.57	34.78	45.65	--
	Costa Rica	--	23.44	6.44	70.22	--
4. Hunters do not often get into the park due to the park rangers' good work	Panama	6.52	41.30	23.91	28.20	--
	Costa Rica	2.13	51.06	17.02	29.79	--
5. Park regulations are applied fairly	Panama	8.70	34.78	19.57	36.96	--
	Costa Rica	--	36.17	6.36	57.45	--

SD= strongly disagree; D=disagree; N=neutral; A= agree; SA= strongly agree.

A strong negative response to statement 4 is observed in the Costa Rican sample. Though Panamanians also expressed high disagreement with this statement, it is likely that these opinions reflect local people's concerns with poachers coming from urban areas to hunt and a generalized perception of unequal enforcement of park regulations by park rangers. These issues are further discussed in section 6.3.2 of the next chapter.

Finally, the influence of socio-structural characteristics was also analyzed across the border as shown in Table 5.25.

Table 5.25 Regression analysis results showing the influence of socio-structural factors per country

Dependant variable	**Costa Rica**		**Panama**	
	Model R^2	**Significant predictor**	**Model R^2**	**Significant predictor**
Attitudes towards park management	**0.33** **Sig.** ($p< 0.01$)	Education (-) ($p< 0.01$)	**0.26** Not significant	---
Behaviour score	**0.07** Not significant	---	**0.01** Not significant	----

Though the R^2 value is low for the model, the analysis of the independent contribution of the predictors shows that Costa Ricans with high education tend to have a poorer opinion regarding the management of the park. For Panamanians, on the contrary, none of the socio-structural variables under study showed any statistically meaningful contribution. These

results point to the importance of formal education as carrier of environmental knowledge and attitudes in Costa Rica.

5.4. Discussion

Though this thesis started with the intention of detecting differences and similarities in the environmental attitudes and behaviours of Costa Ricans and Panamanians who live near La Amistad Trans-boundary Park, a better understanding about how social and natural systems interact in this border region became a pre-requisite to design a meaningful instrument that would allow for these comparisons. Thus, in the process of elaborating a theoretically, culturally and contextually sound tool a series of interesting findings concerning human – nature relationships emerged.

Based on these considerations, the discussion of the quantitative results has been divided into four sections. The first examines general environmental attitudes, the second focuses on specific attitudes towards the park administration and the third discusses conservation action. The fourth section focuses on cross-country comparisons.

5.4.1. Environmental attitudes

One of the first findings of this study was that bio-centricism, as the value of nature for its own sake, was not a main factor influencing how these border communities perceive their relationship with the environment. Bio-centric items loaded negatively or did not load at all in any of the two factors identified through factor analysis (see Table 5.6). In contrast, two factors were recognized as having an impact on peoples' attitudes: environmental services and bequest values on one hand and direct subsistence and economic benefits from nature on the other. These two sets of benefits were named material values and ecosystems services/bequest values of nature. Though these terms require further refinement they serve for the practical purposes of this research.

Finding that biocentric items, which had been originally conceived as indicators of the successful adoption of the park, were not relevant to people's attitudes towards the environment, triggered a conceptual shift in the framework of this study. Benefits that require the long term maintenance of the forests in their natural state were then considered as an indication of a partial agreement with park conservation while benefits that required extractive or consumptive uses of nature were considered as potentially in conflict with park conservation. At this point it is important to note that a more balanced scale that includes the

same number of anthropocentric and bio-centric items is needed to further support these findings.

Factor analysis also demonstrated that these two identified factors were not statistically related. That is, if one person scores high or low in one value it could not be predicted that the same person was likely to score high or low in the other factor. Therefore, the two scores (material and ecosystem services/bequest values) can not be added together but instead each person should have two scores, one for material and another for non-material values. In practical terms this means that both types of attitudes towards nature co-exist within each person. Other studies have found this attitudinal coexistence in Latin America (Finchum 2002; Bechtel *et al.* 2006; Corral Verdugo and Pinheiro 2009).

The lack of influence of biocentric ideas and the identification of two unrelated factors address the first research question that asks whether these communities structure their association with the environment as a biocentric - anthropocentric dualism or not. In this case, human – nature interactions can not be represented as a straight line with the two ends indicating opposing biocentric and anthropocentric orientations as the cognitive model suggests. Instead, there are at least two independent dimensions influencing how a person appreciates nature and these dimensions are constructed around the benefits a person perceives as receiving from the natural environment.

In a strict sense, the generalized lack of appreciation for the intrinsic values of nature can be interpreted as a poor acceptance of the park protection ideology by local communities. This is particularly the case if the primary objective of a national park is defined as " to protect biodiversity along with ecological structure and supporting environmental processes and to promote education and recreation" as stated in the IUCN management categories guidelines (Dudley 2008). As conceived, this objective, pervasive in the park management literature, reflects well the culture – nature dualism as it limits human interaction with nature to educational and recreational activities. If on the other hand, the primary objective of the park is defined as to protect ecosystem services for economic development and for the well being of future generations, as indicated in the government decrees, results of this study show that at the moment there is a partial acceptance of these arguments among the local population.

Thus, local acceptance of park conservation policies can be interpreted differently depending on how the key objectives of the park are defined and these diverge based on the scale of action of the actors involved, whether these are international organizations or national governments. Though it can be argued that there is some level of agreement between these

two perspectives in terms of what is being conserved, they diverge importantly on the type of benefits human populations can expect from the park. International perspectives limit human use to education and recreation while the national points of views consider a wider range of benefits from ecosystem services for economic development to legacy for future generations.

Though comparable base line data regarding people's attitudes towards the environment at the time of the creation of the park have not been found, the examination of environmental history of the region (Chapter 3), particularly during the modern colonization period showed that the prevailing view held by local people, and encouraged by government policies, was that forests were an obstacle to human progress. If this assumption is correct, the establishment of the park might have played an important role in present day people's appreciation for environmental services and bequest values of natural forests.

These considerations have implications for on the ground management. The justification of park protection based on the conservation of ecosystem services and bequest values might have been accepted more easily because of the local population's awareness of their dependence on ecological processes and natural resources for subsistence and economic wellbeing. This awareness was supported by local people's direct observations of environmental degradation during the colonization period and it was at least in partial agreement with the technical rationale for the creation of the park. Conversely, conservation arguments based solely on the biodiversity value and the international importance of the park might have not been readily accepted by local communities due to their direct use of certain species and their continuous exposure to wildlife related risks.

Despite the generalized social consent regarding the importance of environmental services and other intangible values of nature, the direct use of natural resources remains a contentious issue in these frontier communities. This was reflected in the distribution of the responses to the environmental attitudes survey statements (see Figures 5.5 to 5.13). The fact that a third of the interviewed population expressed agreement with direct consumption of nature could be explained based on their cultural appreciation for wild food, their dependence on natural resources, but also as a resistance to government policies. These cultural, economic and political issues might be at least partially responsible for the neutral opinion that people expressed about the park administration.

Other studies conducted in northern latitudes have found that women and young people tend to have greater appreciation for the environment (McFarlane *et al.* 2003; McFarlane *et al.* 2006) but those conclusions are not supported here. Only higher education seems negatively

related to material benefits but this does not necessarily mean that highly educated people will concede higher importance to environmental services, as indicated by the low contribution of this variable to non-material values. Being a member of a local organization seems to have a negative effect on the development of non-material values. This is not surprising considering that most of the local organizations started as farmer cooperatives or development associations and it has not been until recently that they have been implementing conservation-related activities possibly due to the availability of funding.

5.4.2. Attitudes towards the management of the park

The attitudes towards the park administration scale proved to be unidimensional, that is to say, measuring just one factor. Items referring to the effective conservation of natural resources and future generations loaded highest while items regarding the fair implementation of park regulations loaded the lowest. Also, people in these communities tend to provide neutral responses to attitudinal statements. Several reasons might explain these findings including, lack of knowledge about park administration, lack of relevance of park issues or reluctance to provide negative opinions regarding government administration of the protected area. Further studies should aim to develop a more balanced scale that includes a similar number of items reflecting positive and negative attitudes towards the park administration.

The explanatory power of both general environmental attitudes and socio-economic variables in whole sample was 32.50%. This finding confirms the influence of these variables on specific attitudes towards the management of the park, as predicted by the cognitive model. In terms of the attitudes to the management of the park, better educated people who belong to local organizations tend to have a poorer opinion of the management of the park. This is not surprising as schools and organizations are, besides family, important in forming individuals' values and attitudes.

5.4.3. Environmental action

To explore how environmental attitudes might influence environmental action, three measures were designed to assess local people's adoption of pro-environmental behaviours. The intent of these instruments was not to measure behaviour directly mainly because the illegality of not complying with the park regulations created an incentive to report their compliance. The first measure was taken from the informants' response to the question of whether they have done something in favour of the environment in the last six months, while the second measure gave points to the type of behaviour that was reported and the third aimed

to assess the adoption of conservation coffee practices. There are important differences in what is being measured, as the first instrument measures if something considered as environmentally friendly has been carried out while the second one emphasizes the impact of the action on the environment and the effort being done. In contrast, the adoption of conservation coffee practices implies an important conservation impact and considerable effort but also higher risks since coffee production is one of the main sources of household income in the region. Thus, results of these behavioural proxy measures need to be interpreted based on the understanding that each of them assesses different levels of complexity of environmental behaviours and therefore are bound to be influenced by different factors.

In fact, this study shows that as the level of complexity of the environmental action increases, the predictive power of both psychological variables (environmental attitudes and knowledge) and socioeconomic factors decreases. This is suggested by the fact that psychological and socio-economic characteristics of the individual were determinants only of the less complex, first behavioural measure, while for the other more complex, proxy measures were not significant.

Another interesting finding that supports this argument of decreasing influence of psychological factors on increasingly complex behaviours is provided by the selective influence of knowledge and beliefs on different levels of environmental action. Garbage burning, which was the second most frequently reported action, is a widespread practice to "clean" the household's nearby area particularly during the dry season when dead leaves and branches are collected and burned. The problem arises when modern wastes such as tin cans and plastics are also incinerated polluting the air and leaving a concentrate of toxic material on the ground. As these impacts are not easily observed, the belief of garbage burning as an environmentally friendly practice still persists.
Knowledge of conservation coffee practices, a far more complex environmental behaviour than garbage burning itself, proved to be insufficient to lead to the actual implementation of these practices. Despite the fact that the average knowledge among producers was high (80%), regression analysis show that those more readily implementing conservation coffee practices are not necessary the farmers who know the most about these technologies. These findings point to how different behaviours are dependant on different factors. The analysis of garbage burning support the strategy of providing information to the public as a mechanism to promote awareness of their actions on the environment while the lack of influence of conservation coffee knowledge emphasizes the need to create the contextual conditions such

as favourable market conditions, adequate agricultural credits, manpower availability, among others, to facilitate its effective adoption.

5.4.4. Cross country comparisons

When samples were compared by country, no statistically significant differences were found between the environmental attitudes among Costa Rican and Panamanian communities. This conclusion provides an answer to the second research question that asks whether cross-border distinctions can be made in environmental attitudes. Despite this lack of differences, a closer examination of the structure of environmental attitudes and their relationship with other socio-economic variables showed some small country peculiarities.

First, when responses are factor analyzed by country and the results depicted graphically, qualitative differences in meaning emerge. Costa Ricans seem to make a clearer distinction between long term environmental/bequest values and short term direct benefits for subsistence and economic well-being (see Figure 5.19). Panamanians on the other hand, consider the use of nature for economic/lucrative purposes as being different to the use of nature for subsistence purposes. The use of nature for subsistence seems to be considered more closely related to environmental services and bequest values than to economic values (see Figure 5.20).

There are at least two points that need to be considered in order to understand these results. The first is that these differences might be associated with the way narratives about park conservation have been communicated independently in both countries and the second is that attitudinal changes tend to be slow. The analysis of the Costa Rican decree presented in Chapter 3, shows that the creation of the park is justified based on its biodiversity value and its potential contribution to the country's economic development. The Panamanian decree, on the other hand, justifies the park establishment based on the protection of natural resources for economic development. Also, the Costa Rican legislation targeted the eviction of human settlements from the park, while the Panamanian decree allowed human presence though subject to zoning and other regulations. As a consequence, park rangers on the Panamanian side of the border allow hunting and logging and small scale agriculture for subsistence purposes to people who have lived in the protected area since before its creation but commercialization of natural resources and the expansion of agriculture are prohibited (Lionel Quiroz, park director personal communication). In the Costa Rican side of the park these subsistence activities are completely banned and biodiversity conservation is an important rationale for park protection (Nelson Elizondo, park director personal

communication). The adoption of different management strategies might be leading to structural changes in cross border environmental attitudes, though these changes are still not quantifiable.

Another point that deserves attention while examining the apparent lack of quantitative differences between the two countries is that attitudinal changes are, by their very nature, very slow. Thus, it is possible that the observed cross country structural changes are not strong enough yet to be detected by quantitative instruments. Intergenerational as well as longitudinal studies are required to substantiate these assertions.

The second interesting cross-country difference is that the Costa Rican explanatory model of environmental attitudes reached statistical significance, while the Panamanian model did not. This is to say environmental attitudes among the Costa Rican communities seem to be more easily predicted by an individual's socio-economic factors, particularly education. In the Costa Rican sample, people with more years of schooling tend to have less appreciation for direct benefits from nature. Interestingly, though, education did not contributed to the prediction of a higher appreciation for environmental services or bequest values. In contrast, the Panamanian model of environmental attitudes, did not show any statistical significance and the socio-economic variables did not contribute significantly to predict either type of environmental attitude.

In conclusion, there were no statistically significant differences between the environmental attitudes of Costa Ricans and Panamanians but qualitative differences regarding the structure of these general environmental attitudes and the influence of socio-economic factors were observed. These findings might indicate that Costa Ricans are developing more dualistic ideas about culture - nature associations and that the way conservation narratives are deployed as well as how those narratives are transmitted through formal education are important factors in producing these embryonic differences. These peculiarities in the environmental attitudinal structures are not strong enough yet to be detected by quantitative methods.

No statistically significant differences were found across the border regarding people's attitudes to the management of the park. In both countries people tended to provide neutral responses with means ranging from 3.13 (Costa Rica) to 2.94 (Panama). These findings are difficult to interpret and might reflect poor information about park management, a reluctance to express a negative opinion or simply a lack of interest in this topic. Borge (2004) had already indicated that at present most Costa Rican communities consider that the park has a

minor role to play in their daily life. These considerations also emerged during qualitative interviews presented in section 6.2 in the next chapter.

The lack of cross boundary differences, despite the different management strategies adopted, seems to indicate that for the current inhabitants of these studied communities, the management strategy, whether eviction or zoning, is not a relevant factor in shaping their attitudes to the park. Though some people who resent the displacement and the lack of compensation can still be found in Costa Rica (Schelhas and Pfeffer 2008), most of the interviewees did not seem to devote great interest to these past events.

This lack of cross country differences could be the result of two decades of people - park co-existence or reflect the establishment of new livelihood opportunities to compensate for the restricted access to natural resources imposed by the park. However, it could also be due to the possibility that eviction of peasant colonists in Costa Rica was not as forceful and damaging to their livelihoods as in other continents, such as Africa. In fact, displacement issues in Latin America are rarely discussed in the literature and the few articles focusing on these topics reflect contrasting positions. Some authors blame international conservation organizations for promoting displacement and curtailing indigenous peoples' participation in decision making (Chapin 2004); others assert that protected-area induced displacement in Latin America is still small compared with the magnitude of displacement resulting from infrastructure and industrial development in natural areas (Chicchon 2009a). Though global studies on the effects of eviction on local people's livelihoods have been conducted (Brockington *et al.* 2006; Agrawal *et al.* 2009a; Agrawal *et al.* 2009b), a systematic study of the consequences of protected area establishment in reducing local people's access to resources and promoting eviction in Latin America is lacking. Such examination is often hampered by a pervasive lack of reliable quantitative data, particularly among government institutions and conservation organizations (Chicchon 2009a) (see also section 3.4 in chapter 3).

Despite this lack of statistical cross-border differences in terms of people's attitudes to the park, qualitative distinctions can be made in terms of the frequency of certain responses. For example, 26% of the Panamanians interviewees selected neutral responses to the attitudinal statements compared with only 9% of Costa Ricans (see Table 5.24). One explanation is that Costa Ricans might have felt more competent to provide an opinion about the effectiveness of current management of the park than Panamanians due to the perception they hold about themselves as a green nation. This might also reflect a lack of information or interest among Panamanians or their unwillingness to articulate a negative opinion about the park.

