

**The Role of Traditional Storytelling in El Niño Preparedness in La Libertad, Peru**

Ingrid Lucia Patricio Esquén

University of Arizona

College of Architecture, Planning and Landscape Architecture

SBE 498 – Senior Capstone

Advisor: Dr. Nataliya Apanovich

December 2024

## Table of Contents

<b>Abstract.....</b>	<b>04</b>
<b>Introduction.....</b>	<b>05</b>
<b>Research Question.....</b>	<b>13</b>
<b>Methods.....</b>	<b>13</b>
<b>Results.....</b>	<b>16</b>
<b>Discussion.....</b>	<b>25</b>
<b>Conclusion and Recommendations.....</b>	<b>31</b>
<b>References.....</b>	<b>33</b>
<b>Appendix.....</b>	<b>37</b>

## **List of Figures**

Figure 1: Atypical increase in temperature in the coastal regions of northern Peru.....05

Figure 2: Map of La Libertad, Peru.....13

## **List of Tables**

Table 1: Table of themes and subthemes found after interviews with Moche parents....16

# **The Role of Traditional Storytelling in El Niño Preparedness in La Libertad, Peru**

Ingrid Patricio

## **Abstract**

This research investigates the role of traditional storytelling in disaster preparedness, focusing on the impacts of the El Niño phenomenon in La Libertad region of Peru. This study examines the intergenerational transfer of knowledge among members of La Libertad and emphasizes the contributions of grandparents in teaching younger generations about environmental patterns, and disaster mitigation practices. The findings of this study reveal the importance of oral storytelling, including natural processes, myths, and observations of natural signs in strengthening community preparedness. However, there are challenges as urbanization, digital media, and Peruvian educational systems that overlook traditional knowledge and threaten the preservation of these sustainable practices. Through interviews with parents from La Libertad and native experts, this research identifies opportunities to integrate native storytelling into formal education, combining traditional knowledge with modern science to improve disaster preparedness and maintain cultural heritage. This study advocates for educational programs and community hands-on practices that promote that future generations can be equipped to face climate challenges while honoring traditional wisdom.

**Key words:** traditional storytelling, disaster preparedness, El Niño, La Libertad, sustainability

## Introduction

Around the world, the impacts of climate-related disasters such as droughts, wildfires, and floods have been intensifying (Schroeder, 2020). The negative impacts of these disasters range from economic to social to environmental (UNDRR, 2015). For example, in Peru, in the last five years, the El Niño phenomenon has cost \$30 billion in disaster management, representing 1.3% of the country's GDP (De La Torre, 2024). In addition, it has caused environmental degradation, such as the destruction of coastal ecosystems, soil erosion, and loss of biodiversity (Schroeder, 2020). In fact, El Niño has been one of the most consequential disasters in Peru due to its direct and indirect impacts (Schroeder, 2020).

El Niño is a climatic phenomenon that alters global weather patterns in the Pacific Ocean, causing extreme events as droughts and floods across the globe (USGS, 2008). In Peru, its impact is strongest in the northern coastal regions (Figure 1), where El Niño episodes evoke intense rainfall and flooding. This significantly affects local communities and their infrastructure due to the proximity to the coast and low-lying areas (Bayer et al., 2014). For example, during the 1997-1998 events, these regions experienced extreme rainfall that led to rivers overflowing and damaging infrastructure (Bayer et al., 2014).

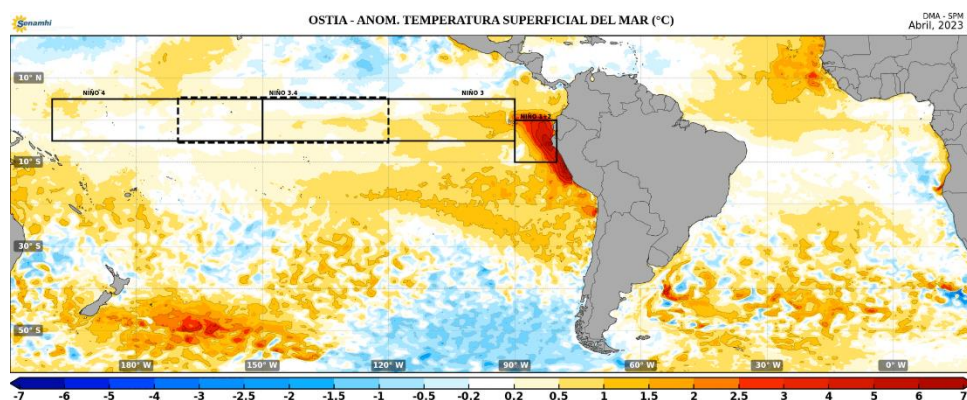


Figure 1. Atypical increase in temperature in the coastal regions of northern Peru (Agencia Andina, 2024).

