



The Power of Ideology: Religion and Environmental Consciousness in Prehistoric Societies

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People are defined by the environments in which they live. This article seeks to explain how environmentally-based ideologies help lead to the development of ecologically sustainable innovations. If the importance of nature is a core ideology of a society, then measures will likely be taken to ensure the sustainable use of environmental resources. In times of short-term environmental instability, religious beliefs become strengthened due to successful rituals (e.g., prayers for rain coincide with the end of a period of drought). However, if poor conditions persist for long durations, faith in rituals will waver, leaving a society in a state of instability. Utilizing various anthropological literature and two case studies (The Central Andes and Easter Island), the following positions are argued: (1) ideology that emphasizes human-environmental coexistence stresses the importance of the environment and leads to successful innovations that allow for humanity to thrive without doing irreversible damage to the surroundings, and (2) unpredictable and lengthy periods of negative environmental conditions can lead to the weakening of social, political, and economic constructs, as well as of their controlling ideologies.

Introduction

Early societies were unified under commonalities between individuals, often in the form of a shared ideology or belief system. Religion was frequently at the heart of early group and societal formation, and there are many theories regarding the true nature and origin of religious belief systems (see Bourrat, 2015). Nonetheless, there are certain benefits brought by a unified belief system to societal development. The advantages of religious practice include improved health, increased chances of survival, economic prospects, and a sense of community (Sosis & Alcorta, 2003, p. 264). However, religious ideology can also create social inequalities, generating “ranked” societies (Flannery, 1995, p. 12). In some prehistoric societies, the entanglement of religious ideology in political authority influenced social

transformations (Joyce & Barber, 2015, p. 835). This is seen archaeologically in several ways, including: the level of importance placed on the construction of temples and religious objects, land-use patterns, and the distribution of material culture.

Local environments affect behavior, and religion is not exempt from such influence. According to entanglement theory (see Hodder, 2016, p. 103), uncertainty is derived from complex relationships that extend through cultural, biological, social, and environmental spheres. Religion serves as a way of filling the gaps in our understanding. In times of uncertainty, particularly relating to the availability of essential resources, religion can become more powerful and widespread; one of the primary theories regarding the root cause of violence (especially religious violence) is resource

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scarcity (Avalos, 2005; Sosis & Alcorta, 2003, p. 266). As this paper will show, care for one's natural surroundings often leads to environmentally conscious innovations that allow for humans to thrive without irreversibly damaging their locality.

According to Bourrat (2015), uncertainty is one of the catalysts of religious evolution in human society. Instability, especially in terms of food and water, has been the heart of conflict all over the world for thousands of years (Kuckelman, 2016, p. 125; Kurin, 2016, p.249; Tung, Misser, DeSantis, & Sharp, 2016, p. 219). Changes in the natural environment that affect food production often lead to societal changes; sometimes these changes lead to cultural dissolution and violence, other times they lead to the development of smaller scale societies and peaceful competition. Short-term environmental instability frequently strengthens religion by reinforcing the power of supernatural beings, many of whom were often intertwined with the natural world. According to Bergmann (2010, p. 18), the belief that supernatural beings are reacting to the morally sinful behaviors of humanity is a customary response to threatening environmental change.

In order to best explain the nature of religion and the effects of ideology on prehistoric state and sub-state societies, religion must be viewed as a product of a group's anthropogenic and natural surroundings. Utilizing the Tetra-dimensional Climate Model (TDCM), the course a society takes (i.e., expansion, devolution, success, failure, etc.) is determined collectively by the environmental, social, economic, and political climates of the society or region being studied (see Davis, 2016).

Two major hypotheses are postulated by this study: (1) in some locations, the development of environmentally conscious practices—particularly relating to landscape management and agriculture—is based on religious dogma that emphasizes coexistence between humanity and

the natural world, and (2) during times of prolonged environmental alteration, religious systems often break down, resulting in societal fragmentation. Ultimately, if a society's ideologies highlight a mutualistic human-environmental relationship, innovations will be environmentally conscious, allowing for greater use of resources and, by extension, a successful and long-lived society. These hypotheses will be tested using archaeological case studies from the Andes, in South America, and Easter Island, in Polynesia.

In the Andes, state formation was inseparable from ideological viewpoints, and an animistic belief system prompted rituals based on environmental phenomena. On Easter Island, an isolated community-based society formed, whereby the religious leader was deemed responsible for the success or failure of crops, along with other natural occurrences (e.g., precipitation). This article will explore existing literature on the anthropology of religion, particularly the concept of 'entanglement', applying it to archaeological examples of state societies (i.e. Moche and Nasca) and community-based societies (i.e. Easter Island). Additionally, the inclusion of TDCM will serve as a new conduit of exploration for this line of enquiry.

Promoting Sustainability Through Ideology

Within many religious systems, there is overlap between environmental and religious structures and an overall importance of nature (Sherkat & Ellison, 2007, p. 73). Mebratu (1998, pp. 517-518) notes that while examining various world ideologies, both religious and philosophical, many contain a theme of living in harmony with nature. This ideal seems to transcend temporal boundaries, and this belief is illustrated even in eras of environmental exploitation. According to Marcus Aurelius (170-180/2006):

The soul of a man harms itself, first and foremost, when it becomes (as far as it

can) a separate growth, a sort of tumour on the universe: because to resent anything that happens is to separate oneself in revolt from Nature, which holds in collective embrace the particular natures of all other things [Meditations 2.16]. (pp. 14-15)

Thus, even in a large and environmentally demanding empire such as Rome, understanding human-environmental connection remains important. As societies have undergone urbanization and industrialization, connectivity between humans and the natural world has been strained. Vining, Merrick, and Price (2008, p. 8) conclude that a lack of contact with nature and an increase in anthropogenic environments can lead to a feeling of separation from the natural world. While this statement certainly holds true in some situations, environmentalist movements remain strong in many industrialized regions of the world. Industrialization has resulted in a greater strain on the environment, and in some cases this has led to ecological crisis. Nevertheless, to suggest that these problems are solely the result of a disconnection with nature (e.g., Brocchi, 2008, p. 30) seems misinformed. While disconnection from nature is one possible outcome of limited interaction with one's environment, it is not inevitable. Such disconnect largely results from the belief system(s) of a population.

Some scholars reject the idea that environmental consciousness is bred from religious ideology (e.g., Greeley, 1993; Woodrum & Hoban, 1994), claiming that belief in the supernatural produces a sense of protection by one's god(s), leading to a sense of apathy toward environmental concerns. However, Greeley (1993) also argues that belief in a gracious god (e.g. Mother Earth) tends to lead toward greater environmental concern. Shaiko (1987) suggests that religious-environmental connection varies by religion, with some having greater concern for environmental issues and others remaining more apathetic toward such issues. One of the main problems with the works of Greeley (1993) and Woodrum and Hoban

(1994) is that they are based on models of ideological formation that are completely independent of environmental factors, when, in reality, the natural surroundings of a group will shape their worldview.