Of the socio-economic factors, only education and only in Costa Rica was negatively associated to attitudes to the park. This is to say, people with more years of formal education tend to have a poorer attitude about the administration of the park. None of the considered socio-economic variables had a statistical meaningful influence on the park attitude of Panamanians. These results are similar to those observed regarding environmental attitudes and support the idea of the key role that schools play as active builders of people's attitudes.

In conclusion, the adoption of zoning and eviction did not have an influence on people's current attitudes to the park as reflected in the similar attitudinal scores observed across the international border. This could be due to several factors requiring further investigation and including two decades the people – park acceptance, a low impact of eviction on local people's livelihoods in Costa Rica, the location of these communities along the international frontier and the emergence of new opportunities away from the protected area and its resources. Few differences were found across the border. Among these are education as an important variable influencing Costa Ricans' park attitudes and Panamanians probably considering themselves less knowledgeable than Costa Ricans regarding park conservation issues.

Cross-country comparisons demonstrated that there were not statistically significant differences between Panamanians and Costa Ricans regarding the three proxy behavioural measures. Similarly, no statistically meaningful differences were found on local producers' knowledge of conservation coffee practices in the two countries. Both these results are surprising considering that Costa Rica is a leading environmentally friendly coffee export country and Panama is not (Chicchon 2009b). This lack of differences among local coffee producers across the border is also unexpected because the local organizations in the Costa Rican communities under study do offer a better price for environmentally friendly coffee, while in Panamanian communities this is mostly not the case.

In this respect, elaborating on why some local producers have adopted these conservation technologies, an interviewed Panamanian farmer commented, "there are organic producers by conviction, by condition and by default", referring to those who really believe that the environmental considerations are important, those who are producing organically because of the foreseen competitive advantages being offered and those who simply can not afford to buy the inputs required nowadays for conventional coffee production. The latter could at least partially explain why Panamanian producers, despite not receiving better prices for environmentally sound coffee, are also adopting some conservation practices. According to this argument, it is the high prices of the agrochemicals and not the current prices of coffee

that are turning the balance towards more environmentally friendly coffee in Panama. These considerations, however, could be applied to Costa Ricans as well.

In fact, Amador *et al.* (2009c) agrees that most of organic coffee in Costa Rica comes from *fincas* which have maintained the traditional crop diversification and shade grown coffee but also from *fincas* which were abandoned due to fluctuations in the international coffee prices and the increasing input prices. Thus, some local coffee producers in both countries are reporting organic coffee production not necessarily because they have decided to take up environmentally friendly practices but more likely because they have been forced to reduce or completely eliminate the use of agrochemicals due to high prices. This might be explaining why there were not significant differences in environmental attitudes between producers who have adopted new practices and those who have not. These findings question the long term sustainability of the observed transformation of conventional to conservation coffee production in the region particularly if an important reduction of the agrochemical prices occurs in the near future.

To the economic contextual factors discussed above it is important to add the "border effect" in influencing producers' actions in the frontier. In 2007, two of the larger coffee estates on the Panamanian side, Duran and Sitton, decided to delay the purchase of coffee from local producers. In response, coffee farmers fearing that the harvest would be lost, started to sell coffee to Costa Rica with the open support of local authorities. In fact, according to local people, illegal smuggling of coffee through the frontier is not infrequent in these communities (Organicoop 2007; Rivera 2008; Lorenzo 2009). Being near the international border, opens wider opportunities to local producers to both sell and buy products at more competitive prices.

This study has tried to isolate as much as possible the factors that could potentially influence the studied dependent variables. This was done by selecting similar communities, studying the history of their establishment and by taking representative and randomly selected samples. Also, analysis prior to comparison showed that both samples shared similar socio-structural characteristics, therefore reducing their influence during comparison. However, given the multi-factorial complexity of environmental attitudes and behaviours in these poorly studied settings, it is important to keep in mind that other un-known factors might be influencing these attitudes and behaviours making cross-sample comparisons problematic.

The further in-depth examination of the people-park relationships presented in the next chapter provides additional elements in this respect.

5.5. Summary

During this study a culturally and contextually specific, reliable scale to measure environmental attitudes was developed. Results of the application of this instrument showed that these communities structure their relationship with the environment in more complex ways that can not be explained by a single biocentric – anthropocentric dualism, as intrinsic values of nature prove not to be significant for these communities. In its place, direct benefits for subsistence and income as well as ecosystem services and bequest values of nature seem to better explain these people's attitudes towards their environment. The interaction between and the manifestation of these attitudes was found to be very complex as both of them are held simultaneously by the respondents and not easily predicted by the socio-economic characteristics of the interviewees.

Thus, these findings suggest that both, bio-centricism and the human – nature dualism, which are integral part of park conservation, have not been fully internalized by these frontier communities 25 years after the creation of the protected area. Instead, a more dynamic and complex association between natural and cultural systems, in which people recognize a wide variety of benefits from nature, including some that will lead them to support forest conservation, is present in these communities. These findings provide an answer to the first research question by discarding the presence of the biocentric – anthropocentric dichotomy in these locations.

In relation to environmental action, this study shows that the predictive capacity of both psychological and socio-structural variables decreases as the complexity of pro-environmental behaviours increases. Knowledge was demonstrated to be important for simple tasks while for other more economically risky behaviours, such as the incorporation of coffee conservation practices, knowledge alone proves to be an inadequate predictor. The role of complex contextual factors on the adoption of complex pro- environmental practices will be explored in the next chapter.

Comparisons across the international border show that Costa Ricans and Panamanians in these frontier communities share similar attitudes to the environment and to the park and report similar levels of pro-environmental practices. Thus, the proposition implicit in the second research question that Costa Ricans, due to the greater influence of international conservation ideas, have developed a greater appreciation for environmental services and the park is not supported by the data.

Also no cross border differences were found regarding people's attitudes to the park. This could be due to several factors including two decades of acceptance between local people and park officials, the existence of other alternative income strategies to compensate for the loss of access to natural resources, the frontier location and the possible low impact of eviction on local people's livelihood. Though all these possibilities require further investigation, some authors argue that protected area-induced displacement in Latin America has not had the impact of displacements occurred in the region throughout history such as during the Spanish colonization or the creation of the modern nation states or even due to the more recent construction of development projects such as roads and hydro-electric dams (Chicchon 2009a).

Despite the general lack of cross-border differences, some embryonic peculiarities were found in the way Costa Ricans and Panamanians structure their association with the environment. These incipient differences might be related to the way park conservation narratives have been distinctively produced in both countries. Costa Ricans make a clearer differentiation between environmental services on the one hand and subsistence/economic well-being on the other, while Panamanians lump subsistence and environmental values together and separate them from economic values of nature. These differing structures might be related to the fact that based on the government decree, park officials in Panama allow the use of natural resources for subsistence but not for commercial purposes while in Costa Rica, these practices are completely banned. According to this research's findings, it is likely that formal education in Costa Rica is an important factor in creating these observed qualitative distinctions.

CHAPTER SIX: LISTENING TO THE VOICES OF LOCAL PEOPLE

Fifteen semi-structured interviews were carried out with local residents who were selected from the same five communities where the quantitative survey was conducted. As explained in Chapter Four, this sample is not intended to be statistically representative. Instead purposive sampling was deployed to ensure representation of local people from both countries. All the interviewees' characteristics are shown in the Table 6.1.

Table 6.1 Characteristics of the interviewed sample

Number	Pseudonym	Gender	Age	Country
1	Santos	Male	52	Panama
2	Rosa	Female	42	Panama
3	Luis	Male	28	Panama
4	Marta	Female	58	Panama
5	Ana	Female	25	Costa Rica
6	Antonio	Male	63	Costa Rica
7	Oscar	Male	35	Costa Rica
8	Mercedes	Female	52	Panama
9	Jose	Male	60	Panama
10	Gustavo	Male	57	Costa Rica
11	Manuel	Male	52	Costa Rica
12	Tomas	Male	75	Costa Rica
13	Suarez	Male	76	Panama
14	Alfonso	Male	72	Costa Rica
15	Maria	Female	92	Panama

It is important to remember that qualitative data were analyzed with two objectives in mind. One was to further explore the proposition that people in these communities do not perceive their relationship with nature along a biocentric - anthropocentric continuum as suggested by the quantitative findings. The other was, given the poor predictive capacity of individuals' psychological and socio-economic characteristics on attitudes and behaviours, to try to identify what other societal and cultural factors might be influencing people's interactions with nature as stated in research question 4..

Based on the objectives presented above and the analysis of the qualitative interviews, three main topics have been investigated in detail: local people's relationship with nature, people -

park interactions and environmental action. Though the individual responses to the questions were unique, common themes emerged from the analysis of each of these topics. These themes were later organized and sub-divided in thematic charts. The three topics, their themes and sub-themes are presented in this chapter. Verbatim responses are shown in italics and the pseudonym and the age of the interviewees are in brackets. Results from the narrative analysis of the cultural meaning of the concept of *montaña* are also presented in some depth. Finally, some cross border similarities and differences are identified.

6.1. Nature and the Place of Humans in it

The overall respondents' response to questions related to the natural world was very positive and enthusiastic. Five themes were identified in the content analysis of the responses to this topic and each theme has been further divided into sub-themes as is shown in Table 6.2.

Table 6.2 Nature and the place of humans in it

Themes	**Nature's Components**	**Nature's importance**	**Religious beliefs**	**Feelings towards nature**	**Links with wider society issues**
Sub-themes	Natural and cultural	Observed negative consequences of not protecting it Benefits it provides	Nature as God's creation Rights of humans to use it properly Responsibilities of humans to protect it Contradictions between religious beliefs and conservation action	Peace, tranquillity and connection with God Birds, flowers and water Accomplishment and camaraderie Fear and repulsion	Nature as a result of people's own reflections and experiences with others Urban/rural differentiation Generational differences Impact of rural – urban migration Regionalism and identity

6.1.1. Nature's components

First of all, it was difficult to grasp a sole definition of what participants consider nature. Instead local people referred to what they considered are elements or components of nature

such as the environment, forests, landscapes, *montañas,* trees, rivers, plants, flowers, animals, air and water. Some of the younger interviewees also incorporated more academic terms such as flora and fauna. Still for others the line between natural and man-made environments is not very clear. For example, Marta (58) considered *cultivated fields, gardens, well-tended plots and the Baru Volcano,* an icon of the Chiricano identity, as parts of nature.

Interestingly none of the respondents mentioned the park as part of nature. This lack of inclusion of the park as nature might be due to the relatively recent insertion of the park concept in these communities. Also, large patches of secondary forests still exist close to local communities and though some of them are in private property, people often enter these forests to collect firewood, ornamental and medicinal plants, construction materials, etc. Some of these patchy forests are also seasonally visited by locals for recreational and ecotourism purposes. People seem to refer to these unprotected forests instead of to the park when asked about nature. The presence of these remaining forests outside the park has allowed the coexistence of two human – nature association models in the region: the model of human – nature separation represented by the park and the model of human – nature integration represented by patches of formally unprotected secondary forests. In contrast to scientists and conservationists, for these communities nature does not need to be "pristine" or legally protected to be regarded as part of the "natural".

6.1.2. Nature's importance

Nature is perceived as important based on three main arguments: the negative consequences of not protecting it, the benefits it provides and the responsibilities humans have to protect it and use it rationally. *Long time ago this was a very cold area and as the time passed it has become hotter. That is the product of the human hand, of the forests being knocked down* (Mercedes 52). Statements like this show how people make connections between the observed changes in local climate and forest loss. These associations go farther to link ecosystem health, weather unpredictability and agricultural success: *Before, in the month of March one cleared the forest to plant corn. Now one clears the forest and it doesn't rain* (Santos 52). *The sustainability of our agricultural activities is linked to nature* (Luis 28).

Besides these historical changes, current ecological benefits were also highlighted. Clean air, scenic beauty, life quality and agricultural benefits were often mentioned. *I like to listen to the birds' songs. To see the flowering trees in the montaña* (Santos 52). Linked to the relevance of nature to local peoples' material and spiritual well being was the acknowledgement of nature being in peril and the need to take actions to conserve it. *What I*

like most is this tranquillity. God created nice things! The flowers, the trees, the crested guans, we saw them flying……the epiphytes flowering on the trees (Rosa 42). I like to stay in the *montaña and listen to its sounds. Sounds that have never been heard.. I go there to forget about my problems, forget about the people* (Oscar 35).

All these elements were presented as the product of people's own reflections, experiences and observations of their environment through time. The influence from other factors such as environmental awareness programs or conservation policies was not acknowledged.

6.1.3. Religious beliefs

Religious beliefs emerged as another common theme in the conceptualization of nature. Nature as God's creation provides a foundation for the understanding of natural phenomena and to establish the rights and responsibilities humans have in it. *I appreciate God's creation best through nature* (Jose 60). Responses coincided that humans should have a balanced relationship with their natural surroundings and portrayed local inhabitants as dependent on and sometimes part of nature. But interviewees also indicated that humans were entitled *to reap some benefits from nature* (Mercedes, 52) but in a *sustainable and friendly manner* (Antonio, 65). This belief finds its foundation in religious writings that depict nature at the service of the human race.

Some even suggested that local conservation actions have the spiritual goal of restoring *harmony between men and nature* (Santos, 52). This however, is not a generalized opinion as there have been reports of religious organizations in the study area opposing local conservation projects arguing that these initiatives are assuming powers that only God possesses (Chicchon 2009d page 15). Religious beliefs have been reported to be associated to nature conservation in very different parts of the world such as the United States (Kempton *et al.* 1996) and China (Shen *et al.* 2006).

6.1.4. Feelings and emotions

Besides the cognitive and religious aspects previously presented, nature also generates a wide range of feelings and emotions. Peace, tranquillity and connection with God were some of the most commonly quoted benefits of being in nature. Appreciation for birds, flowers and water for recreation purposes were also mentioned. Furthermore, feelings of accomplishment and camaraderie were expressed by old and young men when remembering long hunting and exploration expeditions into the forests.

Others in contrast showed feelings of fear, repulsion and recalled memories of adversity when being close to nature. Snakes were the most dreaded animals followed by insects, particularly mosquitoes and flies. Wild cats, such as pumas and jaguars, also generated concern not only because of predation of domestic animals but also for the perceived risk that they pose to young children. Recollections of long travels on foot, muddy trails and flooded rivers are often evoked mainly by colonist women when describing the early colonization of the frontier. These findings agree with other studies that have suggested that human – nature associations are not mere cognitive but also emotional (Kellert *et al.* 1996; Fulton *et al.* 1996; Shen *et al.* 2006; Smith 2006a).

6.1.5. Wider societal and cultural issues

The ways local people conceptualize nature serve as a cultural device to establish clear distinctions between urban and rural inhabitants and age groups. Interviewed people considered that city dwellers do not value the environment and noted that *the city itself is death* (Antonio, 63). *Those montañas… clean air. It is not like going to David or Bugaba. Here we see that there is something alive!* (Mercedes 52). Others resent how people living in the city tend to refer to rural inhabitants as backward, ignorant and old-fashioned. These feelings are further exacerbated as these communities remain detached from their countries' decision making centres and marginalized in the frontier region. This urban - rural differentiation reflects historical power relations with the cities as decision making centres and the countryside as a subordinate (see chapter 3). These findings point to how constructions of nature are utilized to mark these distinctions among societal groups and even discredit competing actors.

Informants perceive how culture - nature relationships have changed and continue to change over time, making apparent differentiations by age groups. Marta (58) summarizes it: *we are all part of nature. I think our grandparents saw themselves as its owners. Our children think about other things. Their life is in the city.* Referring to young people's lack of interest in the countryside, Santos (52) commented: *What happens is that people move away because they don't want to work in the countryside. They look for something easier to do, where they don't get damp or dirty. There in the city they are going to be stressed out because it is not the same as living here*. These comments suggest changes in human and environmental values in these communities, assertions that, though suggested, were not examined quantitatively (see Chapter 5).