During these El Niño events, more than 500 people lost their lives due to intense rains and flooding, primarily in the northern coastal regions such as La Libertad and Piura (CIIFEN, 2015). Around 110,000 homes were destroyed and displaced hundreds of thousands of people. Urban infrastructure was severely damaged, which hindered rescue and recovery efforts (Bayer et al., 2014). Economic losses were estimated at approximately \$3.5 billion USD, especially in the agricultural sector due to crop loss and the destruction of irrigation systems (USGS, 2008). Although recovery efforts were implemented by the government and international organizations like humanitarian aid, the recovery was slow due to limited local response capacity and lack of resources (CIIFEN, 2015).

It wasn't until another El Niño disaster in 2017 that the Peruvian government passed an institutional initiative to address the negative impacts of El Niño. This initiative, the National Council for Risk Management of the El Niño Phenomenon (CONAGERD), is responsible for coordinating the preparation of contingency plans, allocating resources for mitigation infrastructure, and training in safety measures (French et al., 2020). In addition, in 2023, the government implemented risk reduction measures such as river cleaning to prevent flooding and improve water management, as well as regulations to avoid construction in hazard zones (SIGRID, 2021). These initiatives were much needed, but they weren't sufficient in addressing the scope of the issue (Contreras, 2023). It is important, therefore, to engage different sectors of the society to help address El Niño induced disasters.

Climate change disproportionately affects vulnerable populations including children and young people. In South America, El Niño phenomenon claims hundreds of children's lives, especially in countries like Ecuador and Peru, where prevention is severely lacking, and the causes of these events are often not taught to children. Murillo et al. (2021) highlights how early-life exposure to El Niño-related floods can lead to long-term negative outcomes for children. These impacts include increased health risks, both physical and psychological.

Physical risks include a prevalence of infectious diseases, such as acute respiratory infections and gastrointestinal disorders, exacerbated by flooding and unsanitary conditions (Hanna & Oliva, 2016). Families in these regions often already face reduced income and food insecurity, which has consequences on children's development (Hanna & Oliva, 2016). Studies have shown that early exposure to El Niño disasters can lead to heightened rates of anemia, malnutrition, and cognitive developmental delays (Rosales-Rueda, 2018).

Additionally, children exposed to these events are more likely to suffer from psychological issues such as post-traumatic stress disorder, anxiety, depression, and cognitive deficit. These mental health challenges arise not only from the direct effects of natural disasters but also from the indirect consequences, such as food shortages, displacement, and family stress (Aguilar and Vicarelli, 2022). Prolonged exposure to these stressors can impair children's emotional regulation, increase aggression and contribute to long-term developmental challenges (Burke et al., 2018), thus negatively contributing to their overall life experiences.

Educating children on El Niño impacts can prevent some of these negative physical and psychological risks from occurring. Despite growing awareness of the importance of disaster preparedness, the involvement of young people in these risk reduction efforts, particularly in vulnerable regions, remains insufficient. This happens because of limited access to education, a focus on immediate aftermath of El Niño events, and cultural attitudes that do not value children's perspectives (Tanner et al., 2009). By engaging children in natural disaster prevention and management, they can gain valuable disaster response skills, become emersed in a culture of preparedness from an early age, and share disaster preparedness with other community members (Plan International, 2011).

Today, there are several South American programs aimed at educating young people about how to mitigate global impacts and react to climate change phenomena. One way is by

educating people on climate change science, impacts, and response. For example, the Sendai Framework for Disaster Risk Reduction, developed by the U.N., emphasizes the role of communities and children in managing climate change related risks (UNDRR, 2015). This approach acknowledges that the national government has the primary role in disaster risk reduction but highlights that this responsibility must be shared with regional governments, private sector, and society, including both adults and children. The latter are seen as important actors in building resilience and creating a culture of preparedness (UNDRR, 2015).