It has been shown that the level of connectedness a person feels toward the environment in which they live will influence their level of concern for that environment (Vining et al., 2008, p. 10). The TDCM incorporates connections between environmental, social, political, and economic factors in the formation of ideology and societal stability. Ultimately, it must be understood that not all belief systems respond to environmental issues in the same way (Sherkat & Ellison, 2007), and levels of environmental concern will vary depending on the nature of the religious ideologies of specific groups.

Ideology as a Catalyst for Change

Ritual practice is defined by Sosis and Alcorta (2003) as "the foundation of the human social contract" (p. 272), enabling the development of reciprocal relationships which make human life possible. When spiritual rituals and politics mix, religion often becomes the rationalization for political actions. Political leaders sometimes use religion to enhance their legitimacy (e.g., the *ariki-mau* on Easter Island, the chiefs of Moche and Nasca, the Emperors of Rome), and religious leaders will occasionally use political power to funnel government resources toward their own goals (e.g., theocracies, Andean chiefs/kings, the Vatican) (Flannery, 1972, p. 407; Iannaccone & Berman, 2006, p. 123). The use of ideology or religion to justify political authority is one form of 'divide-and-rule' politics (Acemoglu, Verdier, & Robinson, 2004), whereby elite members of a society utilize ideology, force, and wealth redistribution to consolidate power. This is seen archaeologically in the Oaxaca Valley in Mesoamerica, where elites, who claimed much of their power from religion, are found buried with the largest number of luxury items that may have

been used to establish control over other local elites (Joyce & Barber, 2015, p. 832). Religion is also one means by which individuals have taken control of essential resources through monitoring production and distribution, using their religious status to justify their authority (Testart, 1982, p. 527). When tensions arise, conflict usually ensues. With religion as a unifying force, many political and economic conflicts can become imbued with a spiritual ideology, thus giving legitimacy to the conflict (e.g., terrorism) (Shaver & Sosis, 2014, p. 38; Sosis & Alcorta, 2008; Sosis, Phillips, & Alcorta, 2012, p. 238).

In the broader scope of human development, religion is necessary for societal expansion. The belief in moralistic gods who punish humans for transgressions is one of the precursors of increased human sociality, and assists in increasing societal complexity (Purzycki et al., 2016). Religion gives individuals common ties and beliefs, which allow for a group to remain in a state of tranquility. Mythological and theological lessons help to explain the unexplainable, thus alleviating tensions that arise in the face of such uncertainty. Cultural constructs, like religion, affect perceptions, relationships, and behaviors on individual and community scales (Fuentes, 2016). As stated by Hodder (2016, p. 6), religion serves to ‘disentangle’ aspects of the world that are difficult to comprehend, thus permitting some consensus to be made about such phenomena.

According to Tanner and Pawson (2004), “environmental balance supported by religion correlates to survival” (p. 120). For example, the Nasca performed rituals to ensure successful harvesting seasons. These rituals were performed to appease supernatural powers, and in times of environmental stability the rituals were considered to have paid off: harvests were plentiful and tensions subsided. With lessened tensions, the political and social climates became conducive to further growth and development, leading to a more complex and stable civilization. In situations

where rituals were performed and environmental instability failed to dissipate—leaving agriculture in a state of disarray—tensions resumed, oftentimes with a shaken faith in religious canon. Without stability in social and political spheres the economic climate will also suffer, leading to severe and prolonged issues, especially regarding resource availability (Davis, 2016). For these reasons, viewing religion through an environmental-climatological lens is beneficial.

If environmental instability is short-term, faith can be strengthened in the governing cult due to the fact that the rituals performed solved the problem. It appears that in locations where leading religious dogmas emphasize some level of interconnectivity between humans and nature, landscape management practices resemble these principles of coexistence. For example, in the Central Andes, the concept of ‘dualism’ in spiritual and social organization often spreads to land-division, whereby many locations were divided into upper and lower moieties (see Zuidema, 1983). On Easter Island, the importance of stone is seen in the islanders’ landscape organization, which utilizes this material for both religious and agricultural constructions. According to Mebratu (1998), the ability for society and nature to live in harmony is “one of the fundamental tenets of the concept of sustainability” (p. 498).

Animism

The societies used as case studies in this article all possess animistic religious systems. Animism can be defined as the attribution of life and personality to inanimate objects and non-human entities (Brown & Walker, 2008), and it was the basis for many early belief systems. Animistic ideologies are pervasive globally, and many teach that humanity must live in harmony with the environment (Mebratu, 1998, pp. 497-498). Some ideologies even claim that “[a]buse and exploitation of nature for selfish gains is immoral, unethical, unjust and sacrilegious” (Museka & Madondo, 2012, p. 264).

Animistic belief systems in the Andes define certain natural objects and occurrences as supernatural, and such phenomena are often worshiped. Additionally, religious ideology was often the force holding Andean societies together, and land-use patterns often mimicked spiritual configurations. On Easter Island inhabitants were in a constant state of ecological strain, leading to a religious system based on deities that dictated weather patterns. These gods were responsible for rain, harvests, and all natural resources that were present (or absent) from the island at a given point in time. Rituals were performed to continue the natural processes that allowed the land to be productive, and ceremonial constructions often highlighted connections between land and sea. These are good examples of how the environment and ideology are connected to one another. In the Andes this connection allowed for the expansion of state societies, but prolonged ecological crises led to the breakdown of these systems. On Easter Island ideological-environmental connections shaped an isolated community-based society, and ecological catastrophe – initiated by European contact – led to the breakdown of the traditional belief system and societal structures.

Methodology

This study views religion through an environmental-climatological lens. The two hypotheses presented in this article are illustrated through the use of two case studies. One essential aspect of religion is its interconnectivity with all other facets of human society. In terms of human development, the importance of environmental stability cannot be understated.

The Tetra-dimensional Climate Model

In an environmental archaeological analysis of the Roman Agro-economy, Davis (2016) proposes the TDCM as a way of understanding human societal growth and collapse. This model outlines relationships between environmental, societal, economic, and political climates, and suggests that societies can only be successful when there is a state of stability in all four climatological components (Figure 1). Since success is measured in many ways, this can be an ambiguous term.