Some comments also suggest how increasing rural-urban migration is undermining the argument of environmental conservation for future generations. This has been a long argued and well accepted justification among local communities for protected area conservation. Though most respondents agreed that it is important to leave future generations a healthy environment, *there are doubts about the next generations' interest in looking after what is being protected at present. We train* (ecotourism) *guides but they go to hunt instead. I feel doubtful about the youngest protecting this* (Ana 25). Some parents feel that they are in a dilemma. *They think that if they do well they can leave money or* (workable) *land to their children. One is not completely sure what is best to leave to them* (Marta 58). Therefore, from local people's point of view, protecting nature not only has a cost for present generations but the potential for their children to reap the benefits is being reduced given the perceived lack of interest of young people in the rural life. Studies are needed to further explore the interaction between protected area conservation and growing rural-urban migration and particularly the potential contribution of the park in maintaining young, promising locals in the area.

In conclusion, when local people are allowed to develop their own ideas about nature a whole new array of elements influencing this association emerge. Only two of the five identified themes, nature's components and nature's importance, reflect the cognitive component of individuals' attitudes to nature as explored in the previous chapter through quantitative methods. Other elements such as religious beliefs and feelings towards nature come to light as additional factors having an influence on how individuals perceive their relationship with their natural surroundings. Also, besides the individuals' cognitive and emotional factors (attitudes, beliefs and feelings), qualitative interviews pointed to the influence of wider societal and contextual factors such as historical relationships between urban and rural dwellers and current rural – urban migration patterns as determinants of culture - nature interactions in these communities. Future studies assessing human – nature interactions in communities like these need to overcome the conceptual limitations of the biocentric-anthropocentric dualism and engage in the development of more comprehensive tools sensitive to both individual (attitudes, beliefs and feelings) and contextual conditions as determinants of human – nature associations.

6.2. Local People and the Park

In contrast to questions about nature, the exploration of people - park relationships was met with lack of interest and sometimes with suspicion. Also, questions about the park frequently generated initial responses such as "I don't know" or "I'm neutral". These results suggest that

either people do not have basic information about the park and its management or they did not feel comfortable elaborating on this topic.

Four common themes were identified when analyzing the content of the responses: the disconnection between the park and people's daily lives, the rationale behind the creation of the park and the benefits and costs that it entails for local people. Wider societal issues affecting people's perception of the park were identified as part of the latter theme as shown in Table 6.3.

Table 6.3 People – park relationships

Themes	**Disconnection**	**Park rationale**	**Benefits**	**Costs**
Sub-themes	Disconnection from local daily life Historical perspectives	To stop deforestation To protect environmental services To comply with international commitments	Tranquillity Good quality water Pure air/ nice climate Closeness to nature/scenic beauty	Lack of basic infrastructure and services Lack or no adequate compensation Unresolved land tenure issues Unfair application of the law

6.2.1. Disconnection

Interviews depicted a general sense of detachment of the park from local people's daily lives. Many of the interviewees seem not to be well-informed about the location of the park even after two decades from its declaration. For example one of the respondents when asked about the park hesitantly indicated: *The Park climbs up to the highlands, doesn't it? It is at about an hour in car from here. I don't know exactly were its limits are* (Santos 52). Another one pointed to how far the park actually is from her: *I think that the park is that one that is in Las Nubes, away there where the Quetzal's trail gets to Boquete* (Marta 58).

Though this disconnection is more accentuated in communities that do not have a nearby park ranger facility, it was also described by Borge (2004) in the management plan of the Costa Rican section of the park. According to this author for most people the park "is not a topic of conversation or concern (…) the park does not bother them, but it does not help them either". However, this perception seems to have started to change in some communities, particularly in those with active local community groups such as Biolley and Altamira, two of the

communities included in this study. In these locations, "local organizations use the park as an emblem (…) and though the general population is less clear about the park, they follow the discourse and seem to think that the park is important because it provides them with water, they go on Sundays to visit the park ranger station, sometimes they get a job in the park and there are possibilities of catering to tourists" (Borge 2004). According to this study when local people feel that they receive a direct benefit from the protected area the distance between people and the park is shortened and some connections, though fragile, start to be built.

Also, it is interesting to note that none of the interviewees included the park as part of nature, even though the protected area legally protects the largest expanse of forest in the region. In this sense, it is possible that for local people the park is interpreted as an artificial boundary, a government instrument to manage nature but that conceptually is not part of it. As Ana (25), referring to illegal hunting as a way to express local unconformity, indicated: *We can not blame nature. It is the human hand that manages it*, making a distinction between nature and the park as a mechanism to conserve it.

This emphasis on the park as an instrument for nature conservation and not nature *per se* also emerges when locals compare the park with the coffee estates that were established in the Costa Rican section during the 1960's and 1970's (See Chapter 3). One of these estates' workers remembers that to enter the property *we had to be granted a permit* (by the company) *to get into Colorado. There was a forest guard controlling the entrance, a park ranger* (Gustavo 57). Using his previous experience and understanding as a reference, the interviewee draws similarities between the management of the park and the management of a coffee estate. Previously, access to the land and its resources was limited by an absentee foreign landlord, nowadays it is restricted by the government. These social exclusions have been the result of both modern agricultural development and the establishment of protected areas, both of which simply disconnect people from the nature they value and need (Pretty 2002b).

6.2.2. Park rationales

It is interesting that, despite the fact that the park was created 25 years ago, there were some respondents that indicated that they did not know why the park was created and some even reduced its existence to a legal document: *The reason to be honest, I don't know. I know that there is a decree but I don't know the number…one is told but it is forgotten* (Jose 60). Most interviewees however, provided three justifications that triggered this decision. These were to

stop deforestation, to protect environmental services and to comply with international obligations.

Some see the park as a barrier to protect nature from destructive human action: *When people got here, they got here looking for land. With the park they got to a limit. It was an eye opener to look for a balance with nature* (Ana 25). Many reflected and agreed with the creation of the park: *as everything was being finished, they created it. If not, it would be pastures from here to Changuinola* (on the Caribbean slope) (Mercedes 52).

Answers regarding the protection of ecosystem services and international importance of the park were vague suggesting a poor understanding of these issues. *It is said that many countries met and created an international park linked to the Mesoamerican Corridor* (Marta 58). *I'm not very sure. Maybe because there are other countries that do not have montañas reserves and this could help them with air purification* (Mercedes 52).

6.2.2. Benefits and costs of park conservation

Answers became more polarized when people were asked whether it was good to live close to a national park. More than half of the interviewees initially responded: "No, I don't know" or "It depends". Though some of these answers could be interpreted as showing poor knowledge about the park's benefits, they could also be pointing out to certain level of disagreement or conflict among some interviewees.

For the ones who provided answers to these questions, appreciated benefits of living near a park included being far from the crowd, good and cool water, pure air, closeness to nature, nice climate and scenic beauty. Urban - rural comparisons came up to emphasize the benefits the park provides to rural inhabitants. Despite these advantages, important limitations were often noted. *Yes, it is good to live near a park as it is healthier but there are limitations as well* (Antonio 65). *It is a problem for those who own land there. They have to move or leave behind what they had worked* (Mercedes 52). *People who live near or in the park have food shortages. One can't even have electricity* (Marta 58).

Many of the interviewees made a distinction between the importance of nature conservation and how this is actually being carried out by local authorities. Ana (25) indicated that *the park is not the problem but MINAE's people* (government officials). Gustavo (57) agrees: *when the park was created it was seen as something bad. A bad reputation was created around MINAE*. Oscar (35) a Costa Rican who worked illegally in the United States

compares the implementation of conservation regulations in the two countries: *The greatest experience has been when I went to the US. There the law is severe and it has to be complied with. Here nobody complies. And they do it differently there. There if you cut a tree they fine you.*

Though these statements about the poor management of the park tend to be harsher in Costa Rica, Panamanians also expressed their unconformity with what they consider is the unfair application of the law. *When they created the park they said that they were going to give something to the people who were there but it was never true. My brother has a piece of land there in Jurutungo that others have attempted to buy several times but he doesn't want to sell. If he wants to cut a tree they don't grant him the permit. An outsider or a foreigner comes and they get the permit* (Jose, 60).

Another Panamanian described in detail the active forest clearing for cattle ranching that is occurring within the park boundaries: *Over there* (pointing to the highlands that are part of the park) *there are a lot, a lot of people. If you go over there you'll find one, farther up another one and so on. They are both coming and going…And it is that those people like to have cattle, a lot of cattle and to have cattle one has to have a lot of land and here there is not enough land. And over there, there is always rain or drizzle and the grass is very green* (Jose 60). Narratives like this are difficult to interpret. They can be simple descriptions of a well known situation or an instrument to indirectly discredit park authorities and large cattle ranchers, here referred as *that those people like to have cattle, a lot of cattle.* But it could also be understood as a way to play down the role of small cattle ranchers in clearing the park's forests.

The uncontrolled expansion of cattle ranching within the park boundaries described above has been analyzed by Panamanian authorities who have argued that this situation has developed due to the lack of personnel and funding to adequately manage the protected area (Pretty 2002a). A study on the expansion of cattle ranching in the Panamanian portion of the park indicates that there are two strategies followed by large cattle ranchers. One consists in moving cattle from their estates located in the drier Chiriqui lowlands to their *fincas* in the park. This is done mainly during the dry season because the grass in the park stays greener for longer due to the influence of the wet Caribbean weather. The other strategy entails buying cattle from smaller *fincas* also located within the park boundaries. In this last strategy, the report states, there is a commercial relationship between the big and small cattle ranchers as the small cattle ranchers buy calves from large producers and after approximately a year they sell the grown cattle back to them. Large cattle owners transport and later sell the cattle

outside the protected area. The report concludes that these practices have encouraged further forest clearing by small cattle producers within the park boundaries (TNC *et al.* 2004).

As mentioned before, in contrast with Costa Rica, in Panama, owners of land within the park boundaries were never compensated and park regulations considerably limited infrastructure development as well as resource extraction. These conservation policies were aimed to discourage new settlements, but given the lack of control, the opposite seem to have occurred. Landowners have found ways to put those lands to work by selling their land rights, renting them to others to exploit and deal with government restrictions or raising cattle that they later sell to large cattle ranchers.

But, as with conservation coffee, cattle ranching in the region is also shaped by the frontier. The existence of active cattle commerce on the Panamanian side of the park has encouraged at least the permanence of cattle ranching on the Costa Rican side, particularly in Las Tablas Hydrological Reserve bordering the Costa Rican side of the Park. Though only one interviewee admitted that *yes, there are still cattle up there, in a little finca where they have a little pastureland that they always look after* (Tomas 75), conversations with both local people and park rangers suggest that one important path used by cattle ranchers to move their cattle within the park is along the Panama-Costa Rica border. This situation, though acknowledged by authorities on both countries, has resulted only in isolated bi-national patrolling (TNC *et al.* 2004; Batista 2005).

6.3. Socially Acceptable Environmental Behaviour

Informants did not admit the influence of government regulations in the development of socially acceptable environmental norms. However, some elements of the legal standards are present in what is currently described as socially acceptable environmental behaviours. This incorporation of legal regulations into socially acceptable norms varies according to the resource being managed and it is greater with respect to forest management than hunting. The adoption of formal regulations as socially accepted norms also seems more heavily dependent on contextual rather than individual conditions as suggested by quantitative findings.

6.3.1. Forest management

Most respondents agreed that it is socially acceptable to cut a tree when there is some personal need as opposed to commercial benefit. It is also acceptable when trees threaten human life or property but always with the condition of planting more to replace the ones that

have been cut. It is not acceptable to cut trees that are close to a water course but the use of fallen trees is considered acceptable if they have fallen naturally (See table 6.4).

Table 6.4 Forest management

Themes	Acceptability	Individual factors	Contextual conditions
Sub-themes	It is acceptable to cut a tree to satisfy personal needs and when it threatens human life and properties It is not acceptable when is near a water course Reforestation is required after cutting a tree	Perceived adverse consequences of cutting the forests	Timber scarcity Economically and culturally acceptable alternatives

All these socially adopted norms are in agreement with the official regulations that apply to forests outside the protected area in both countries. Within the park, cutting trees is completely forbidden. The observed social consent is relevant, because legal norms that have been incorporated into what these societies considered appropriate have a better chance of being complied with. But besides social acceptability, there are contextual conditions that favour or hinder the translation of norms into actions.

In this case, the acceptance of official forest regulations is facilitated by resource access, available alternatives and the perceived environmental consequences. In the studied communities on both sides of the border quality timber is currently hard to find and where it is found it is not economically feasible to extract. Also other construction materials, such as concrete blocks, are easily available and economically competitive and houses built with these materials are considered as representing the higher social and economic status of their owners. Personal observations of the local variations in climate, temperature and water availability are being linked to local forest reduction, further encouraging the social acceptability of these norms.

In sum, both contextual (resource availability, alternatives) and individual factors (personal experience) are at play in promoting the social acceptability of government environmental regulations. This proposition is relevant as the quantitative study, which emphasises the individual rather than the context, proved to be just partially useful in disentangling human – nature interactions in these frontier communities. The qualitative findings presented here confirm the need to incorporate both individual and contextual elements in the understanding

of culture – nature interactions which emerged from the following analysis of hunting regulations.

6.3.2. Hunting

Government regulations in both countries fully proscribe hunting within and outside of protected areas. Consumption of wild meat coming from captive breeding programs is permitted but full documentation attesting its origin needs to be provided. Subsistence hunting is not permitted in Costa Rica but in Panama it is allowed on a case by case basis and is highly dependant on the judgement of on the ground officials.

Despite these regulations, two thirds of the interviewees considered that hunting should be permitted under certain conditions. Responses were highly polarized with women generally opposing hunting and men favouring it. The latter is understandable as hunting is traditionally practiced by men.

Table 6.5 Hunting

Theme	Acceptability	Individual factors	Wider societal issues
Sub-themes	It is acceptable when the species is abundant, it is not endangered, hunt in order to survive, as a subsistence resources for poor families. Also it is acceptable during certain periods, when animals are raised in captivity or when wild animals pose a risk.	Comradeship Personal/physical achievement Culturally beliefs associated to vigour and longevity	Benefits/costs sharing Urban/rural differentiation Poor compliance Illegal hunting as local resistance

According to some interviewees hunting is socially acceptable when the species is abundant or is not endangered. Also it is acceptable when it is a matter of survival when people are *lost in the montaña* or as a subsistence resource for poor families. Others suggest that hunting could be allowed for certain periods and it is acceptable to consume wild meat when animals have been raised in captivity. It is also considered acceptable to kill an animal if it represents a risk to human life or property unless local people are compensated for the resulting losses as Jose (60) points out: *There is also the case of people who own cattle and the jaguar comes and eats them. Nobody compensates for this loss and then the authority comes and they don't want the jaguar to be killed. It is a difficult case*.

And it is indeed a complex matter because hunting is not only appreciated, as subsistence and income generating activity, but it is also linked to feelings of physical achievement and comradeship mainly among men. Furthermore, the preparation and eating of wild meat are entrenched cultural practices often associated to vigour and longevity. Maria, who arrived to the area 60 years ago and who is now 92 suggests: *Yes, I cut the meat, salted it and dried it and we also ate it fresh. We hung it over the fire to dry. I said that that is why I have this life like this. Now, meats are no good… they make one sick...*
These beliefs make the complete abandonment of hunting culturally unviable despite all the accumulated evidence of declining wild populations pointed out by local people themselves.

Furthermore, hunting regulations are also questioned by locals based on how conservation costs and benefits are distributed across different social strata as most people argue that the costs of stopping the activity altogether are mainly paid by the poorest people in these communities. These issues of fairness are also expressed through rural - urban differentiation. This is noted by Oscar (35): *people who live close to the forest and participate in natural resource conservation should be allowed to hunt. Not people from the city or even other communities.* This statement also expresses dissatisfaction with known cases where, despite official regulations, permits have been granted to influential urban based individuals following political pressure (Borge 2004).

Though most of the informants concurred that humans have responsibilities to protect nature they also admitted that compliance with hunting regulations was poor. Reasons given for this incongruity included the lack of an environmental conscience and poor appreciation for nature, short-sightedness and consumerism. Marta (58) describes this: *Also the way of life we have. We are paying more attention to other things. We think that things are going to last forever and we don't have to look after them*. The lack of incentives and alternatives to environmentally damaging behaviours was put forward as a critical issue. Ana (25) indicated that *sometimes it is a mistake to ban and ban but without incentives…. The present costs of these actions need to be analyzed to see if it is really going to benefit future generations*. Based on their own experience, the need for alternatives is also advocated. *Before, trees were cut for necessity because there was no alternative* (to build a house). *Now there are. For example, there are new materials for building* (Antonio 65).