Another program is Climate Change and Environmental Education, which promotes the integration of climate change and education into school curricula (UNICEF, 2015). The goal is to enhance the understanding of climate science, develop critical thinking, and promote sustainable behaviors. This program develops educational materials, trains teachers, and creates hands-on activities like school gardens and sustainability clubs, empowering students to engage in ecofriendly initiatives. With a reach across many countries in South America and a direct impact on approximately two million children, this program has resulted in 70% of students adopting more sustainable practices. This led to decreased waste from school and increased rainwater harvesting and organic farming practices (UNICEF, 2015).

Another example can be found in Brazil, where UNICEF collaborates with local governments to organize school workshops on natural disasters. This initiative is part of the UN Environment Program (UNEP) called TUNZA, which organizes youth conferences to discuss global environmental issues. During these events, children share their ideas and projects while participating in reforestation, recycling, and awareness campaigns focused on preserving the Amazon rainforest (UNEP, 2013). The TUNZA initiative has shown considerable success in engaging youth and promoting environmental stewardship. Success was measured through surveys that assessed knowledge and behavior changes, evaluations of community impact from participant-led projects, and long-term tracking of involvement in



environmental advocacy (UNEP, 2013). As a result, over 2,000 young people have participated globally in these initiative with 60% adopting more sustainable practices and 80% sharing their knowledge with other family members. Additionally, TUNZA has helped in local community projects to make them achieve their environmental goals, leading to the planting of over one million trees around the world (UNEP, 2013).

While institutional efforts to mitigate the impacts of the El Niño phenomenon have been made, ongoing distrust between Peruvian citizens and local authorities remains a significant obstacle (Dapieve & Zubieta, 2020). This mistrust, which is largely due to a history of corruption, poses a crucial challenge in dealing with future El Niño events. Continued corruption undermines public trust by misappropriating funds intended for disaster preparedness and response, leading to ineffective government initiatives and broken promises (UNDP, 2013). As a result, citizens feel abandoned and skeptical about the commitment of authorities to their safety (Oxfam America, 2017). To bridge the gap between the ongoing distrust of authorities and the need for effective disaster management strategies, citizen-driven approaches are crucial in vulnerable communities.

Citizen-driven approach such as storytelling can be an effective response to the gap between what the government can do to help the people and what the people actually need. One example of this citizen-driven approach can be found in Piura where a story-telling program “Rescuing Ancestral Knowledge about the El Niño Phenomenon in My Community” (RECUST) plays an essential role in educating younger generations about adaptation strategies (Bell et al., 2023).

This initiative gathered memories from the elders about the El Niño events that happened from 1998 and 2017 in northern Peru by teaching intergenerational oral history skills to students. Through workshops with students and their parents, the program collected

knowledge through interviews, videos, written stories and recorded oral stories. All of this helped to engage the whole community, including the children, in learning about the El Niño phenomenon and its negative impacts on the environment and people.

However, despite these educational efforts, not all children have access to the same storytelling resources, thus precluding them from participating in similar initiatives. In many cases, the knowledge children have about El Niño and how to mitigate its impacts is taught only by their parents. This highlights the importance of strengthening the role of storytelling at home, as intergenerational knowledge transfer plays a critical role in preparing children for future climate challenges. This way of knowledge transfer doesn't require many costly resources and thus serves as an accessible solution to many families in La Libertad.

Traditional storytelling as an educational tool can serve as a unique way of understanding knowledge that differs from traditional methods (Nthogo, 2017). It is an integral aspect of everyday communication, allowing people to share life experiences and cultural narratives that link the past, present, and future.

The benefits of using traditional storytelling as an educational tool are significant since native people have a detailed and expansive understanding of the natural world. This wealth of knowledge allows for a deeper appreciation of local ecosystems, season changes, and weather patterns. This ecological perspective facilitates cultural preservation by passing down values from generation to generation since traditional storytelling plays a critical role in the adaptation to climate change. These stories inform contemporary strategies for community resilience to be used for the development of localized risk management plans that address their vulnerabilities (Nthogo, 2017).

Despite its advantages, there are social challenges associated with traditional storytelling. Modern technologies have diminished the role of traditional storytelling practices,

as younger generations increasingly turn to digital media for information and entertainment. This shift is problematic because it can lead to a loss of control over the ability to understand and interact with the natural world, creating dependency on sources that may not be reliable. Moreover, the rise of digital platforms often prioritizes mainstream narratives over native perspectives. This can marginalize native voices and dilute the richness of diverse storytelling traditions. As children gravitate toward digital media, they may lose touch with their cultural roots and identity, leading to a disconnection from their heritage and a weakening of their sense of belonging within their community (Poitras, 2019).