Economic success is often measured by the extent and quantity of goods being exchanged. Evidence

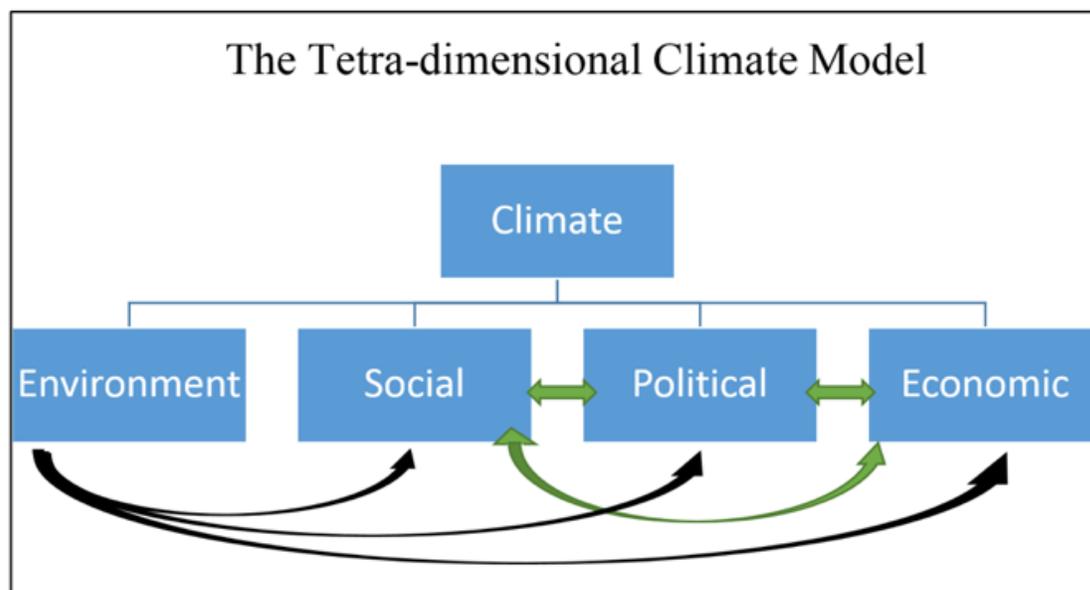


Figure 1. The Tetra-dimensional Climate Model postulates that climate is divided into four distinct parts. The environmental climate is independent of, but affects, the other three components. The anthropogenic factions of climate (social, political, and economic) are dependent upon one another. Religion is not bounded by any one classification, but rather influences social, political, and economic climates.

of mass-violence or warfare can suggest expansion (i.e., political/economic success) or could evidence unstable socio-political systems (i.e., coup d'état). In order to address whether or not climates were conducive to societal growth, archaeological evidence in the form of resource abundance, extent of building projects, and evidence of widespread violence should be considered along with other environmental proxies (Davis, 2016, p. 50).

Collapse is another term that must be further defined to avoid ambiguity. The simple lack of archaeological remnants does not automatically mean that a society that previously occupied an area 'collapsed' or disappeared. A lack of archaeological evidence could also result from migration, devolution of a previous socio-political system, or the disappearance of a particular group. To label a lack of archaeological evidence as societal collapse is imprudent and may lead to misinterpretations in contemporary and future research.

Religion overlaps all anthropological components of climate, flowing between social, political, and economic bounds; Hodder (2016, p. 99) notes this while studying the archaeological site of Çatalhöyük. TDCM and the influences of its various climatological components exemplify the notion of 'entanglement' as described by Hodder (2016). However, consonant to other components of the model, religion is influenced by environmental climate change. Prolonged environmental flux often results in instability of the anthropogenic climate. When technological innovation can offset the effects of poor environmental conditions, then humans will thrive. Unfortunately, this is not always the case if poor environmental conditions fail to dissipate (e.g., in the case of long-term drought or famine). The following research takes TDCM into consideration when discussing societal sustainability and the impact of religion on the natural world. To best understand religion using this framework, it is best to break down each

general category in order to demonstrate how their individual components interact with one another.

The TDCM can be expanded upon by subdividing the environmental climate into resources, temperature, and precipitation, social climate into ideology (consisting of religious and secular beliefs), economic climate into trade and innovation, and political climate into system type (Figure 2). From this breakdown, it is clear that the environment dictates all facets of environmental climate with the exception of resources. We as humans cannot directly control how much it rains or how hot or cold the weather is in a location, but we can manipulate available resources and landscapes. As shown, resources and ideology influence one another to develop views and ideals about the surrounding environment. Once such a worldview is shaped, ideology can then lead to innovation which can supplement resources presented by the environment. This is not to say that ideology dictates innovation, nor that religion is responsible for advancement; it simply suggests that the surrounding landscape and its resources help to form ideology, and that ideology in conjunction with environmental conditions leads to innovation. From an evolutionary perspective, cultural processes (including religious systems) channel the creation of new strategies and allow for human progress to take place (Fuentes, 2016).

Case Studies

The Central Andes

The history of the Central Andes has involved the development of numerous cultures, guided by diverse religious traditions. Many of the most well known Andean societies, such as Nasca and Moche (Figure 3), began to emerge during the Early Intermediate Period or EIP (Table 1). Societies that developed in this area demonstrate how religion and politics became entangled with one another in many prehistoric state societies,

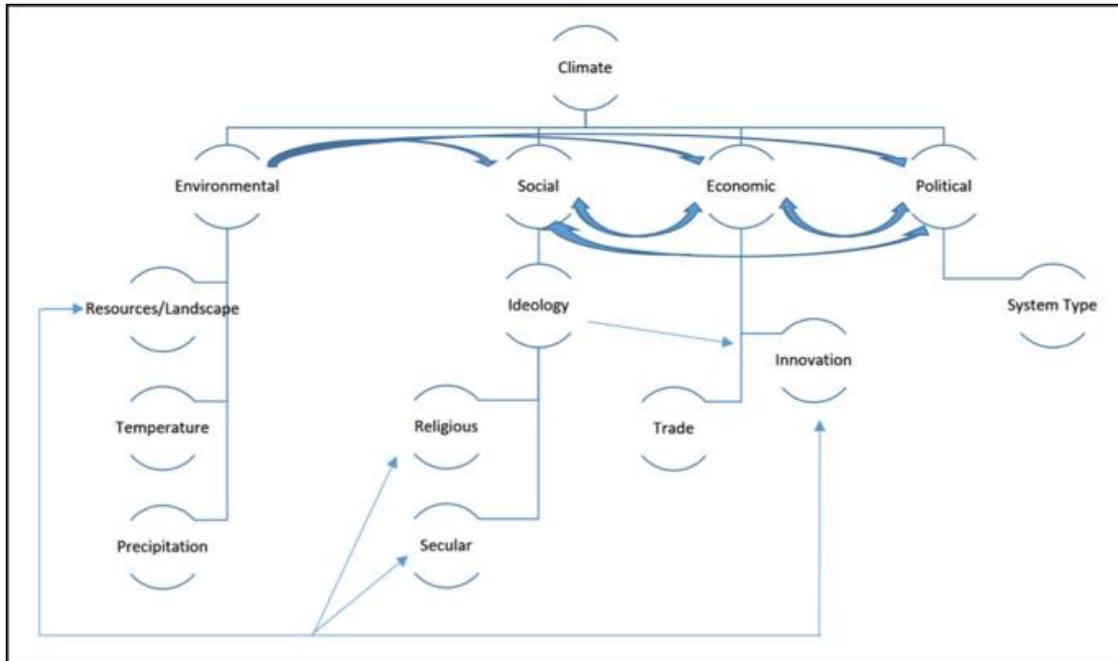


Figure 2. Tetra-dimensional Climate Model in further detail. Environmental climate consists of the landscape and available resources, as well as factors outside direct human control such as temperature and precipitation. Social climate consists of ideology, which can be subdivided into religious and secular beliefs. Economic climate consists of trade and innovation. Political climate is largely based on system type (e.g., democracy, oligarchy, monarchy, kakistocracy). It is notable that resources and landscape influence, and are influenced by, ideology and innovation, and innovation is influenced by resource availability as well as by a society’s worldview.