Besides these considerations, it is important to note that feigned ignorance of official regulations and illegal hunting might also be mechanisms to subtly express disagreement and frustration with the implementation of imposed conservation regulations. During the field work there were two cases of hunters coming into the Costa Rican side of the park and

leaving parts of the hunted animal along trails known to be frequently patrolled by park rangers. These actions seem to give a completely different meaning to hunting and it might explain why opinions regarding hunting are so highly debated even within the communities themselves.

Other studies have analyzed these complex and often contradictory behaviours using Scott's Weapons of the Weak (Scott 1985) as an analytical tool (Agrawal and Gibson 1999; Norgrove and Hulme 2006). According to this proposition, hegemonic conservation policy might be challenged by local people from within or from outside the conservation agenda or both using overt or covert mechanisms of resistance. Some low profile, covert mechanisms might include: maintain a positive image with the park staff to reduce attention, make up bad stories about rangers, sign cooperation agreements without commitment and not turn up to government sponsored meetings. Overt resistance on the other hand, might encompass legal challenges, mobilizing support from politicians, threat of violence and actual violence against people and property. Following this approach, some illegal hunting cases could be also interpreted as covert resistance, a mechanism through which the conservation agenda is actively challenged, while at the same time access to a highly valued resource (wild meat) is secured.

6.4. Montaña

Although nature or *naturaleza* is a commonly understood term as proved by the answers provided by the interviewees, there is another concept that was more often mentioned to describe it and that deserves detailed consideration. *Montaña* which translates directly into English as mountain means more than an elevation of the terrain for these colonist communities. The word *montaña* in the context of these peasant colonists also refers to an isolated heavily forested area, frequently described as potentially dangerous, ugly, rugged, cold, dark and damp. These perceptions and feelings are well described in the conversation of a group of men who gathered to clear an area of *montaña* nearly 50 years ago. This story was told by Suarez (76) one of the earliest colonists of these forests:

> *We couldn't sleep. They started to make coffee and to talk about the zone…and the wind, blowing….the serious stuff was the bajareque* (mountain rain). *The bajareque came in a driving downpour. Here we were under the pouring rain, yes…And it was dry season. In the highlands in the dry season it rains hard. It was in the dry season that we were knocking down trees, you see. And chatting…. And that bajareque… and that wind…*

Mr. Caballero says: Did you think of a name for this thing here?
Mr. Elizondo says: No, let's give it a nice name…thinking….
One said something. The other said something else.
Mr. Caballero says: No. The name of this (place) is Jurutungo, he says, because this is the place of the Tulivieja (Weeping woman).
Because it was an awful place… You know what is like to be under that bajareque, pouring… No, it is that, that was awful, beneath the montaña. It is that, that was awful. You know, it's that that was a montaña! It was only like this where we had cleared the trees. I think that the owner had made a palm bower here. And there we were, there… It was cold….

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The Tulivieja is the main figure of a well-known Latin American folktale. She is variously depicted as a grieving widow or a disgraced woman who did not comply with her duties and due to her carelessness her child drowned in the river. She is said to return to earth converted into a horrendous monster wearing rags with her face full of pimples, thin legs, long claw-like nails and her feet reversed. She is also known as La Llorona or the Weeping Woman as she is condemned to look for her child near water courses for ever. Cultural studies conducted in Mexico have shown that La Llorona folktales are often an attempt to inhibit immoral behaviour by illustrating the terrible consequences resulting from failure to follow culturally prescribed norms and behaviours ascribed to each sex as well as marriage obligations (Mathews 2005).

The parallelism established between the *montaña* and the Tulivieja's home, is an indication of the profound cultural meaning that forests had for the region's earlier colonists. The *montaña* was not only something to be afraid of and when local people say *perdío en la montaña* (lost in the montaña) or *hundío en la montaña* (sunk in the montaña), they refer not only to the actual fact of being lost but also to be entangled by mysterious forces beyond human control. Alfonso (74) told the story of a coffin with candles that was said to appear at night on the track that follows the border line between the Panamanian community of Candela and the Costa Rican community of Las Mellizas: *There, the oxen were turned around and went back to Sabalito... Before, there was something scary in that little patch of montaña. They cut that little montaña down and everything finished. There were scares no more.*

From a comparative perspective the meaning that these frontier communities ascribe to the word *montaña* resembles that of wilderness in eighteenth century United States. As Cronon (1995) points out, the most common usage of the word wilderness in the English language

referred to landscapes that were deserted, savage, desolate and barren, and the emotions that were associated to them were bewilderment and fear. According to the same author, the sublime and the frontier were the key conditions for the transformation of the prevalent meaning of wilderness into the foundation of the US environmental movement. The sublime as represented by the association of nature to religious beliefs and the frontier as yearning for the disappearing older, simpler and truer ways, the no man's land.

Those feelings of the sublime and the frontier created the conditions that sparked a movement to protect large extensions of wilderness in what is currently known as the US park system, a symbol of American identity. On the contrary, as explained in chapter 3, in Panama and Costa Rica it was the US liberal ideology that considered wilderness as waste lands that was very influential among the political class and provided the foundation for the discourses of modernity and progress. Its maximum expression can be found in the construction of the Panama Canal, a project conceived and brought to reality by the United States and still regarded as a "victory of progress through human control over nature" (Castro 2005a).

The Costa Rican ecologist Luis Fournier (1979) on the other hand, proposes that the foundation of the culture that regards tropical forests as representations of backwardness and ignorance rests on our Spanish heritage. According to this author, most of the *conquistadores* came from the arid regions of Spain and brought with them production systems, tools and knowledge associated with those environments. For them the tropical forests brought up feelings of apprehension and a compelling need to eliminate them. Both the Spanish *conquistadores* and the North American settlers were peoples who had left their homelands in search of new territories and riches often having to adapt to the new settings. This frontier mentality was also present among the first colonists of the study region and the meaning of *montaña* is an integral part of it (See chapter 3). The effect of the frontier on how these communities perceive and act upon the environment will be further examined in Chapter 7.

Not surprisingly, the word *montaña* is more often recalled by old than young people and used most frequently to describe events of the past suggesting that the expression might be falling into disuse. Its abandonment is probably associated to the loss of *montañas* themselves, but also to a reduction in peoples's interaction with them either by forceful limitation or lack of appreciation or a combination of these factors. These findings provide additional evidence of the intimate culture - nature connection.

A structural analysis of the words associated with *montaña* found ten verbs describing the action of cutting it down, suggesting the centrality these activities had in the life of these

peasant peoples. With the exception of the word *apear* (to take down), which is predominantly used by Costa Ricans, the rest are known to be of common usage on both sides of the frontier. Table 6.5 presents these findings and a tentative translation into English.

Table 6.6 Verbs associated with *montaña*

Spanish	English
Romper	to break
Derribar	to knock down
Tumbar	to fell
Socolar	to clear of scrub
Tirar	to slash
Trabajar	to work
Apear	to take down
Volar	to blow up
Rozar	to clear
Voltear	to turn over

Montaña can also refer to the backwardness of rural areas and it can be used by outsiders in derogatory terms as Rosa (42) remembers: *If we are going to live in another world* (separate from nature), *maybe we are not going to give it much importance. As that lady who came from David…. There are many people who talk about people living in the montaña. But there is good and bad in everything …. clean air, a healthy environment. In the city* (in contrast) *you have to be…..quick…You know?...*

But things have changed and the establishment of the park has marked a clear limit, as Tomas (75) clearly regrets: *….Farther in there are huge montañas….Here, there are no more. No, it will never be possible to establish a town (*there*). That montaña is now well looked after.*

6.5. Cross Country Comparisons

When the content of the interviews was analyzed by country very few differences were found. Distinctions lay mainly in the frequency of the use of the term *montaña* and concerns about increasing migration out of the area. However, strong similarities were found regarding peoples' perception of the unfair implementation of the park regulations. This finding could explain, at least partially, the lack of cross country differences found by quantitative methods as, independently of the adopted management regime, people still consider that the way the park was created and is being managed is inequitable.

During the interviews, Panamanians used the word *montaña* twice as much as Costa Rican interviewees. This might be because two of the three Costa Rican communities under study,

Biolley and Altamira, were established in areas that had been previously cleared and exploited by absentee landowners and therefore were not in much contact with old isolated forests or *montañas* (See chapter 3). In contrast, Las Mellizas in Costa Rica and the two Panamanian communities, Santa Clara and Piedra Candela, were established by poor colonists who cleared large tracts of *montaña* in order to claim the land. Also it is possible that many of the most recent Costa Rican colonizers came from areas previously deforested where the interaction with *montañas* was only part of local folk stories.

The other observed cross boundary difference was that Costa Rican interviewees tended to express more concern about local people leaving the communities. According to survey data, human migration is slightly higher in Costa Rica with 45% households reporting at least one current migrant compared to 39% in Panamanian communities. The migration destinations of these people are detailed in Table 6.7.

Table 6.7 Migration destinations per country

Destination	Costa Rica	Panama
USA	38.9%	10.3%
Other countries	7.5%	7.8%
Urban areas within the region	24.1%	56.6%
Urban areas outside the region	29.8%	25.7%

In Panama more than half of the reported migrants moved to another town within the province (56.6 %) compared to just a quarter (25.7 %) moving to Panama City and its surrounding areas. Only 10.3% had a relative in the US. In Costa Rica, the numbers tell a different story. Nearly 40% had a relative in the US. This number is followed by 29.8% who moved to urban areas near the country's capital and a remaining 24.1% who decided to stay in the region.

In order to account for cross country differences, the role of the already mentioned Chiricano regionalism (see Chapter 3) in maintaining people's attachment to the land needs to be considered. In the only published study that was found on Chiricano regionalism, Coriat (1993) notes that regionalism is the ethnocentric manifestation of a social group. For the Chiricanos its culture is at the centre of social life and other groups within Panamanian society are qualified according to its cultural standards. Chiricano regionalism is rooted in the existence of particular natural and historical conditions some of which ha already been discussed in Chapter 3. These include a variety of ecosystems and natural resources that support prosperous agricultural activities (Illueca Bonnet 1983d; Coriat 1993), the isolation

and centralism of colonial and postcolonial governments that made the Chiricanos develop a sense of independence and autonomy (Coriat 1993; Vega Loo 2000; Gómez 2007) and the success of Chiricano leaders in promoting the idea of the province's singularity (Coriat 1993; Gómez 2007).

In contrast, a strong individualism persists in Costa Rican communities colonized by Cartagos from the Central Plateau (Borge 2004). Cartagos are the result of the mix between Spanish and Indigenous groups, though they describe themselves as white. For the Cartagos, families are considered nuclear instead of extended as in the case of Chiricanos, and tend to present a self-reliant unit both economically and socially. These Costa Rican families also tend to be very protective of their autonomy within the community (Borge 2004). Also contrary to the Chiricanos, the Cartagos are the majority ethnic group in Costa Rica and control the country's government and the economy (Borge 1997).

According to Coriat (1993), attachment to their homeland is one of the components of Chiricano regionalism. In this sense, place attachment could be defined as the affective link that people establish with specific settings, where they tend to remain and where they feel comfortable and safe (Hernández *et al.* 2007). Studies indicate that people who express a rooted sense of place, such as the Chiricanos, are less residentially mobile and are often tied to the land through ancestry and/or family farms (Hay 1998). These investigations suggest that the observed cross boundary differences in migration patterns might be due to a stronger sense of place among Chiricano communities. However, these assertions need to be further studied as well as the influence of education and job opportunities and of informal networks of relatives and friends in the selection of migration destinations.

The more frequent use of the word *montaña* among Chiricanos might also be an expression of their regionalism. According to Coriat's (1993) study, the most common form for the Chiricanos to explain their regionalism is by referring to their attachment and admiration for their land and its diverse natural resources as well as for their success in agricultural production. Not surprisingly then, most of the Chiricanos interviewed during Coriat's study selected a natural feature, the Baru Volcano, as the symbol of Chiricano regionalism.

This cultural regionalism, including attachment to the homeland, might positively influence nature conservation. The literature on place attachment reveals that there is potential for these studies to contribute to our understanding of the relationship between attachment to the land and environmental conservation. Williams and Vaske (2003) developed a two dimensional scale to identify and measure place bonds based on the concepts of place identity and place

dependence. According to these authors, place identity refers to feelings about specific settings including those that provide meaning and purpose to life and place dependence refers to connection based on activities that take place within that setting such as timber harvesting or hiking. Studies of the relationship between place attachment and environmental protection using this scale show that place identity correlates positively with support for park conservation and reduced density of visitors in an Appalachian Trail (Kyle *et al.* 2004). The value of this approach resides in its ability to provide insight into the different meanings diverse stakeholders ascribe to nature and to recommend policies that aim to conserve both culture and nature.

Although awareness that identity is relevant to environmental conservation is increasing, there is a considerable variation in the way researchers study this phenomenon and some conceptual confusion in the use of related terms (Devine-Wright and Clayton 2010). Most of this type of work falls under study concepts such as "rootedness" (Tuan 1980) , "sense of place" (Hay 1998), "place identity" (Proshansky 1978), and "place dependence" (Kyle *et al.* 2004), the terms used often depending on the research discipline. For example, according to Brown and Raymond (2007), sense of place has been the focus of geographical sciences and is the equivalent of place attachment for environmental psychologists.

This thesis starts by referring to Costa Rica's international image as a green nation and the incorporation of environmentalism as part of Costa Rica's national identity. However, in light of the qualitative findings discussed in this chapter, the role of Chiricano regionalism has emerged in addition, suggesting that issues of national and regional identity should be central to this study. In this sense, the introduction to the special issue of the Journal of Environmental Psychology on place, identity and behaviour by Devine-Wright and Clayton (2010), seems to be particularly useful. These authors assert that as natural environments become increasingly salient in the public discourse, the relevance of environment to identity also increases. This is because the discourse leads to an incorporation of environmental matters into identities but also because environmental degradation impacts specific places with the consequent implications for localized identities. These authors make a distinction between place identity and environmental identities based on geographical scope. Therefore, place identities involve more specific, localized experiences and specific memories and emotions, while environmental identities are more general, typically referring to larger areas and broader issues.

From this point of view, human – nature associations in the communities located along the Panama – Costa Rica border seem to be influenced by two distinct process of identity

development. According to this point of view, Costa Ricans seem to have developed what Devine-Wright and Clayton (2010) define as environmental identity, by incorporating nature conservation to the way they see themselves as a nation. The development of the Costa Rican environmental identity is relatively recent, dating from approximately the last three decades. It also seems to be widespread through the country and has been successfully exported globally. Panamanian communities in the Chiriqui province, on the other hand, seem to have developed a place identity that shapes how these people perceive their relationship with their natural surroundings. Place identity is an important component of the Chiricano regionalism, a type of ethnocentricism that has developed in this region through at least two hundred years. This phenomenon is far more localized and seems to be restricted to within the provincial boundaries.

But Devine-Wright and Clayton (2010) go a bit farther to predict the implications of these two types of identity. These authors suggest that it is useful to compare them with other psychological constructs such as attitudes. General attitudes tend to be insufficient at predicting specific behaviours; therefore more general identities should be more relevant to a broader than to a narrower set of issues. According to this point of view, regional identities, such as the Chiricanos', might serve better to promote pro-environmental attitudes and behaviour related to their location than nationwide issues, whereas environmental identities will support conservation behaviours at a larger scale. These assertions require further studies but they undoubtedly represent a promising field of study in human – nature associations in these border communities.

6.6. Summary

Allowing local people to express their own perspectives has helped to expand the results obtained by the quantitative study. The early finding that these peasant communities do not arrange their appreciation for nature along a biocentric-anthropocentric continuum was fully supported by the qualitative inquiry. It is now clear that respondents appreciate their environment based on the benefits it provides but also that religious beliefs and feelings and emotions play an important role.

Qualitative results also showed that focusing only on the individual, as the cognitive model suggests, is only a first step to understanding culture – nature interactions and conservation action. Local contextual factors such as resource scarcity and available alternatives can favour or hinder environmental action by local people. But even if the resource-related context is favourable, conflictive and contradictory behaviours might occur if conservation

policies are perceived as unfair or illegal activities are used as political instruments to express resistance to the conservation agenda.