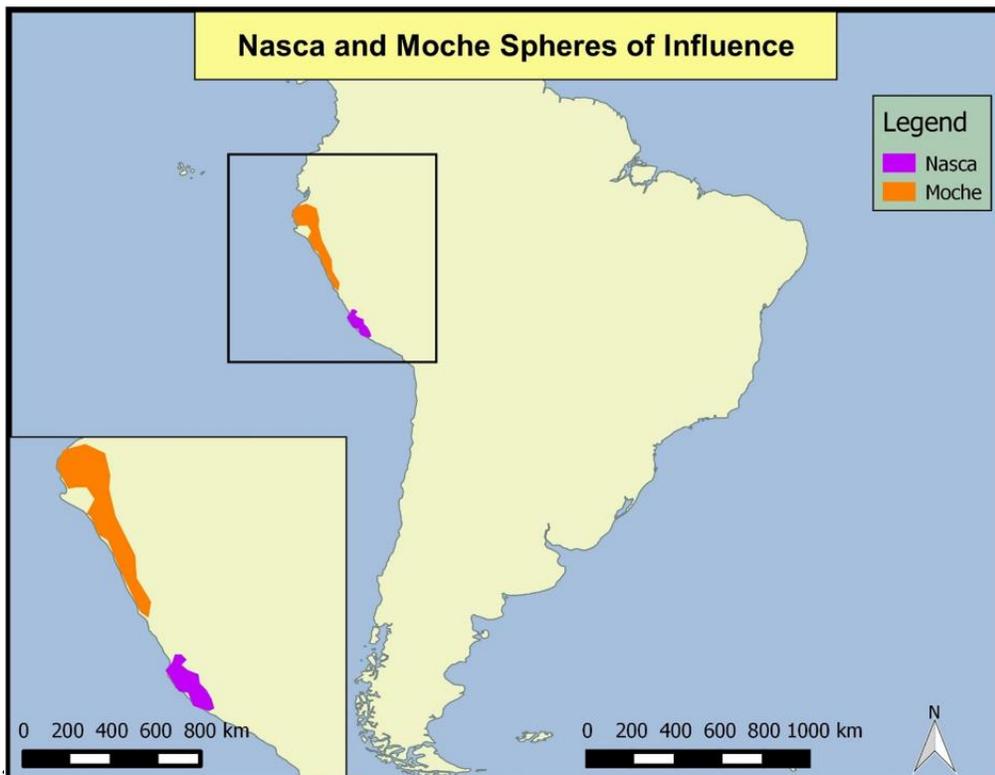


Figure 3. Map showing spheres of influence of the Central Andean Nasca and Moche cultures.

Chronological Period	Date Range (C.E.)
Late Horizon	ca. 1450-1600
Late Intermediate Period	ca. 1000-1450
Middle Horizon	ca. 700-1000
Early Intermediate Period	ca. 1-700

Table 1. Chronological classifications for the Peruvian Central Andes, after Quilter (2014)

and how religious ideology assisted in creating a worldview that emphasized the importance of protecting the natural world.

Dualism

In order to discuss Andean spirituality, the concept of dualism must be examined. In its simplest form, dualism refers to social ordering based on oppositions (Moore, 1995, p. 170). These oppositions create a model of existence by which all objects are paired into juxtaposing elements (e.g., light and dark, sun and moon, life and death). Dualism was incorporated into most aspects of Andean life, including social, political, and religious organization. Zuidema (1983) notes that all aspects of Inca society had strong interests in “global oppositions” (p. 69). Andean belief systems incorporate an important dichotomy between humans and the supernatural forces of nature, which embodies the Earth as a spiritual being, sometimes referred to as *Pachamama*. *Pachamama*, or “Mother Earth”, nurtures her human children by providing elements necessary for survival (Allen, 2002, p. 29). If people’s actions anger *Pachamama*, then rituals must be performed to appease the supernatural power. Although this system places a divide between people and the natural world, the very fabric that defines Andean spirituality highlights its emphasis on coexistence. This underlines the first hypothesis posited in this paper, as Andean animistic ideology emphasizes human-environmental connectivity.

The Nasca

The Nasca culture developed during the EIP (Table 1) out of small agricultural villages linked by religious beliefs, eventually becoming a collection of chiefdoms ruled by a leader with religious and secular power (Isbell, 2014, p. 1102; Proulx, 2008, p. 576; Quilter, 2014, p. 186). Ideology was transported to different villages by means of ceramics and artwork (Isbell, 2014, p. 1103), and a similar ceramic style between Nasca villages is suggested to indicate ideological unity. Nasca religion, like most forms of indigenous Andean spiritual belief, is rooted in animism. In the Late Horizon (Table 1), the Inca participated in similar nature-worship, whereby *wak’as* (objects or places of worship) served as a means of communication between people and the forces of nature (Kolata, 2013, p. 150). Many *wak’as*, such as mountains, were parts of the natural landscape. The Inca believed in supernatural spirits found in nature, often represented by various animals capable of controlling natural processes, and such figures were often depicted on ceramics and other artwork (Proulx, 2008, p. 578; Quilter, 2014, p. 188).

Nasca religious practice also involved pilgrimage to important religious centers (Proulx, 2008, p. 579), and the purpose of many of these rituals was to appease the forces of nature. Evidence for pilgrimage comes from ceramic vessels and artwork depicting procession scenes (Proulx, 2008, p. 579) as well as, more significantly, the distribution of ceramics from ceremonial centers to peripheral villages. Vaughn and Gijseghem (2007) conduct a quantitative study of Nasca polychrome ceramics, classifying samples based on composition. These authors determine that the ceremonial center of Cahuachi was responsible for the spread of certain types of Nasca polychrome ceramics. In terms of pilgrimage, this evidence shows that people traveled from all reaches of the Nasca sphere of influence to ceremonial centers, such as Cahuachi, returning with different technologies and ideologies. With the foundation

of religious centers, settlement patterns shifted toward non-defensive locations, fostering community integration (Gijseghem & Vaughn, 2008). Violence decreased in the Inca-Nasca region at this time, giving way to a period of prosperity. Religious ceremonies highlighted natural forces, especially during the harvesting and planting of crops (Proulx, 2008, p. 578).

Early Nasca society does not appear to have been highly stratified based on spatial analysis of settlement and burial patterning (Vaughn, 2004, p. 117). The remains of foodstuffs and agricultural products have been recovered from ceremonial sites (such as Cahuachi), and these indicate that massive feasts took place at the end of each agricultural season. This is interpreted by Valdez (1994, p. 677) to mean that these ritual feasts emphasized the importance of agricultural fertility. Vaughn (2004, p. 117) suggests that these ceremonies welcomed a renewed water supply for the crops. It is certain that agriculture was a crux to the survival of the Nasca, and, as a result, food availability was a major focus of religious ceremonies.

The Moche

The Moche culture developed during the EIP (c. 200-850 C.E.) in the northern valleys of Peru (Castillo & Uceda Castillo, 2008, p. 707). An abundance of archaeological evidence—much of which is found in Moche artwork—points to the occurrence of intense warfare between Moche centers (Quilter, 2014, p. 179). Moche iconography depicts scenes of war, as well as prisoners of war being paraded in chains and sacrificed to the gods (Verano, 2001). Further evidence for warfare is seen in osteological material, which shows striking similarities between iconographic depictions of sacrifice and warfare and trauma observed on human skeletal remains (Quilter, 2002, p. 167-169). Some scholars argue that violence depicted in Moche art is representative of ritual combat, rather than expansionist conquest (e.g., Arkush & Stanish,

2005; Isbell, 2014, p. 1110), and much of the bioarchaeological evidence consists of healed wounds rather than excessive unhealed trauma (Verano, 2001, p. 117). Regardless of whether or not warfare was ritualistic, Moche society clearly revolved around religious ideology (Castillo & Uceda Castillo, 2008).

Evidence from excavated Moche burials indicates social stratification, and settlement organizational patterns point to the existence of ceremonial spaces (Demarrias et al., 1996, p. 24). Differential access to ceremonial spaces signals a hierarchical social structure, whereby individuals possessing access to the highest ceremonial positions and the most preferential property had the highest status. According to DeMarrais, Castillo, and Earle (1996), the goal of ceremonies was to “increase social solidarity, involving all levels of society...In Moche ceremony, each social segment was ascribed a role that reflected its position in the Moche pantheon of deities and supernatural beings” (p.23). Such ceremonies and ritual celebrations were often used to coordinate agricultural production (Swenson, 2008, p. 412), and were important to the survival of the society. This was especially the case in times of ecological instability, as ritual served as a means of coordinating harvesting and planting seasons, emphasizing connections between people and their natural surroundings.

Environmental Effects on Andean Society

Both the Nasca and the Moche survived as cultures for approximately 700 years (Castillo & Uceda Castillo, 2008, p. 713; Proulx, 2008, p. 563; Quilter, 2014, p. 182), and both had political systems that were deeply comingled with religion. Agriculture was of the utmost importance, both physically and economically, to the Moche and the Nasca. Sustainable agriculture was stressed due to the inheritance of land from previous generations (Erickson, 2000, p. 329); if one generation destroyed their farmland their children gained nothing, thus losing the family inheritance.

Social positions, as well as political and religious roles, dictated individual access to resources (DeMarrais et al., 1996, p. 25). One of the ways in which resources were distributed was through ‘dualism’, whereby land was divided into upper and lower sections (see Zuidema, 1983).

Environmental stressors, such as prolonged drought, are likely to have caused spikes in social tension despite agricultural innovation. During periods of prolonged drought, as recorded by glacial ice-core records (see Thompson, Davis, & Mosley-Thompson, 1994), Nasca ceremonies pertaining to the agricultural seasons intensified; Valdez (1994, p. 678) suggests that this is a sign of environmental deterioration. In later Nasca artwork, scenes showing similarities with Moche art, in which warfare is vividly depicted, become commonplace (Isbell, 2014, p. 1105). Archaeologically, there are typically three features used to indicate conflict: recovery of weaponry, artistic depictions of violence, and evidence in human skeletal remains (Thorpe, 2003, p. 150). In the Central Andes, the primary forms of evidence for conflict are artwork and skeletal lesions. Warfare illustrated in Nasca artwork coincides with the recovery of ‘trophy heads’, which seem to have possessed ritual importance as many such objects are found as offerings at Nasca sites (Proulx, 2008, p. 579; Quilter, 2014, p. 188).

While stable climatic conditions allowed for surfeit agricultural production, and thereby the development of societal and political structures, changes related to natural disasters subsequently undermined dominant ideologies and the ruling elite’s authority, and in extreme cases caused violent outbreaks (Davis, 2015, p. 68; Quilter, 2002, p. 159).

Increases in violence experienced by the Moche and the Nasca occurred during periods of unstable temperature, as indicated by fluxes in the overall $\delta^{18}\text{O}$ and decreases in ice accumulation (Figures 4 and 5). Temperature and $\delta^{18}\text{O}$ have an inverse relationship, where temperature rises as $\delta^{18}\text{O}$ levels fall (Andrus, Sandweiss, & Reitz, 2008, p. 149). Quelccaya Ice Core records indicate that during the later stages of Moche and Nasca society $\delta^{18}\text{O}$ levels were above average (Figure 4), indicating cooler temperatures. This shift in temperature was met with over a century of intermittent drought between 524 C.E. and 645 C.E., with a small pluvial period between shorter periods of drought (Shimada, Schaaf, Thompson, & Mosley-Thompson, 1991, p. 261). Climatological evidence, coupled with a study of gene flow by Sutter and Castillo (2015), indicates that the Moche entered a state of political and social instability during periods of environmental flux. The Nasca also underwent cultural

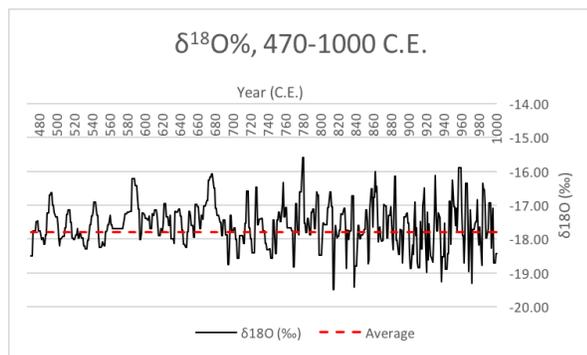


Figure 4. $\delta^{18}\text{O}$ records from the Quelccaya Ice Core. Drops in $\delta^{18}\text{O}$ indicate rising temperatures. During periods of increased violence, temperatures seem to have been erratic, and often colder. Data taken from Thompson and Mosley-Thompson (1992).