The mutual influence of natural and social systems becomes apparent when studying the meanings local peoples have developed through time. This study examined the meaning of *montaña,* its decreasing use among generational community groups and the potential influence of primary forest loss and restricted access to the remaining forests in this disappearance. Associated terms and folktales that emerged from experiencing *montaña* are likely to vanish as well.

Cultural identity and power relations seem to be of particular importance in shaping culture – nature interactions. This becomes evident as local marginalized people use human – nature relationships to distinguish themselves from but also discredit urban dwellers, a group that has historically played a dominant role in both Costa Rican and Panamanian communities located in the frontier. The historical relations among societal sub-groups are both inherited and reinforced by the creation of a protected area as the establishment of the park is perceived as another imposition made by the urban decision making centres on marginalized communities through government intervention.

Very few cross – border differences were found. In depth interviews showed that these differences reside in a higher persistence of the term *montaña* among Panamanians as well as a stronger sense of identity and attachment to their homeland expressed in a higher rate of in-province migration. A perceived unfair implementation of conservation regulations is common to both sides of the frontier, suggesting that this factor is more relevant in determining people's attitudes to the park than the management regime adopted for its administration. Though eviction was probably a more forceful way of approaching park conservation, the perceived infringement of the park regulations by politically and economically powerful actors on the Panamanian sector seems to impact negatively people's attitudes about the management of the park.

Despite these conflictive relationships, the influence of government conservation regulations on shaping what is becoming socially acceptable behaviour in these communities is apparent. These influences as well as local people's own experiences and reflections offer common ground for local authorities and communities to further the adoption of new socially and environmentally sound self-regulation. Also regionalism and attachment to the homeland emerge as promising allies in inserting protected areas as a meaningful component of people's daily lives.

CHAPTER SEVEN: GENERAL DISCUSSION

In this chapter, qualitative and quantitative data are integrated to answer the main research questions that this study has aimed to address. These were: do local people structure their relationship to nature as a biocentric – anthropocentric dualism; what are the socio-economic factors influencing these associations; are there any cross border differences in environmental attitudes and behaviours; and finally what other cultural factors shape human – nature interactions in these communities. Both quantitative and qualitative findings have been linked when appropriate keeping in mind the ontological and epistemological differences of both types of data but maintaining a pragmatic approach to the problem as presented in the research design section (see Chapter 4).

This chapter also brings forward some elements discussed in the environmental history and literature review chapters and ties them to the research findings thus providing a more thorough, though complex, picture of culture – nature associations in these communities. It also introduces some contributions of the new discipline of border studies that might help to understand the lack of differences found in environmental attitudes and behaviours across the international border.

Thus, this discussion is divided into five sections. These are: environmental attitudes; attitudes towards the management of the park; conservation behaviours; cross country comparisons; and the frontier.

7.1. Environmental attitudes

Present day culture – nature associations in these communities are the result of the interaction of different worldviews, traditions and practices that has occurred over time. Agricultural practices such as slash and burn and slash and mulch testify to the influence of indigenous practices, while cattle ranching gives evidence of an enduring Spanish heritage. More recently, there has been an influence of North Americans and Europeans in the region who also introduced new ideas and practices such as coffee, garden cultivation and milk and dairy production.

By the 1970's and 1980's the already well established agriculture and cattle ranching expanded considerably when government policies provided the political and economic incentives to incorporate *montañas* or previously isolated forested areas, into the nations' progress and modernity. Apart from being considered as a source of raw materials for

economic development these frontier regions served to decrease, at least temporarily, the mounting social and economic disruption that prevailed in the Central American region at the time.

In search of a mechanism to stop the resulting pervasive forest conversion and degradation, the governments of Panama and Costa Rica embraced the park conservation idea. Up to this point, there was a generalized belief that *montañas* and their natural resources were unlimited and that the only requisite to incorporate them into human progress were hands and minds determined to exploit them. The establishment of the park put a limit to this expanding agricultural frontier and also introduced new rules for people's interactions with nature. Free access to the park's forests was prohibited and frontier colonists re-categorized as squatters. Daily activities that were carried out to make a living such as forest clearing, hunting and logging were declared illegal.

According to this new conservation paradigm people were harming nature, so in order to protect it, human access and use needed to be prohibited or at least partially excluded. As a consequence, human perspectives about nature were defined in two categories, biocentric and anthropocentric, depending on whether the prevailing attitude was to give importance to nature or to humans.

In its first section, this study assesses the success or failure of the adoption of this biocentric - anthropocentric dualism by local communities, 25 years after the creation of La Amistad Trans-boundary Park. Quantitative results from this research indicate that these peasant communities appreciate nature for the direct benefits it provides such as agricultural land, wild meat or construction materials and for long term ecosystem services and benefits for future generations. Intrinsic values of nature, that are at the heart of park ideology, do not appear as a relevant factor to how these communities relate with their natural surroundings. In conclusion, local people have not fully embraced the biocentric and anthropocentric views of human - nature associations but perceive their well-being connected to the land, its resources and ecosystem services.

Furthermore, these apparently opposing views of appreciating both material values and ecosystem services are held simultaneously by the respondents. Thus, one person might value natural forests for watershed protection but at the same time appreciate the taste of wild meat or cut a tree to build a house. The coexistence of what appears to be contradictory environmental attitudes have also been found by other researchers in Latin America when studying environmental attitudes of fishermen in the Galapagos Islands in Ecuador and

students in Mexico and Brazil (Finchum 2002; Bechtel *et al.* 2006 respectively). In contrast, other authors seem to find a more clear separation between anthropocentric and biocentric views in northern societies (Reading *et al.* 1994; Vaske *et al.* 1999; McFarlane *et al.* 2006).

Another important difference from studies conducted in northern latitudes is the lack of predictive power of the individual's socio-economic factors on people's attitudes towards the environment. In North America, young people, women and highly educated individuals tend to have a greater appreciation for the environment (Vaske *et al.* 1999; McFarlane *et al.* 2000; McFarlane *et al.* 2003; McFarlane *et al.* 2006). However, in this study socio-economic factors have a poor predictive capacity of people's environmental attitudes. Only education in the Costa Rican sample was associated with a low appreciation for material benefits but not with a high value of long term benefits of nature.

These quantitative results show that local people have not adopted the people – park separation model. Instead they value nature based on the benefits local communities, directly or indirectly, receive from the forests in a process that requires their interaction with nature. Though this position could be considered anthropocentric, it is not completely opposing conservation ideals as the appreciation of ecosystem services and benefits for future generations is a clear manifestation of people's appreciation of the forests in their natural state, an attitude that offers common ground between local people and environmental conservation.

The quantitative investigation also indicated that the two identified factors, benefits from direct use of nature and ecosystem services, only explain 48.5% of the responses, which raises the question of what other elements might be influencing this association. Studies conducted in the US have shown that the biocentric/anthropocentric scales explain up to 67.5% of the variance of the responses (Vaske *et al.* 1999). These results suggest that there are still other important factors that need to be understood when investigating human – nature associations in these communities.

Using qualitative instruments, this thesis also explores what these other factors might be. In-depth qualitative interviews that gave local residents the opportunity to develop their own ideas about their relationship with nature, confirmed that cognitive elements such as nature's benefits and observed negative consequences of environmental degradation indeed influence how local people understand their rights and responsibilities towards nature. These findings support the adoption of the cognitive model as the theoretical framework to explore the

contribution of cognitive aspects to human – nature associations and establish cross- country comparisons.

However, in depth interviews also point to the limitations of the model in explaining environmental attitudes and behaviours. In this sense, the qualitative investigation found that religious beliefs, feelings and emotions towards nature, positive or negative, play a role in people's perception of the environment as well. Similar results have been found in investigations exploring human – wildlife interactions (Kellert *et al.* 1996; Smith 2006a), which suggests the importance of both cognitive and emotional factors in shaping human – nature interactions in these communities.

Most importantly, nonetheless, qualitative findings also showed the importance of the contextual conditions, particularly the relationships among different actors to how these rural societies perceive and relate to the environment. Among others actors are included government officials, cattle ranchers, members of local organizations, urban inhabitants. In this respect, three societal factors tightly related to each other were identified in the thematic analysis as affecting human – nature interactions. These factors are: rural – urban relationships in the frontier, current rural – urban migration and regionalism and identity.

As presented in Chapter 6, interviewees used appreciation for nature to make distinctions between themselves and urban inhabitants, often referring to the latter as disconnected from nature and cities as places of "death", deprived of natural, organic elements. Interviewees also expressed their resentment at often being regarded, by some urban visitors, as backward and old-fashioned. These sentiments are rooted in the historical marginalized position of these frontier communities in comparison with the main centres of political and economic power located in San Jose or Panama City, the countries' capitals, as discussed in Chapter 3.

In relation to the above, local people also expressed their concern about rural – urban migration. These migration patterns are motivated mainly by a perceived lack of job and higher education opportunities in these communities. Young men are more prone to move from their rural homelands, though promising young women also tend to travel, particularly in search of university education. More often in Costa Rica than in Panama, this issue also extends to international migration as local people, using illegal networks of traffickers or "coyotes" travel to places such as South Carolina, New Jersey and New York to work as agricultural or construction labourers.

According to the qualitative interviews, these rural – urban movements are undermining the rationale for protecting nature for future generations in these communities. Though most survey respondents indicated that it is important to leave a healthy environment to their children, during the in depth interviews it became clear that some respondents have started to question whether, given the generalized lack of interest of the young people in staying in the countryside, having a long term vision for the local conservation of nature makes sense or not. According to some, the well accepted conservation argument of protecting nature for one's children's future is becoming out of date because not only protecting nature has a cost for the present generation but the likelihood that their children will reap the benefits is small considering their lack of interest in rural life and increasing migration to urban areas (see Chapter 6).

Quantitative studies such as the one presented in Chapter 5, though useful for comparative purposes, only tap the cognitive aspects of these far more complex interactions. These research conclusions agree with a analysis conducted by Corral Verdugo and Pinheiro (2009) who have indicated that the dominant approach in environmental psychology reflects the Euro – American individualistic and de-contextualized value system that gives prominence to the analytical capacity of the individual. Thus, the cognitive approach suggests that environmental solutions should be found in the individual and his or her rational processes. However, in Latin American communities, these authors assert, cognitive approaches alone have limited success as emotional attachment and relationships with others are more important than individualism and rationality in these cultures.

In sum, 25 years after the creation of La Amistad Trans-boundary Park, the biocentric – anthropocentric separation model does not describe well how the studied frontier communities structure their relationship with the nature. On the contrary, these communities perceive their well-being linked to nature which provides them with natural resources and environmental services. Also, though these culture – nature associations are affected by people's environmental attitudes, as the cognitive model suggests, the social and political context surrounding these associations has proved to be equally important. According to the qualitative inquiry, broader societal issues such as historical interactions between rural and urban inhabitants, current patterns of rural – urban migration and regionalism and identity might be playing an important role in how these communities perceive their relationship with their natural surroundings.

7.2. Attitudes Towards The Management Of The Park

A Likert - type scale was constructed to measure people's attitudes towards the management of the park administration. Results indicated that people in these communities tended to provide neutral responses to statements referring to the management of the park. Greater agreement was expressed on broad statements related to the effectiveness of the park in conserving natural resources for future generations. Most people, however, disagree with the statement referring to hunting in the park being reduced by the park rangers' effective action.

The identified underlying factor explained only 30.2% of the variance, less than the variance explained by the two factors identified for general environmental attitudes. This result goes in accordance with the cognitive model that suggests that specific attitudes, such as attitudes to the management of the park, are influenced by higher hierarchy factors, such as general environmental attitudes. In fact, the regression model confirmed the influence of general environmental attitudes on people's appreciation for the park though in an unexpected manner as people with high appreciation for material values of nature were found to express higher appreciation for the park. Similar studies exploring community – park relationships in Mount Elgon National Park in Uganda, interpret local people's conformity with park management as a way to reduce attention from park officials while at the same time conducting activities that break park regulations (Norgrove *et al.* 2006). These surprising results seem to point to the highly contested people – park relationships, a key contextual factor not included in the cognitive model.

Again the analysis of qualitative data not only supported but considerably expanded quantitative findings. According to qualitative interviews, relationships with other members of society seem to have a greater impact on local people's attitudes to the management of the park than on general environmental attitudes. An indication of this is that, though the park encloses the largest expanse of forests in the region it was not considered by local people as part of nature. Instead, the park is perceived as an invention of urban- based government officials, another way for the state to take control and administer nature in response to international commitments. "*The park was imposed on us"* indicated one of the interviewees, summarizing this point. And the fact is that relationships between the state and frontier people have been historically driven by foreign interests often in detriment of local interests. The establishment of banana plantations, the definition of the border and the construction of the Pan-American Highway discussed in detail in Chapter 3 are examples of this style of conducting public policy. Such experiences seem to be used as a reference in order to

understand the establishment of the park, another project based on international conservation ideas.

Increasing rural – urban migration was another factor identified as having important implications for park conservation in these communities. This is the case because the most talented young people are often the first ones to migrate, reducing communities' social capital, a fundamental element for sustainable livelihoods (Borge 2004). Four key aspects of social capital, relations of trust, reciprocity, common rules and sanctions and local networks and groups are particularly lost when people abandon their homelands. In this way, migration of young people to urban centres reduces the local capacity to participate in conservation projects and therefore the opportunity of the park to provide concrete benefits and become meaningful to local communities.

Despite the park being considered as a political construction, local people recognized that the park has been effective in stopping deforestation and acknowledged the role first colonists had in environmental degradation. However, local people also indicated that the costs and benefits of park conservation are not being equally distributed across different societal groups. In Costa Rica, eviction is regarded as unjust and economic compensation is often considered as inadequate, particularly for poor farmers (see also Schelhas and Pfeffer 2008). In Panama, small farmers who own land within the park are still waiting for economic compensation while influential cattle ranchers illegally expand their business within the park boundaries. In both countries local people resent this unequal implementation of park regulations and complain about the lack of economic alternatives and incentives for nature conservation and the unfair application of environmental regulations. Thus, though in theory eviction and zoning are different management strategies local people perceive them as equally unfair. This generalized perception regarding the unfair on-the-ground implementation of park regulations might account for the lack of observed cross-country quantitative differences particularly in a frontier regions were the enforcement capacity of state actors is often limited. This point will be further developed later in section 7.4.

At this point it is important to note that scales developed during this study have some limitations. The environmental attitudes scale, for example, does not have an equal number of bio-centric and anthropocentric items. Also the attitudes to the park management scale lack a balance between negative and positive statements with a higher number of the latter. These limitations should be taken into account when analyzing these results and conducting further research.

7.3. Conservation Behaviours

The establishment of the park meant a change in what was considered to be appropriate regarding local people's actions upon their natural surroundings. Three proxy measures of pro-environmental behaviour were designed in this study, given the difficulties of directly assessing compliance with park regulations. The first one of these alternative measures assessed pro-environmental actions that the interviewee had taken in the last six months, the second one aimed to assess the impact of such activity on environmental conservation and the third one measured the level of adoption of environmentally friendly coffee practices.

The level of complexity of the proxy measures increases from the first one to the third one as greater conservation impact often implies greater costs and risks for the individual or the household. The first measure aimed to know whether the person has actually done something for the environment in the last 6 months. Older people and those with higher appreciation for ecosystem services and bequest values tended to provide a positive answer to this question. The belief the person holds about what constitutes an environmentally friendly action is another factor that influences this self reported behaviour. In some cases such as garbage burning, this belief proved to be inaccurate. This finding indicates that besides environmental attitudes and social characteristics of the interviewee, beliefs are another factor with the individual that is relevant in shaping behavioural intentions. These results go in accordance with the cognitive model's predictions and provide support for environmental education programs that aim to offer accurate information to the public about the benefits or dangers that specific behaviours can have for the environment.

However, when the conservation impact is considered, results tell a different story. Neither the individual's psychological (environmental attitudes and knowledge) or socio-structural variables had a significant influence on the environmentally significant behaviour in general (second proxy measure) or on the adoption of coffee conservation practices in particular (third proxy measure). These findings indicate that the predictive capacity of the cognitive model becomes limited as the complexity, personal costs and risks and conservation impact increases. These results also suggest that more attention needs to be given to the context in facilitating or hindering complex environmentally friendly behaviours.

In this respect, qualitative interviews show that government regulations have played a role in shaping local people's relationships with forests. For example, cutting a tree is considered appropriate only if there is a risk to human life or property or when is it going to be locally used for construction purposes, but it is not considered appropriate when the tree is close to a

water course or within the park boundaries. Reforestation is regarded by local people as essential to ensure resource sustainability. All these currently considered desirable behaviours are part of the government regulations that make sense from people's own perspectives and have been validated based on people's own experience interacting with these forests. It is likely that these conditions have favoured their general social acceptability.

However, not all government regulations have been equally accepted, hunting being a case in point. Though there are local people who oppose hunting, there are others that argue that it should be allowed but regulated based on different parameters such as species abundance, time of the year or risk to human life or property. Others argue that hunting should be allowed for subsistence purposes. However, most interviewees tend to disagree with people from other communities coming to hunt in the nearby area or the use of hunting to challenge park authority, considerations that point to the importance of relationships with other societal groups (community outsiders) and actors (state). Other studies have also found that household consumption of wild meat depends less on natural abundance than on cultural preferences and socio-economic and political factors (Barucha *et al.* 2010).

Figure 7.1 shows the factors identified during the in-depth interviews as having an impact on the incorporation of conservation regulations as part of socially accepted behaviours. Three general factors are indicated: individual's characteristics, contextual factors and the frontier. Arrows located on the border of the individual's characteristics indicate that the influence of these factors might expand or contract depending on contextual conditions. Among the contextual factors are cultural preferences, economic and social considerations, the physical environment and relationships with others. The frontier effect will be discussed in the last section of this chapter.

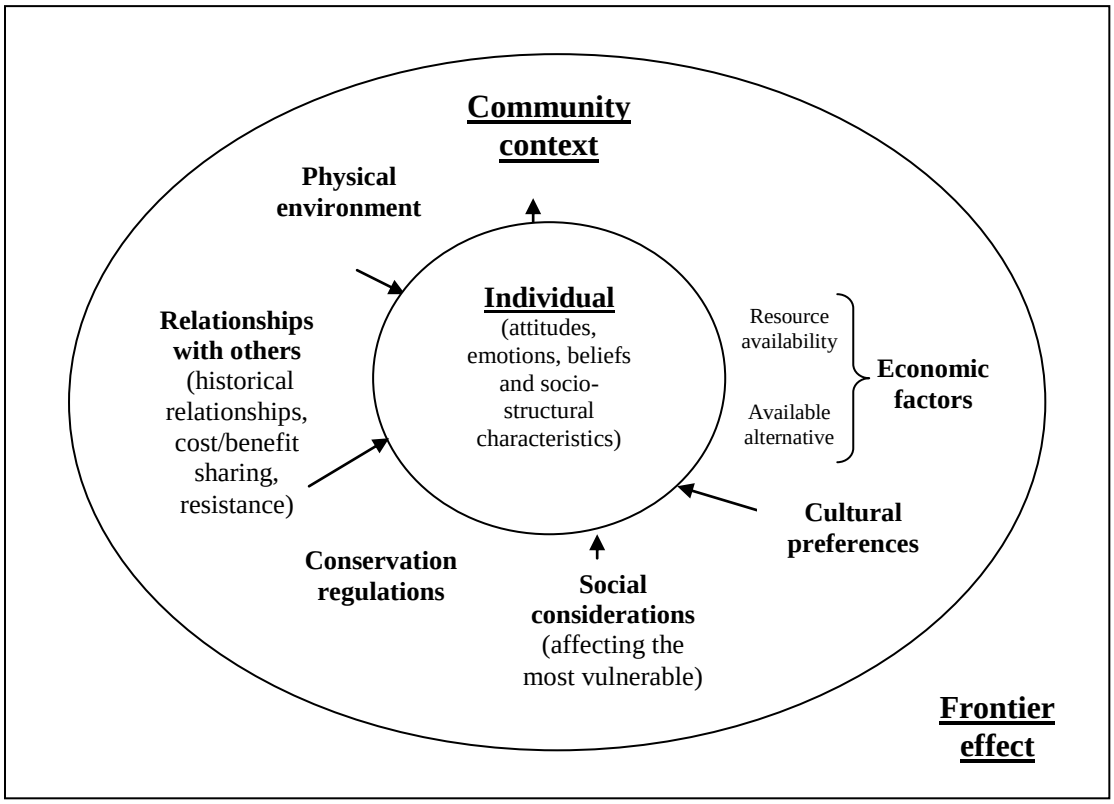

Figure 7.1 Factors influencing social acceptance of environmental regulations.

These findings indicate that, as with international conservation ideas that are not fully adopted by national governments but negotiated depending on the countries' characteristics at the time of declaration (see Chapter 2), the social acceptance of conservation regulations is negotiated between local communities and local authorities during on-the-ground implementation of park regulations. Without this social consent, the application of conservation norms becomes unfeasible and a source of permanent conflict. These multi-scale processes bring to light the complexity of implementing trans-boundary conservation and emphasise how different stakeholders exercise their power at different scales. It also points to the need of involving all these relevant actors at the appropriate scale if nature conservation is to be attained. These contentions, about local people's not passively accepting conservation regulations but *de facto* negotiating them, are likely to be more accentuated along international borders as further supported by evidence provided by border studies, as will be discussed later in section 7.4.1.

7.4. Cross-country Comparisons

A main objective of this thesis was to understand whether the adoption of different management regimes on both sides of the border had an effect on local people's current attitudes to the environment in general and the park in particular. This research objective guided the selection of the biocentric - anthropocentric dualism which ties well with the human – nature separation and inclusion models that the two management regimes represented in theory in the two countries. It also determined the selection of communities which had to have the same basic characteristics in order to isolate, as much as possible, the management regime as the main variable under study.

In addition, with the aim of ensuring, as much as possible the comparability of the country samples, the socio-economic characteristics of the interviewees per country were compared. Results showed that only age was slightly different, the Panamanian sample being older that the Costa Rican one. This age difference was considered unimportant as further regression analysis with the whole sample showed that age does not affect people's environmental attitudes or behaviours.

Cross country comparison findings show that people in both Panamanian and Costa Rican communities have not adopted the human – nature separation model, and that there are more similarities than differences across the international border. The three main quantitative variables under study, general environmental attitudes, attitudes towards the management of the park and environmental behaviour, proved to be very similar on both countries. Most differences are very small or in some cases seem to be still developing.

Though there were no statistically significant differences in terms of environmental attitudes, some differences on how human – environment relationships are cognitively structured were present. Costa Ricans make a clear distinction between long term (environmental services/bequest values) and short term (direct) benefits from nature. Panamanians, on the other hand, tend to lump together environmental services/bequest values and subsistence values of nature and consider economic benefits from nature as a separate category.

It is possible that implementation of different park management regulations are leading to these embryonic differences by providing a theoretical basis for both Panamanians and Costa Ricans to understand what is environmentally acceptable and what is not. As mentioned above according to Panamanian regulations, the park protects ecosystem services and bequest values and allows extraction of natural resources for subsistence but not for commercial

purposes. These regulations help to explain why Panamanian attitudinal responses lump together when they are deployed graphically (see Figure 5.20).

Another difference found was that Panamanians use the term *montaña* twice as much as Costa Ricans. The term *montaña* here is identified as having some similarities with the term wilderness coined in the US to refer to desolate, wild places located on the colonization frontier, though in Latin America the origin of the term and its cultural meaning are more likely to be inherited from the Spanish perception of the tropical forests as *mare magno e inculto*. These cultural perceptions of the forests as an obstacle to modernity and human progress were further supported by economic policies adopted by the modern liberal states and together responsible for the environmental degradation witnessed in the Central American region during the 1970s and 1980s and that, among other things, led to the creation of the park. In this sense, Panamanians might have used the term *montaña* twice as frequently as Costa Ricans, because the majority of the Costa Rican colonists arrived to the region when most of the forests had been cleared by their previous land owners (see Chapter 3).

Another potential explanation for this cross boundary difference might relate to Chiricano regionalism. As Coriat (1993) demonstrated in her study, Chiricanos feel proud of the diversity of their province's natural resources, including *montañas*. Furthermore, in Coriat's investigation, a natural feature, the Baru Volcano was selected as symbol of the Chiricano identity by most of her interviewees. A tendency to stay within the province's boundaries, which is another aspect of place attachment, was also found among Chiricanos but not as much among Costa Ricans. Some Chiricanos even inferred that moving outside of their province to Panama City is "*done as a last resort or only for a short period of time*" (Luis Sanchez and Jorge Pitty, personal communication). Other place attachment studies conducted elsewhere have shown that people who feel this affective link to their homeland tend to stay as they feel more secure and comfortable (Hay 1998; Hernández *et al.* 2007). Similar research has also demonstrated that people in communities with strong place bonding are more cohesive, identify more landscape values and tend to support their conservation (Kyle *et al.* 2004; Brown and Raymond 2007).

Regarding the management of the park, there were no quantitative cross country differences found. Though in both countries respondents tend to provide neutral responses to these statements, these were more frequent among Panamanian interviewees. This could be interpreted as Panamanians feeling less competent or knowledgeable regarding park management in general compared to Costa Ricans who are more acquainted with the park

conservation discourse. Or it could be also due to Panamanian's reluctance to openly express a negative opinion about the administration of the protected area. More important than these small distinctions, however, are common issues shared across the international border such as unfair application of conservation regulations and benefits/costs distribution.

There were no differences found in terms of environmental action between the two countries either. This is surprising particularly in the case of the adoption of conservation coffee practices because Costa Rican communities under study receive better prices for conservation coffee than for conventional coffee while Panamanian communities do not. Two factors potentially explain these findings. One is that the sharp increase on agrochemical prices has affected both sides of the border and coffee farmers have become "organic" not because they are necessarily more environmentally aware or receive an economic incentive but because they can not afford to pay the current agrochemical prices.

The other factor that might account for the lack of difference regarding the implementation of environmentally friendly agriculture refers to the frontier effect. Being close to an international border expands the opportunities to sell and buy products at competitive prices. In this sense coffee smuggling through the frontier has been reported since 1920 (see Chapter 3) and still continues today in some cases with support from local authorities (González 2008b; Lorenzo 2009). The direction in which coffee and other agricultural products informally cross the border is highly dependant on the demand and prices being paid on each side. According to some members of the communities, when there are shortages of organic coffee, this product is bought from Panama by Costa Rican buyers who process and export it as a Costa Rican product. The location of these communities along the international border creates special conditions, like this one, that need to be considered when trying to understand the adoption of conservation behaviours in these frontier regions.

7.5. The Frontier

As countries, Panama and Costa Rica are very different. Panama's destiny has been determined to a great extent by its natural condition as the narrowest part of the Central American isthmus. As such it has been a preferred communication route between the Caribbean and the Pacific Oceans since the time of the Spanish arrival. Its natural "vocation" has also produced what is known as a "transitist" society focused on providing services to world commerce in detriment of other activities such as agriculture and industry (González 2008a). In contrast, Costa Rica developed a culture around agriculture, particularly coffee, which has become a symbol of the country's identity. To peasantry, whiteness and peace,

Costa Ricans have successfully added a fourth element, the environment. Though the debate still persists about Costa Rica's effectiveness in protecting its biodiversity (Boza *et al.* 1994; Hunter 1994; Campbell 2002a; Campbell 2002c), the country is internationally considered among the three most environmentally friendly nations in the planet (Emerson *et al.* 2010).

Despite these divergences, however, this study showed that in the Panama – Costa Rica border area, local people share similar environmental attitudes and behaviours and that these do not reflect the people – nature separation implicit in park conservation ideology. On the one hand, these findings suggest that the argument of Costa Rica as a green nation is not valid in the frontier area, as there were no statistically significant cross border differences found. In this respect, it could be argued that the similarities are the result of Chiricanos showing higher levels of environmental attitudes and behaviour than the rest of Panamanians, given their strong regionalism and connection to their homeland. Conversely, it could be assumed that Costa Ricans in the frontier have lower levels of environmental conscience than the rest of their compatriots, given their marginalized position in Costa Rican society. Further comparative research needs to be conducted to explore these alternatives.

The observed cross-border similarities, on the other hand, might also be the result of the singular conditions that are at play in the frontier. This location might attenuate the influence of what could be labelled as "the national", allowing the emergence of shared cross boundary environmental idiosyncrasies. This notion of spaces along international borders as depicting particular features that set them apart from the dominant cultures of the countries they politically belong to is a primary justification for the emergence of the discipline of border studies.

7.4.1. Border studies

Historically, border studies concentrated on the processes involved in the establishment of international borders brought about by the creation of nation states and the potential for conflict and cooperation among newly established countries (Koff 2010). More recently, the globalization phenomenon, the notion of a borderless world and the implementation of economic and political regional integration mechanisms have posed new challenges to border studies. These new challenges have motivated the introduction of innovative analytical approaches, some of which might be useful in understanding the lack of cross border differences in environmental attitudes and behaviours found in this study.

New approaches in border studies have identified frontier regions as socially constructed territories that show features that are similar to those of independent government systems (Koff 2010). For this reason, recent studies have examined the creation of political trans-boundary institutions, trans-boundary identities, the expansion of trans-frontier markets and trans-frontier social movements. These approaches however, have been criticized for their marked support for trans-frontier integration and cooperation as a key strategy in a globalised context, without critically analyzing the processes that led to such assumptions. Also, up to now, border studies lack a unifying theory that could propose answers to questions such as why integration has occurred in certain frontier areas while not in others or what is the best way to promote trans-boundary cooperation (Koff 2008; Koff 2010). Despite these limitations several studies have effectively provided evidence that trans-frontier regions frequently develop autonomy and separation from state political actors and central governments (Balbuena Bello 2001c; Balbuena Bello 2001d) .

The uniqueness of the border regions, which is a main assumption and justification of border studies, is determined by two elements that coincide in these geographic spaces: the border and the frontier. The international border is the imaginary line that defines the limits of the sovereign territory of the nation states. Sometimes these borders are materially demarcated but more often they are not. The history of their definition and demarcation is frequently associated to some level of conflict and involvement of extra-regional interests (see Chapter 3). The frontier, on the other hand is the result of both the location of the political boundaries frequently in remote, isolated regions and the settlement of the borderline. The frontier is the no-man's land, a cultural construction, a transition between adjacent cultures. Both the symbolic and physical demarcation of the international border makes possible the existence of a frontier, as an unruly territory where the transgression of the boundaries becomes an aim and a way of life (Medina García 2006).

This notion of the border regions as having a unique character is contrary to early studies on globalization which postulated a widespread dominance of "the global" over "the local". Actually, recent research on these social processes and adaptations occurring in border regions indicates that the opposite might be happening. Globalization does not necessarily undermine the notions of "the region" or "the local", instead global forces might be reinforcing them by creating new frontier identities (Balbuena Bello 2001d).

In his study of environmental conflicts in South America, Gudynas , found that there are two conditions that are pervasive to these frontier regions: a generalized weak presence of state institutions and a strong concentration on free trade of products and services. These regions

mostly lack adequate health, education services and infrastructures, such as roads and aqueducts. Citizens' rights are often not protected and administration of justice is limited. Most state entities are concentrated in promoting and facilitating exports of natural resources, manufactured goods and services under the principles of free trade and global commercial networks. Important economic and political interests support such exports and local authorities might offer some "flexibilities" in terms of customs, migration requirements or environmental quality, which lead to poor governance and pervasive lack of legitimacy of state institutions among local peoples (Balbuena Bello 2001b).

Another feature of frontier regions is what Gudynas (2001a) has called "fragmented geographies", the uneven distribution of certain key conditions across the frontier landscape. Thus, frontier regions tend to portray both zones with a stronger presence of the state, usually urban centers, and extensive zones where the state presence is partial or non- existent. Also frontier areas are characterized by "enclaves or nodes" where natural resources and agricultural products are extracted, processed and sent directly to places to be exported often through regionally located maritime ports.

7.2.2. Border studies and human – nature interactions in the Panama – Costa Rica frontier

These notions of the frontier as a unique, culturally created space, characterized by limited institutional capacity and legitimacy of state actors and the dominance of commercial interests describe well the Panama - Costa Rica border. A line of small shops are found along the borderline that separates Las Mellizas and Piedra Candela, two of the communities under study. In these shops both Panamanian and Costa Rican products are sold and both currencies equally accepted. As there are several mobile communication companies that offer competitive prices in Panama whereas in Costa Rica these services are nationalised and therefore only provided by the government telecommunications company, it is common to observe Costa Ricans using Panamanian cell phone chips and pre-paid cards in different towns along the international border. These free commercial relations also work the other way. Panamanians searching for medical assistance cross the border to go to the San Vito hospital, a Costa Rican government facility that is considered better equipped than any of the health services provided on the Panamanian side (Batista 2005).