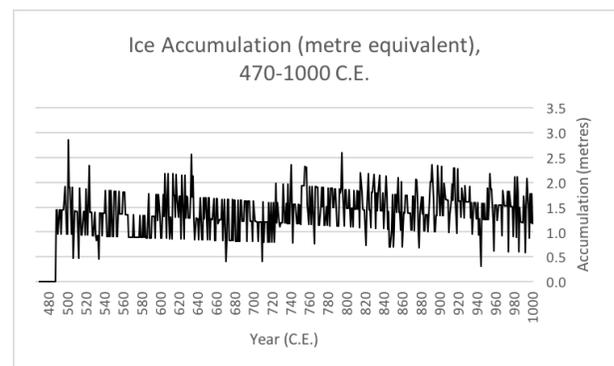


Figure 5. Ice accumulation records from the Quelccaya Ice Core. Note the drop in accumulation between 620 C.E. and 720 C.E., signifying drought conditions. Data taken from Thompson and Mosley-Thompson (1992).

transformations, as artistic styles changed to include more militaristic depictions (Shimada et al., 1991, p. 254).

Both the Nasca and the Moche cultures were susceptible to severe adverse effects from drought and famine. With fluctuations in El Niño events, drought became a larger concern, followed by agricultural and social stress. Environmental proxies (e.g., palynology and ice core samples) show a period of drought lasting throughout the 6th century (Chepstow-Lusty et al., 2009, p. 379). For both cultures, increased tension led to spikes in warfare and violence, which ultimately led to a loss of legitimacy for the ruling elite, schisms within religious ideologies, and ultimately the introduction of foreign threats (Castillo & Uceda Castillo, 2008, p. 724; Isbell, 2014, p. 1111). One of the leading theories regarding the disappearance of the Moche involves the lower classes' loss of faith in religious ideology as a result of environmental catastrophe (Quilter, 2002, p. 155).

Although many short-term environmental climate events occurred in the Central Andes during the Middle Horizon, civilizations of this era, namely the Tiwanaku and Wari, survived these incidents. Nonetheless, such events required an immediate response and caused cycles of agricultural failure and competition (Goldstein, 2009, p. 283). Like the Nasca and Moche, Tiwanaku in the Lake Titicaca Basin used the dissemination of religious ideology as a tool to unify a group of diverse regions under its dominion. In order to cope with climatological disequilibrium, these Andean groups undertook the transformation and expansion of natural resources, through cultural practices, into anthropogenic resources (Erickson, 1999, p. 637). These supplies could then be controlled and manipulated as fluctuations in the environment occurred. It seems that prolonged drought sparked agricultural failure, which in turn led to social stress and increased inequality. Following drought, periods of heavy rainfall would have taken place (Erickson, 1999, p. 640),

leading to the displacement of a large population and the abandonment of major centers. The TDCM once again explains this phenomenon. The agricultural economy of these civilizations was in recession, and resulting from this economic crisis in the form of food shortages, social and political tensions erupted, causing instability in the Nasca and Moche political and social climates. Thus, vacillation of the environmental climate caused the anthropogenic climates (social, economic, and political) to fall into a state of disarray.

In the Central Andes, religious ideology and ritual practices dictated other facets of society. Religion helped to organize society into a rigid hierarchy, with political elites in control of natural resources. Agricultural technologies, such as irrigation canals and terracing, were orchestrated by the political elite, and often bounded the social structure of communities (Erickson, 2000, p. 327). In addition to organizing bifurcated political and social frameworks, religion also joined humans and nature, whereby the natural world and its forces were entities to be worshiped and respected. The canon of connectivity with nature taught by Andean belief systems allowed for societies to manipulate their natural environments sustainably. When short-term environmental fluctuations occurred, innovations were undertaken to restore balance to nature and stabilize the agricultural sector. It was only in the face of prolonged climatological flux that environmental degradation occurred and faith in religious ideology wavered, leaving Andean society in a state of dissolution.

Rapa Nui

Rapa Nui (Easter Island), is located in Eastern Polynesia (Figure 6), approximately 3200 kilometers from the western coast of Chile, and was settled between 800 C.E. and 1200 C.E. (Brander & Taylor, 1998, p. 121; Hunt & Lipo, 2006). Polynesian migrants settled this infinitesimal island, which has an area of just 164 km². Easter Island is unlikely to have been

organized around a centralized authority (e.g., Brocchi, 2010, p. 147; Stevenson, 2002), but was probably centered on small community groups (see Lipo et al., 2005; Morrison, 2012). As such, the island provides a glimpse into a highly isolated community-level society. Individual communities probably competed with one another for the highest social status on the island, which was marked by constructing the largest *moai* (monumental statue). The term for Rapa Nui's (and most eastern Polynesian islands') social and political organization is known as a *ramage*, which is a form of kin group organization based on genealogical ties (Martinsson-Wallin & Wallin, 2014, p. 325; Sahlins, 1955, p. 1037).

All individual groups on the island shared some level of cultural connection; the *ariki-mau* (divine king) was considered to be the supreme religious leader, possessing all of the spiritual power on Rapa Nui (Metraux, 1937, p. 59; Simpson Jr., 2009, p. 131). It was believed that the *ariki-mau* was intimately connected with nature, allowing for all of the essential environmental processes to take place (Fischer, 2005, pp. 121-122; Metraux, 1937, p. 54). Overall, the social and political organization on Rapa Nui was community based, and religious authority was centralized under a select few. Religion was used to control political,

economic, and social processes on the island, which Sahlins (1955) terms “esoteric efflorescence” (p. 1045).

On other Polynesian islands, such as Tikopia, religion was often used to achieve economic ends, and was responsible for the consumption of many economic and natural resources (Firth, 1970, p. 23). At the same time, communal projects (both ritualistic and economic) were undertaken at the direction of a centralized state, which allowed for the transformation of the island into an inhabitable location for humanity. On Rapa Nui, heavy landscape modification resulted in a landscape comprised of stones, oftentimes referred to as “lithic mulching” (Bork et al., 2004, p. 10).

Environmental-Religious Connectivity

Historically, agriculture on Rapa Nui has been limited by soil nutrients (Hunt & Lipo, 2012, pp. 193-194; Ladefoged, Flaws, & Stevenson, 2013, p. 1204). With a limited amount of cultivatable land and an increasing population size, new agricultural techniques were needed in order to prevent ecological disaster. The solution came primarily in the form of *manavai* (rock gardens) and lithic mulching (Hunt & Lipo, 2012, p. 191; Wozniak, 1999). Data from archaeological

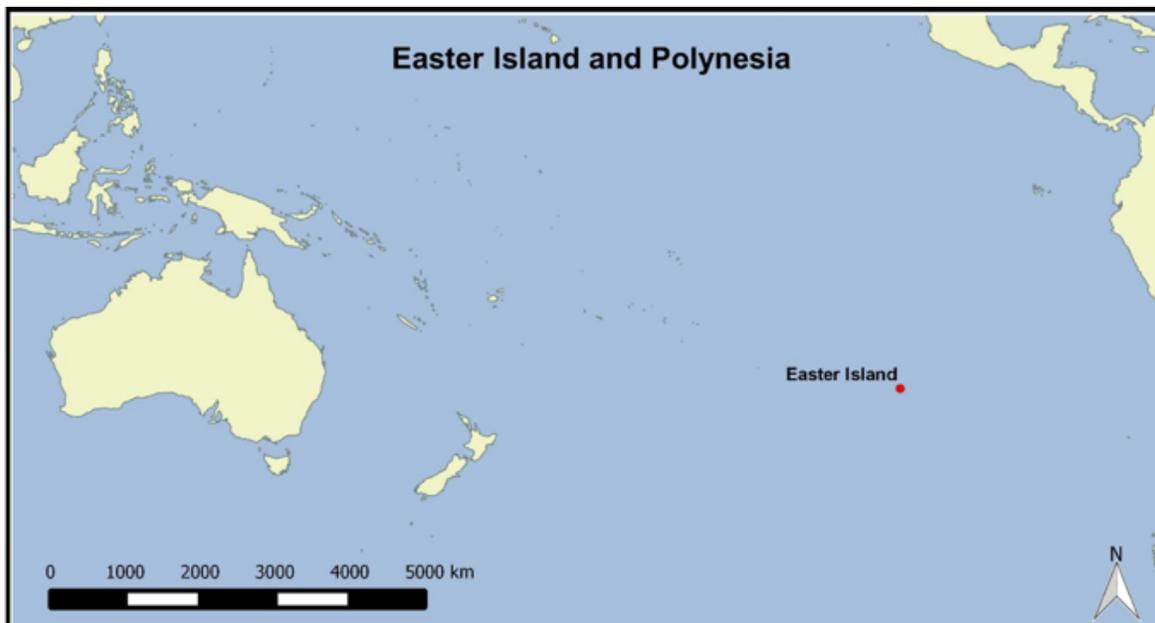


Figure 6. Map of Polynesia, highlighting the location of Easter Island (Rapa Nui).

excavations date rock gardening to a period of increasing social complexity beginning around 1400 C.E. (Ladefoged et al., 2013, p. 1204). According to Wozniak (1999, p. 96), lithic mulching was potentially the most important innovation made by the prehistoric inhabitants of Rapa Nui, allowing for sustainable food supplies even in times of environmental hardship. In what way, however, does this innovation relate to religious ideology?

Religion on Rapa Nui was largely political, in that it provided protection and prestige for the kin-group that took part in traditions and rituals (Fischer, 2005, p. 28). Polynesian belief systems state that all power is derived from the supernatural and is transmitted genealogically (Richards, Croucher, Paoa, Parish, & Tucki, 2011, p. 197). The *ariki-mau* was the entity that provided for fertile soil and agricultural success (Metraux, 1937) and acted as an intermediary between mortal and supernatural dimensions. According to Routledge (1919, p. 242), the *ariki-mau* would perform rituals to the god of the sky in times of drought to bring forth rain. In this way, religious rites brought rain to improve the soil and allow crops to grow, emphasizing religious-environmental connections. Additionally, ceremonial platforms known as *ahu* were positioned in locations from which major resource sectors of the island were visible (Hamilton, 2007, p. 53). The *moai* were positioned on top of these *ahu*, and would have been able to “see” activities taking place, including agricultural production; this emphasizes the connection between religion and landscape use. Lithic mulching and *manavai* were also symbolically important due to their material: stone. Stone was considered to be a living thing, and *moai*, constructed of quarried stone, were embodiments of gods and ancestors (Hamilton, Thomas, & Whitehouse, 2011, p. 185). Additionally, stone was “a substance of construction that linked ceremonial, funerary and elite contexts and the world of the everyday” (Hamilton et al., 2011, p. 172). Spatial patterning

and material composition hint at religious connections to cultivation practices.

The ‘elite’ of Rapa Nui oversaw many aspects of society, and food production was among the features directly controlled by the ruling class (Kennett & Winterhalder, 2008, p. 91; Simpson Jr., 2009, p. 131)¹. For islands such as Rapa Nui, resource scarcity was a very apparent threat, and agricultural innovation was one aspect of Polynesian society that was dictated by politics and religion. Archaeological and statistical analyses by Martinsson-Wallin and Wallin (2014, p. 335) reveal that politically empowered individuals built their settlements in regions of the island that were most favorable in terms of access to natural resources. The settlement pattern of ‘elites’ allowed for better control and observation of resource sectors, including the monitoring of agricultural technologies such as *manavai* and terraces (Simpson Jr., 2009, p. 143).

Peace or War?

Rapa Nui society notably lacks evidence of violence prior to the arrival of Europeans (Hunt & Lipo, 2012, p. 98), with an absence of defensive architectural structures as well as a lack of skeletal evidence of trauma. The presence of *mata’a* (flaked obsidian tools) have been cited as evidence of increased warfare (e.g., Kirch, 1984, p. 274), but recent research by Lipo, Hunt, Homeman, and Bonhomme (2016) indicates that such tools were almost certainly not used as weaponry. It was not until the arrival of the Europeans in the late 18th century that Rapa Nui society fell into violence and disarray, caused by the introduction of Old World disease and environmental catastrophe (Rainbird, 2002, p. 448).

Globally, archaeological studies reveal correlations between food shortages and violent competition (Keeley, 2016, p. 295). Brander and Taylor (1998, p. 132) suggest that violence and warfare is commonly the result of the degradation

of vital resources. On Easter Island, this only occurs after society entered a state of decline following the arrival of Europeans. Furthermore, the agro-economy that developed on Rapa Nui was threatened only after European contact in the 18th century (Mulrooney, 2013, p. 4384), leading to an imbalance in the economic climate. This imbalance may have destabilized other aspects of Rapa Nui society, such as the social and political organization of the island, once again illustrating TDCM. Archaeological examination thus far shows no evidence of widespread abandonment of inland or coastal residencies, but rather suggests continuous habitation of sites into the post-European contact era (Mulrooney, 2013). Tanner and Pawson (2004) assert that “[h]uman societies quarrel over immediate issues that are popularly understandable and indeed find it easier to fight than to compromise” (p. 123). However, the people on Rapa Nui demonstrate the complete opposite of this claim. How, then, is it possible that such a small island could have such peaceful inhabitants?