The Panama - Costa Rica frontier region is also very sensitive to the ups and downs of the regional and global markets as suggested by border studies. As the international price of bananas has been steadily decreasing, the banana company that once had a great influence on

the frontier definition ended its activities in the frontier region of both countries about 10 years ago. Now part of the territory previously occupied by bananas has been converted to oil palm production which is currently being sold at a good price.

A closer look at the environmental history of the studied region (see Chapter 3) shows that the concepts of border and frontier have been closely tied. The conditions that led to the final definition of the Panama – Costa Rica border, particularly the construction of the Inter-American highway, also led to the opening of a new frontier, the then isolated montane forests of western Panama and eastern Costa Rica. Fifty years ago, these remote forests represented the frontier for influential Costa Ricans who occupied large areas of these forests and for landless peasants who spearheaded the colonization of these forests on the Panamanian sector (see Chapter 3). These forests were the barrier that needed to be overcome to give way to human progress. Twenty five years later, however, a new limit was put to this human endeavor. Also in response to international interests, a new boundary was drawn to protect the remaining forests from human destruction by stopping the colonizing frontier, this time in the form of a Friendship (La Amistad) trans-boundary Park. This new limit left these communities in a corner, a triangle made up of the international border and the park boundary and the frontier effects generated by both (see Figure 3.1. in Chapter 3).

More specifically, two concepts brought about by border studies assist in understanding the lack of cross-country differences. These concepts are the uniqueness of the border regions and the pervasive poor capacity and legitimacy of state actors. The concept of frontier idiosyncrasies is particularly useful in explaining why the Costa Rican conservation discourse seems to re-shape itself to better respond to the conditions of the international frontier region. In its frontier version, the conservation discourse of park officials tends to depart from the dominant Costa Rican environmental perspective of biodiversity preservation to favor the equal appreciation of ecosystem services and natural resources for the well-being of local communities, a vision similar to that of the neighbouring Panamanians. Other features of the Costa Rican identity such as coffee as a symbol of economic and social status remain intact, though. Similarly, on the Panamanian side the transitist culture widespread in central Panama diminishes as it reaches Chiriqui province. Contrary to the rest of the country, this province is distinguished by its inhabitants' strong regionalism, attachment to the land and agricultural success. In both cases, the predominant national cultural patterns seem to dilute along the international border and what remains of them seem to overlap to conform a unique frontier dynamic.

The shared weak presence of state institutions is also useful for understanding similarities found across the border. Despite, its pro-environmental reputation, the institutional capacity of Costa Rican environmental authorities is very similar to that of their Panamanian counterparts. During the field work for this thesis there were only one park director and seven park rangers on each side of the border. As these park rangers take turns, most frequently there were only between three and four of them working at the same time.

The poor government capacity and "flexibility" prevailing in the Panama – Costa Rican frontier that has been widely recognized (Batista 2005; Rivera 2008; Lorenzo 2009) offer challenges and opportunities for conservation action. As this study has shown, despite the lack of economic incentives for the cultivation of environmentally sound coffee that are in place in Costa Rica, some Panamanian farmers have also embraced conservation coffee production. Though this might reflect increased environmental awareness or limited financial capacity to cope with the increase of agrochemical prices, a third explanation might be found on the informal trade of coffee that has historically occurred along the international border (see chapter 3).

In conclusion, using border studies as an explanatory framework, it has been argued that the location of this study in the Panama - Costa Rica international border region has important repercussions on the observed cross-country similarities. In this sense, "the frontier effect", particularly the emergence of a unique, frontier culture, the pervasive weak capacity of state institutions and a strong focus on trade of products and services, are key factors in the understanding of the equivalent levels of environmental attitudes and behaviours found on both sides of the border. If this is the case, it can be hypothesized that if the "frontier effect" can be controlled for by conducting similar studies in communities surrounding national parks that more closely respond to the countries' dominant culture and where government presence is stronger, cross country differences would perhaps be more evident.

CHAPTER EIGHT: CONCLUSIONS AND RECOMMENDATIONS

This final chapter summarizes the most important conclusions of this thesis. These general conclusions are divided in four main topics: environmental attitudes, park protection, conservation behaviours and cross-country comparisons. Based on these main findings, recommendations for both research and conservation policies are also presented.

8.1. Conclusions

8.1.1. Environmental attitudes

Present day people – nature interactions in this frontier region are the result of the dynamic interplay of different cultures that has occurred through time and still continues. The establishment of the trans-boundary park was an important event as it introduced new rules for people's interactions with the natural environment, particularly the human separation from nature.

However, in response to the first research question, both the quantitative and qualitative investigations of this thesis have shown that, these communities do not structure their association with nature as a simplistic dualism but as complex interactions in which relationships with other members of society are also important. This is the case as biocentricism as the value of nature for its own sake, which is at the core of park conservation strategy, is not a main factor influencing appreciation of nature in these rural societies. Instead, two elements were identified as having an impact on people's appreciation for nature: ecosystem services and benefits for future generations on one hand and direct use of natural resources for subsistence and economic income on the other.

These apparently contradictory views are held simultaneously by the respondents, thus indicating that culture – nature associations in these local communities are not a case of binary categories such as anthropocentric and biocentric but instead describe a more dynamic and complex relationship in which local communities recognize the link between human well-being and nature. Also, in contrast with studies conducted in northern latitudes, the socio-economic characteristics of the individual are not useful to predict people's attitudes towards the environment. Only education was found to be associated with a low appreciation for the direct use of natural resources but not with higher appreciation of ecosystem services.

When people were allowed to express their own opinions, through the use of qualitative methods, further evidence of the absence of a nature – culture dualism in how these communities related to their natural surroundings was found. In depth interviews showed that cognitive elements such as nature's benefits and observed negative consequences of forest degradation indeed play an important role in how local people structure their associations with the natural world, which goes in agreement with the cognitive model propositions. However, qualitative findings also point to the partiality of this model as wider societal issues such as regionalism, in particular emotional attachment to the homeland, power relationships between rural and urban inhabitants and rural-urban migration, emerged from the interviews as being relevant to these frontier cultures' associations with nature.

This complex association between natural and cultural systems also became apparent when analyzing the meaning of the term *montaña*. Though this term shows some similarities with the North American concept of wilderness, it is also likely to be linked to the Spanish visualization of tropical forests. The use of the word *montaña* and the associated folktales is decreasing. The impact of primary forest loss and restricted access to these remaining forests on their disappearance requires further study.

8.1.2. Park conservation

People in the studied communities rated the management of the park as acceptable. Though interviewees tend to recognize that the park has been effective in stopping deforestation and acknowledge the role first colonists had in environmental degradation, they also point to inequities in sharing the costs and benefits of park conservation among different societal groups, even internationally.

In this sense, qualitative investigations showed that relationships with other groups of society are particularly influential on local people's attitudes to the management of the park. The park is considered not only disconnected from local life but interpreted as another way for the state to administer nature in response to international commitments and in detriment of local interests. Historical relationships between the state, foreign interests, influential local actors and local communities serve as frames of reference that local people use to understand the establishment of the park and the application of environmental regulations. Also increasing rural-urban migration is having its implications for park management. Migration of young people not only reduces the social capital of the communities but undermines the rationale of protecting the park for the benefit of future generations.

The scales developed in this study, however, have some limitations. A better balance between the number of anthropocentric and biocentric items should be pursued in future studies. Similarly, the attitudes to the park scales requires equal number of positive and negative items in order to fully ensure that this imbalance does not result in a response bias.

8.1.3. Conservation behaviours

When studying the adoption of conservation behaviours, older people and those with higher appreciation for ecosystem services and bequest values more often report simple tasks in favour of the environment. However, these behaviours are highly influenced by the beliefs that the person held about what constitutes an environmentally friendly action. These beliefs sometimes proved to be inaccurate. This influence of knowledge on environmental behaviour goes in accordance with the cognitive model and provides scientific support for environmental education programs that aim to provide accurate information to the public about the environmental benefits or dangers of specific behaviours.

The predictive capacity of the cognitive model becomes limited however, as the complexity, personal costs, risks and impact of conservation actions increase. No associations were found between individual's socio-economic characteristics, environmental attitudes and knowledge on the adoption of high impact environmental behaviours or the adoption of environmentally friendly coffee practices. These results suggest that providing accurate information alone will not encourage such complex environmentally friendly practices.

Government regulations seem to have had an important influence in shaping what is currently considered socially accepted conservation behaviours. The adoption, however, is selective and varies according to the resource being managed and is greater on forest management than on hunting and it is more heavily dependant on contextual factors than on the characteristics of the individual. Among these contextual factors are cultural beliefs, resource scarcity and accessibility, economically and culturally available alternatives and rural – urban power imbalances. Government regulations have a better chance to be incorporated when these norms make sense from people's own perspectives, have been validated based on people's own experience and do not exacerbate differences among society's sub groups, such as poor farmers and influential cattle ranchers and urban dwellers. The selective incorporation of government regulations as socially accepted behaviours shows that these norms are not simply accepted but negotiated between local communities and local authorities in these frontier locations.

8.1.4. Cross- country comparisons

In order to address the second research question of this thesis, environmental attitudes, attitudes towards the management of the park and pro-environmental behaviours were compared across the international border. Results show that these three variables are very similar in both countries, thus not supporting the argument of Costa Rica as a nation with higher levels of environmental conscience. A potential explanation for these findings resides in the singular conditions that are at play in the frontier. The marginalized conditions of these locations, the weak presence of the state and the concentration on trade result in an attenuation of "the national" to give way to the emergence of shared cross boundary environmental idiosyncrasies.

Despite this general lack of statistically significant differences, qualitative distinctions in the cognitive structure of environmental attitudes were identified. Costa Ricans make a clear distinction between long term (environmental services/bequest values) and short term (direct) benefits from nature. Panamanians, on the other hand, tend to lump together environmental services/bequest values and subsistence values of nature and consider economic benefits from nature as a separate category.
These small differences might be related to the way park conservation discourses have been presented to local communities on both sides of the border. On the one hand, Costa Rican park authorities, based on the content of the decree, make more emphasis on the role of the park in conserving biodiversity. Panamanian field authorities, on the other hand, allow hunting, logging and forest clearing for subsistence but not for commercial purposes. The countries' peculiarities in the way the park is justified and the use of its natural resources regulated at the local level might be providing a theoretical basis that people use to shape their own ideas about what is environmentally acceptable and what is not.

Another distinction is that Costa Ricans' environmental and park attitudes are more easily predicted by socio-structural characteristics. Costa Ricans with more years of formal education tend to have less appreciation for the direct use of natural resources and lower opinions regarding the management of the park. Interestingly, though, education did not contribute to higher appreciation for environmental services and bequest values among Costa Ricans. In contrast, in the Panamanian sample none of the studied socio-structural characteristics of the individual predicted their environmental or park attitudes.

In both countries people tend to give a neutral response to statements aiming to assess their attitude about the park administration. Though in one country eviction was implemented

while in the other zoning was the selected management option, from local people's perspectives these differences do not seem to be that relevant. Instead, 25 years after the creation of the park, local people on both sides of the border share a generalized perception of the unfair implementation of environmental regulations and unequal distribution of the benefits and costs of environmental conservation. Other potential explanations for these similarities in cross-border attitudes towards the park that require further investigation include the possibility that the impact of park-related displacement which occurred in Costa Rica might not have affected local livelihoods severely or that alternative livelihood strategies were available to mitigate this impact. Unfortunately, a pervasive lack of documentation on the eviction process among both government institutions and conservation organizations hampers the study of these propositions.

Another observed difference was that the selection of neutral responses to park management issues was more common among Panamanians than Costa Ricans. This could be interpreted as Panamanians feeling less competent or knowledgeable regarding park management compared to Costa Ricans who are more acquainted with the park conservation discourse. It also could mean that Panamanians are less willing to state a negative opinion about the park administration.

It is also interesting that despite the fact that the Costa Rican communities under study receive better prices for conservation coffee than Panamanian communities, no cross border differences were found in the adoption of environmentally friendly coffee cultivation. Though there might be a rise in environmental awareness among coffee farmers, it is also likely that sharp increase in agrochemical prices has forced some farmers to reduce agrochemical input and by default change to "organic" production. A third potential factor might be related to the location of these communities in the frontier, where agricultural products are often smuggled through the border. These associations require more in-depth research.

Finally, qualitative findings showed that Panamanians use the word *montaña* twice as frequently as Costa Ricans. This finding together with the tendency of Chiricanos to stay within their province's boundaries could be interpreted as a manifestation of their attachment to their homeland. This result together with the incorporation of the environment as part of the Costa Rican national identity suggest that identity is an important factor in determining human – nature associations in these communities and has the potential to positively influence nature conservation.

8.2. Policy and research recommendations

This section aims to address research question four, regarding the implication of this research for both conservation management and research.

8.2.1. Increased local participation

Conservation programs should take advantage of the environmental appreciation for ecosystem services this research has identified in these communities to actively engage them in the protection of the forests that are relevant for them and for nature conservation. This proposition is also supported by the data suggesting that government regulations are not passively accepted by local communities but *de facto* negotiated with field authorities, particularly in these frontier localities were the presence of the state is weak. These findings show that common ground exists and that opportunities should be opened for increased local participation in management decisions and benefits under schemes such as shared responsibilities and co-management. Caution should be taken though not to increase power imbalances among different societal groups.

This thesis has found that though the formal creation of a trans-boundary park by national authorities is important to encourage cross-boundary conservation, it is the daily interaction between park officials and local people that finally decides the level of protection achieved. Given the attention that conservation organizations have given to the formal creation of these trans-frontier protected areas and that the opportunities for further adoptions decreases over time, the findings of this research suggest that a change in focus and resources is appropriate. In this respect, it is suggested that trans-boundary conservation initiatives give more attention to the role local structures are playing in on-the-ground trans-frontier conservation. Also, conservation practitioners should consider that though important in offering structural opportunities, government bi-national agreements tend to be politically complex and tend to reaffirm top down approaches and urban-rural differences that, as shown in this study, are resented by local people.

New trans-boundary agreements should acknowledge the conservation potential of ongoing informal cross- border cooperation among local communities and organizations. These efforts need to be understood, supported and considered as important elements for enhancing effective conservation beyond political boundaries. As a minimum, formal trans-frontier accords should not negatively affect or distort already occurring environmentally friendly local trans-frontier cooperation.

The contribution of forests outside protected areas as sources of natural resources for subsistence, household use, income generation and recreational purposes needs to be better understood. It is likely that these unprotected forests near the communities have played an important role in providing alternative natural resources and services after the enclosure of the park forests. Legal tenure of these forests needs to be clarified and when possible, communal management should be acknowledged and supported.

8.2.2. More attention to enabling conditions, including societal and cultural issues

The influence of the individual's beliefs on the adoption of simple conservation behaviours provides support for the implementation of environmental education programs that aim to offer accurate information to the public about the impact of their actions upon the environment. In this sense, more information needs to be provided to promote adequate garbage management in these communities. As these communities on both sides of the border completely lack garbage collection services and this situation is likely to worsen in the medium term, it is important to provide precise information about the negative effects of inadequate garbage management, including burning, for both nature and human health. Also household practices such as garbage separation, reuse, recycling, composting and burial need to be introduced and encouraged in these communities. Successful waste management initiatives should also be shared across the border.

Though the average knowledge about conservation coffee practices observed among local farmers was high (80%), some clarifications are necessary to further support the adoption of these behaviours. Twenty five percent of the interviewed producers indicated that the conversion of conventional farms to organic production should be done at a stroke when the opposite is true and gradual conversion is more often advocated. Clarifying farmers' understanding of this issue might reduce their apprehension of the dramatic decline in production expected after the reduction of agrochemical input. Also a wider variety of organic fertilizers and pesticides should be introduced and made available to local farmers who, for the moment, are only using one type. Local producers experimenting with different natural products and techniques should be encouraged to document and share their experiences with other organic producers, including those across the border.