Due to the small size of Easter Island, close familial ties linked many individuals, and as a result there appear to be strong social norms encouraging individuals to reach a consensus rather than resort to armed conflict (Hunt & Lipo, 2012, p. 106). For example, family disputes do not usually result in murder. This concept of ‘kin-selection’ may play a role in evolutionary processes, whereby genetic similarity helps to favor cooperation over conflict (Denison & Muller, 2016). Diplomacy generally works its way into familial tensions, limiting violent outbreaks. This same phenomenon seems to have occurred at Rapa Nui.

In addition to having close genealogical ties, Easter Island’s population was fairly small. According to Smith and Price (1973), in order for a group to be evolutionarily stable it must adopt a strategy favoring ‘limited war’ and compromise. This idea is expressed through computer simulations and game theory, whereby ‘total war’

strategies are less successful than ‘limited war’ strategies. Hunt and Lipo (2012) build on this model and come to the same conclusion: a small population with limited resources and a lack of opportunity to leave the island attributed high costs to interpersonal violence, favoring peaceful strategies over violent outbreaks. Such peaceful strategies are best explained through costly signaling theory and conspicuous consumption (see Bliege Bird & Smith, 2005; McAndrew, 2002; Neiman, 1997; Sosis & Alcorta, 2003). According to costly signaling theory, an individual’s prestige is elevated by the price or cost of the display. The more elaborate the display (e.g., a feast, monumental architecture, religious ceremony) the more prestige and status the host receives.

Ecological Catastrophe and Ideological Transformation

Archaeological examinations of Rapa Nui reveal that the political hierarchical structure was controlled by individual communities, and was not (as previously thought) highly centralized. The *ariki-mau* was the religious leader of Rapa Nui, and was in charge of many important ritualistic functions. In times of environmental ambiguity, the *ariki-mau* was sent to perform religious rites in order to restore ecological balance to the island (Metraux, 1937, p. 55). The importance placed on nature by Rapa Nui society was largely the result of a religious system that revolved around natural phenomena. Natural disasters (i.e., El Niño events, drought, famine, disease, etc.) were a substantial threat to the entire island’s population.

Following European contact, the structure of Rapa Nui’s society changed, particularly the religious hierarchy. The “Birdman Cult” strongly challenged the religious supremacy of the *ariki-mau*, whose power slowly eroded. The only temporary legitimacy that the *ariki-mau* was able to claim was through the newly introduced concept of writing (Fischer, 2005, p. 63). Through

writing, the *ariki-mau* established a new set of rituals revolving around chants written down on tablets, known as the *rongorongo* (Fischer, 2005, p. 64). However, this legitimization proved to be only a temporary solution.

The arrival of Europeans threatened traditional ideologies of Rapa Nui. The presence of Europeans completely altered the islanders' traditional ideologies because "gods" on foreign ships brought desired goods (Hunt & Lipo, 2012, pp. 153-154; Routledge, 1919, p. 239). The construction of *moai* appears to cease after European contact, signaling a change from an ideology based in tradition to one based in contemporary observations. Faith in the old ideology was shaken by the appearance of 'gods' that were observable and (for the most part) gracious, bringing numerous items for trade. The introduction of disease also played a role in the breakdown of traditional belief systems by severely limiting the population; in 1867, the last *ariki-mau* died of tuberculosis (Fischer, 2005, p. 101).

Discussion

The first hypothesis postulated in this article asserts that religious convictions that emphasize the connection between humanity and the natural world assist in the development of environmentally conscious practices. This is especially true for economic practices related to resource acquirement, including agricultural production. The second hypothesis states that in times of prolonged environmental alteration religious systems often break down, resulting in societal fragmentation. These hypotheses are substantiated through the use of archaeological case studies from the Central Andes and Easter Island.

Archaeological evidence from the Central Andes and Easter Island demonstrates how religious ideology that emphasized a connection between humans and their environment encouraged

manipulation of the landscape in ways that benefited human growth, but did not disrupt the ecological status quo. Religious practices of the Moche and Nasca cultures, as well as the religious traditions of Easter Island, were deeply rooted in nature-worship and human-environmental connectivity. Such animistic systems have been known to influence human environmental relationships (Hodder, 2016, p. 49). Rituals were performed to appease deities that controlled rain in order to end droughts, with such rites often led by omnipotent leaders. Religious and secular forms of power were intertwined; in the Central Andes, elites used religion to assert their power. Religion and politics divided some societies into rigid hierarchical orders (i.e., the Nasca and Moche), while others remained highly uncentralized (i.e., Rapa Nui). Religion served as the backbone for public works. This was especially true for agricultural innovations, including irrigation canals, terraces, and stone mulching, but also applied to cultural activities, such as the construction of massive statues.

Religion provided prehistoric groups with common ties, thereby amalgamating them into unified societies. Nonetheless, religion also separated the masses and assisted with social division, which frequently led to conflict. In times of prolonged stress, especially in the Andes, societies often resorted to warfare. This was not the case for Rapa Nui, partially due to kin-selection and the devastating consequences of 'total war' strategies on a small population. As a result, compromise was often the preferred method of conflict resolution. Despite this, both locations were agrarian, and agricultural surplus was often the difference between tranquility and pandemonium. During periods of short-term ecological stress, religious faith is frequently strengthened, as are the political and social systems connected to this ideology. However, in times of prolonged ecological stress, systems often break down, sometimes leading to the abandonment of settlements.

Conclusion

People are defined by the environments that surround them, and to claim that people are independent from nature is a fallacy. At the same time, to state that humans are at the mercy of nature is also incorrect, as innovations have repeatedly saved and improved human life. This study seeks to explain how environmentally-based ideologies help lead to the development of ecologically sustainable innovations that improve standard of living without doing irreversible damage to the surrounding natural world. If the importance of nature is vital to a society's core ideology, measures will be taken to ensure sustainable usage of the environment and its resources. On the contrary, humans are, to some degree, at the mercy of the environmental climate in terms of uncontrollable elements (e.g., precipitation, temperature). In times of environmental instability, religious beliefs become strengthened due to successful rituals (e.g., prayers for rain result in the end of a period of drought). However, if poor conditions persist for long durations (decades, centuries, etc.), then faith in consistently failing rituals will waver, leaving a society in an unstable state. Ultimately, it must be understood that care for one's environment leads to successful innovations that allow for humanity to thrive without irreversibly damaging the surroundings. However, unpredictable and lengthy periods of negative environmental conditions can weaken social, political, and economic constructs as well as their controlling ideologies.

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¹ The exact nature of "elites" in the loose community based political organization becomes slightly ambiguous. In order to avoid any inaccurate labelling,

"elite", for the purposes of this discussion, refers to groups, families, or individuals who manage and organize group activities.

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