Though individuals' knowledge does have an impact in facilitating simple behavioural changes, this research has shown that its contribution is limited for complex, high- impact conservation behaviours. Thus, conservation practitioners need to further understand and act

upon key contextual factors hindering or favouring the adoption of specific pro-environmental practices. This research has showed that the adoption of complex behaviours is also influenced by cultural preferences, economic/market conditions, social relations among different societal actors and the location of these communities in the frontier.

In relation with the above, park officials need to be aware of how local communities use their previous experiences with influential actors, including the state, as a reference framework to understand the establishment and the management of the park. In this sense, the park "inherits" the historical conflicts and alliances between different societal actors.

Park officials, particularly at the national level, should also be aware of the importance of periodically updating park management strategies in order to adapt to emergent circumstances. Of particular relevance is the understanding that the advance of the agricultural frontier in most of the park might have stabilized or stopped and that most of the communities are becoming expulsion zones, characterized by high levels of rural - urban migration and land concentration by cattle ranchers, foreigners and urban-based landlords. Though some conservation practitioners would argue that the abandonment of lands near the park will positively reduce pressure on its natural resources, this might not be the case as land consolidation might be leading to what has been called "hollow frontiers" (Schelhas and Sanchez-Azofeifa 2006). In these areas there is a reduction of the number in people but little forest recovery due to the intensification of agricultural developments financed by capital from urban areas.

Park officials should give more attention to the negative effects that rural-urban migration could have on environmental conservation. In this respect, when young more capable individuals leave their communities, they take with them decades of efforts to promote local appreciation for nature. In this sense it is crucial that conservation organizations get involved and invest to attain a better understanding of the migration phenomenon, its connection with park conservation and identify strategies to ensure that environmentally minded capable local people have opportunities to stay in their homeland in a way that will benefit both the people and the park.

This strategy of making people - protected area connections should not be seen as a park strategy alone. On the contrary, it should be considered as a country-wide socio-environmental policy. As rural inhabitants migrate, pressure on urban centres' basic infrastructure such as water supply, transport, education and medical attention increases, leading to the collapse of these services as frequently reported in the media. Also rural

migrants often compete and tend to succeed in getting jobs that otherwise would be available for the urban poor, leaving the latter more expose to illegal activities associated to drug trafficking and money laundry, pervasive in Latin American cities.

8.2.3. Equitable benefit cost sharing

Current relationships among different stakeholders are also important, and park management efforts will have limited success until park authorities recognize the importance both of equitable benefit sharing and fairness in the application of the law and take measures to improve them. The resolution of issues such as land tenure and cattle raising within the park boundaries should be a priority.

Conservation schemes that compensate rural inhabitants for protecting the environment, such as payment for environmental services, should be more efficient, improve their conservation targets and become stakeholder-driven as recent assessments of the Costa Rican schemes have proposed (Engel *et al.* 2008; Menzel and Teng 2009). Using the Costa Rican experience, these compensation mechanisms could be more easily and effectively created in Panama. Funding to implement these programs could come from international initiatives such as Reducing Emissions from Deforestation and Forest Degradation (REDD) or from conservation taxes imposed on coffee estates, cattle exporters, pineapple companies and hydroelectric projects (Vignola *et al.* 2009) that benefit from ecosystem services provided by the park, particularly water. These charges could also be part of green certification schemes.

Although tourism has not been a focus of this study, the communities' organizations of Biolley, Altamira and Piedra Candela have initiated small scale rural ecotourism initiatives and the impact of these should be studied to better understand their contribution in creating positive people – park relationships and improving local economy. Successful projects should be strengthened and shared across the border. Networks of rural tourism projects could be created in both countries to provide tourists with a truly trans-boundary experience. Mechanisms to evaluate and monitor equitable benefit sharing within the communities themselves are required.

As a complementary action, awareness programs should be launched to make people living in urban areas more conscious about the biodiversity value and the ecological services protected areas provide but also about their responsibility in protecting them to ensure sustainable enjoyment of these benefits. This awareness will potentially assist in gaining their support for re-distribution schemes such as payments for ecosystem services.

These benefit re-distribution initiatives should be implemented with ample participation of affected parties, transparency and efficiency. Otherwise, these programs run the risk of exacerbating inequalities among different community sectors. Incentives should prioritize people who have long inhabited the area and be balanced in such a way as not to attract new settlements.

8.2.4. Understanding nature protection and cultural identity

Trans-boundary conservation could benefit from the intimate connection between natural and cultural systems that the results of this thesis have shown. Though the use of culturally relevant natural features located in trans-boundary national parks to promote conservation has been proposed in the literature (Sandwith *et al.* 2001), few experiences have been reported in this direction. This study has shown that the recognition and reinforcement of these natural – cultural connections could benefit both nature conservation and people's regional identity.

These connections can also be created and encouraged as in the case of the recent adoption of the name Biolley to denominate a recently created district near the park boundaries in the Costa Rica sector. Biolley is the name of a hill located in the park which was proposed by local organizations as a representation of these communities' sense of pride and individuality. Initiatives of these kind have been denominated revitalisation projects and are taking place all over the world to reinvigorate communities, cultures and their connections with the land with multiple benefits for both cultures and nature (Pilgrim *et al.* 2009). Also of special interest is the study of the influence of frontier identities in shaping human – nature associations in these remote trans-national regions.

The potential contribution of projects that encourage attachment to the homeland to discourage rural – urban migration and promote nature conservation is a novel area that requires further examination. Equally needed is a greater understanding of the role that protected areas could play in providing incentives for rural inhabitants to stay in their homelands without attracting the establishment of further settlements which could negatively affect both regional nature and culture.

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APPENDIX 1

APPENDIX 1

PILOT SURVEY (English Version)

Greetings!

My name is Indra Candanedo and I am doing a survey with people living in communities near La Amistad National Park in Costa Rica and Panama. This survey is part of my research project and is not related to any organization that works in the area.

During this survey, I will ask questions about the people and forests, and you can also give your opinion about the community and the national park. Your participation is very important. Everything you tell me is only for this study and I will not share your direct responses with anyone. I am not even going to ask your name. I hope you feel comfortable with this and express your opinions openly. There are not good or bad responses, only opinions. I hope that the results will be useful and interesting for the communities and the organizations that work here.

Are you happy with this? Do you have any questions? If you agree, we can start. The survey will take us about 20 minutes.
Please feel free to ask me questions at any moment, OK?

Community_____ Date _____ Starting time_____

A. PERSONAL DATA

a. Gender 1.Male 2. Female

b. Age _____

c. Origen

Were you born in this community? 1. Yes 2. No 3. Don't know
If not, where were you born?_____In which year did you arrive to this area?_____

What did you do before getting here?_____Why did you come here?_____

d. Education

How many years did you attend school?_____

e. House characteristics (economic wealth)

Roof	1. Corrugated iron	2. Tejalit (imitation tile roof)			
Floor	1. Wood	2. Concrete	3. Tiles		
Equipment	1. Radio	2.TV	3. Telephone	4. Internet	
Windows	1. Wood	2. Glass	3. Iron work		
Transport	1. Own car	2.Motorcycle	3.None		

f. Sources of income

How do you make a living?

1. Agriculture 2. Cattle ranching 3. Timber extraction 4. Reforestation 5. Commerce
6. Tourism 7. Hunting 8. House wife 9. Remittances 10. Selling plants
11. Working with _____12. Without a job 14. Other_____

Which one is your main source of income?_____

g. Land tenure

What kind of land right do you have? 1. Title 2. Letter of sale 3. Rent 4. Other_____

Do you own land within the national park? 1. Yes 2. No 3. Don't know

If the answer is yes, do you have 1. Title 2. Selling letter # of hectares _____

In the past, did you own land within the park? 1. Yes 2. No 3. Don't know

If the answer is yes, what did you do with it?

1. Sold it to MINAE 2. Sold it to others 3. Still keeps it 4. Other_____

h. Migratory patterns

Is there somebody in this household who has gone to live, study or work away? 1. Yes 2. No

If the answer is yes, this person

Relationship with you	Age	Where did she/he go?	Reasons to move

i. Participation in environmental initiatives

Have you participated in an environmental project or training before? 1. Yes 2. No

If yes, which one?_____

Do you belong to a community organization? 1. Yes 2. No

If yes, which one?_____ How long have you belonged to this organization? _____

If not, would you like to get involved? 1. Yes 2. No 3. Don't know

B. VALUE ORIENTATIONS

I am going to read you some statements that people make about the forest and the park. Please tell me if you strongly agree, agree, disagree, strongly disagree with or are neutral to these statements.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Forests are important because they provide fertility to the soil					
Plants and animals have as much right to live as humans					
It does not matter to cut trees if they are replanted					
It is important for our children to have the opportunity to know the forest and its animals					
Forests are sacred places					
Forests should exist only to satisfy human needs					
Forests gives us peace and well-being					
People must live in harmony with nature					
The main purpose of the park should be to benefit local communities					
The main objective of the park should be to protect plants and animals only					
People should have more respect and admiration for the forests					
Young people should look after the forests because they are their future					
Hunting should be permitted for subsistence purposes in the communities					
The economic benefit of the communities is more important than the protection of the forests					
Human beings are part of the biosphere					

What does PILA mean?_____

What does Talamanca mean?_____

Do you receive any benefit from the park? 1.Yes 2. No 3. Don't know

What kind of benefit?_____
_____

That's it. Do you have any questions? If not, thank you for your time. As I explained to you before, this information is confidential. Thanks very much for your cooperation.

Time: _____

APPENDIX 2

APPENDIX 2

MAIN SURVEY (English Version)

Greetings!

My name is Indra Candanedo and I am doing a survey with people living in communities near La Amistad National Park in Costa Rica and Panama. This survey is part of my research project and is not related to any organization that works in the area.

During this survey, I will ask questions about the people and forests, and you can also give your opinion about the community and the national park. Your participation is very important. Everything you tell me is only for this study and I will not share your direct responses with anyone. I am not even going to ask your name. I hope you feel comfortable with this and express your opinions openly. There are not good or bad responses, only opinions. I hope that the results will be useful and interesting for the communities and the organizations that work here.

Are you happy with this? Do you have any questions? If you agree, we can start. The survey will take us about 40 minutes.
Please feel free to ask me questions at any moment, OK?

Community_____ Date _____ Starting time_____

A. PERSONAL DATA

a. Gender 1.Male 2. Female

b. Age _____

c. Origen

Were you born in this community? 1. Yes 2. No 3. Don't know
If not, where were you born?_____In which year did you arrive to this area?_____

What did you do before getting here?_____Why did you come here?_____

d. Education

How many years did you attend school?_____

e. House characteristics (economic wealth)

Roof	1. Corrugated iron	2. Tejalit (imitation tile roof)			
Floor	1. Wood	2. Concrete	3. Tiles		
Equipment	1. Radio	2.TV	3. Telephone	4. Internet	
Windows	1. Wood	2. Glass	3. Iron work		
Transport	1. Own car	2.Motorcycle	3.None		

f. Sources of income

How do you make a living?

1. Agriculture 2. Cattle ranching 3. Timber extraction 4. Reforestation 5. Commerce
6. Tourism 7. Hunting 8. House wife 9. Remittances 10. Selling plants
11. Working with _____12. Without a job 14. Other_____

Which one is your main source of income?_____

g. Land tenure

What kind of land right do you have? 1. Title 2. Letter of sale 3. Rent 4. Other_____

Do you own land within the national park? 1. Yes 2. No 3. Don't know

If the answer is yes, do you have 1. Title 2. Selling letter # of hectares _____

In the past, did you own land within the park? 1. Yes 2. No 3. Don't know

If the answer is yes, what did you do with it?

1. Sold it to MINAE 2. Sold it to others 3. Still keeps it 4. Other_____

h. Migratory patterns

Is there somebody in this household who has gone to live, study or work away? 1. Yes 2. No

If the answer is yes, this person

Relationship with you	Age	Where did she/he go?	Reasons to move

i. Participation in environmental initiatives

Have you participated in an environmental project or training before? 1. Yes 2. No If yes, which one?_____

Do you belong to a community organization? 1. Yes 2. No

If yes, which one?_____ How long have you belonged to this organization? _____

If not, would you like to get involved? 1. Yes 2. No 3. Don't know

B. ENVIRONMENTAL ATTITUDES

I am going to read you some statements that people make about the forest and the park. Please tell me if you strongly agree, agree, disagree, strongly disagree with or are neutral to these statements.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Animals and plants have as much right to live as humans					
It does not matter to cut trees if they are replanted					
It is important for our children to get to know the forest and its animals					
Forests should exist only to satisfy human needs					
Forests gives us peace and well-being					
The main purpose of the park should be to benefit local communities					
The main objective of the park should be to protect plants and animals					
People should have more respect and admiration for the forests					
Young people should look after the forests because they are their future					
The economic benefit of the communities should be more important than the protection of the forests					
To walk the park's trails reduces stress					
Forests are important because they protect water sources in our community					
If people do not use the forest, its natural resources are wasted					
Human beings are part of the ecosystem					
Forests should be used mainly to improve people's economic income					

What does PILA mean?_____

What does Talamanca mean?_____

Do you receive any benefit from the park? 1.Yes 2. No 3. Don't know

What kind of benefit?_____
_____

C. ATTITUDES TOWARDS PARK MANAGEMENT

I am going to read you some statements that people made about how the park is being managed. Please tell me if you strongly agree, agree, disagree, strongly disagree with or are neutral to these statements.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The park is being well managed for the benefit of future generations					
The park administration is doing a good job considering local people's opinions					
The ecological benefits of the park are higher than the costs of protecting it					
The park is being well managed to conserve plants, animals and water sources					
Local communities can express their opinions about the park freely					
Deforestation within the park is so extensive that there are going to be no forests left					
Hunters do not often get into the park due to the park rangers' good work					
Park regulations are applied fairly					

E. ENVIRONMENTALLY FRIENDLY BEHAVIOR

In the last 6 months what have you done for the environment? Yes No

What? _____

F. MIGRATION

If the interviewee is between 15 and 35 years old,

Are you thinking in staying here? 1. Yes 2. No 3. Don't know

If not, where would you like to go? _____

What would need to change for you to stay?_____
_____

G. COFFEE PRODUCTION

Have you heard of:

Conservation coffee	Yes	No	What is it?_____
Transition coffee	Yes	No	What is it?_____
Organic coffee	Yes	No	What is it?_____

Do you have any of these coffee types in your farm? Yes No

Which one?_____

What were the main reasons why you changed or you did not change?

a. _____ b._____

H. CONSERVATION COFFEE KNOWLEDGE

Shade grown coffee produces less and pests develop more	Yes	No	I do not know
Changing from conventional coffee to organic coffee has to be done all at the same time	Yes	No	I do not know
People change to organic coffee mainly because they spend less money in agrochemicals	Yes	No	I do not know
Organic manure is cheaper than chemical fertilizers but producers need to put more	Yes	No	I do not know
Producers always have to buy organic manure	Yes	No	I do not know
Producers can negotiate better prices with organic coffee	Yes	No	I do not know
Changing from conventional to organic coffee is very expensive	Yes	No	I do not know
The fruit of shade grown coffee is smaller than that of the coffee grown under the sun	Yes	No	I do not know
Trees need to be pruned regularly so the pests do not infect the shade grown coffee	Yes	No	I do not know
People change to organic coffee mainly because it helps to protect local animals	Yes	No	I do not know
Conventional coffee is of better quality that organic coffee	Yes	No	I do not know

What would you need to consider changing to produce a more environmentally friendly coffee? _____
_____

That's it. Do you have any questions? If not, thank you for your time. As I explained to you before, this information is confidential. Thanks very much for your cooperation.
Time: _____

APPENDIX 3

APPENDIX 3
INTERVIEW GUIDE

A. PERSONAL DATA

Name: _____

Age:_____

Gender:_____

Nationality:_____

Number of years living in the community:_____

Main source of income:_____

B. GUIDING QUESTIONS

1. NATURE

a. What is nature? Is it important? Why?

b. What is the role of humans in nature? Do you think humans are part of nature? Do humans have responsibilities towards nature?

c. How was nature when you got here? How is nature now?

d. When is it appropriate to cut a tree or hunt an animal? Do you think we can do something for nature?

e. What do you like best about nature? What do you dislike the most?

2. THE PARK

a. Do you know that there is a national park nearby, Do you know why?

b. Do you think it is a good idea to live close to a national park? Or not? Why?

c. Do you think that the costs of protecting nature are justified?

d. What do you think are the benefits and the problems of living near a protected area?

APPENDIX 4