In Peru, traditional storytelling is a vital tool in natural disaster management, especially among the Quechua and Aymara communities in the Andes, the Asháninka communities in the Amazon and the coastal cultures such as the Chincha and Moche. These native communities have faced natural disasters as landslides and floods, and used their traditional narratives to pass down the knowledge of these events. For example, stories describing historical flooding events in the Sacred Valley provide lessons on effective practices for selecting safe locations (Covey, 2006).

Coastal communities, as the Moche, have developed oral narratives that convey the importance of respecting the sea and understanding its patterns, which are crucial for fishing practices. These stories highlight the consequences of overexploitation and the need for sustainable practices to protect marine resources (Benson and Cook, 2001). Furthermore, these narratives include spiritual dimensions, which emphasize the relationship between nature and the people. In the Asháninka native community, for example, stories about the origins of their land and its resources motivates their members to engage in practices as reforestation and flora and fauna conservation (Schneider, 2022).

To fully harness the potential of traditional storytelling in disaster management, it is necessary to integrate these narratives into formal education. This approach not only validates traditional knowledge but promotes collaboration between traditional and modern practices, leading to more effective disaster risk reduction strategies (Mercer et al., 2010).

However, today there is limited information on how traditional storytelling in Peru is related to disaster management during El Niño. This gap is concerning as native communities, which often depend on agriculture and natural resources, are disproportionately affected by these events.

To fill this gap, this research project will analyze the role of traditional storytelling in natural disaster management, specifically regarding the El Niño phenomenon. Through interviews with parents in La Libertad and literature review, the study will explore how traditional stories can help prepare children to mitigate the impacts of this phenomenon.

This research presents a different approach to think about preventing and managing natural disasters by including native knowledge in children's education. Native stories about El Niño teach vital lessons on environmental patterns, resource management, and resilience. By blending these teachings with modern science, the study aims to create more effective disaster strategies that engage communities and empower future generations to confront climate challenges. This holistic approach could be the key to help reducing disaster impacts in vulnerable areas while preserving native cultures.

### **Research Question**

What is the role of native storytelling in mitigating El Niño impacts in La Libertad region of Peru?

## Methods

### Study Site

The study takes place in the La Libertad region of Peru, specifically focusing on the coastal areas inhabited by the Moche people. La Libertad is a large region in northern Peru that includes a variety of cities and towns (Figure 2). The most prominent city is Trujillo, the capital of the region, with a population of over 970,000 people (INEI, 2023). Other notable cities are Chepén, Pacasmayo and Ascope, having a total population of approximately 2 million people (INEI, 2023), with the majority of Moche people living in urban areas like Trujillo. The study participants come from Chepen and Trujillo.

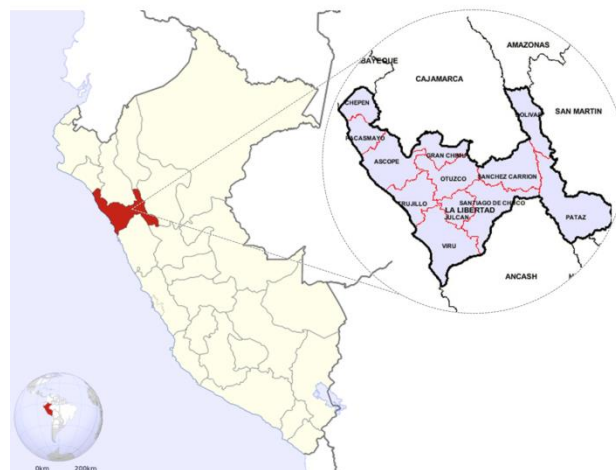


Figure 2. Map of La Libertad, Peru (Peru Top Tours, 2010).

The Moche culture, which developed in northern Peru from approximately 100 to 800 CE, is known for its advanced agricultural practices such as irrigation systems and terracing, pottery, and diverse religious beliefs (Moseley, 2001). Today, the community lives with a mix of modern and traditional practices both in rural and urbanized areas. While many engage in contemporary professions, many coastal communities still maintain their connection to the land and sea. Cultural elements like storytelling, oral traditions, and religious rituals are significant to this day. Storytelling and festivals as Carnaval de Huanchaco and Campeonato de Chicama remain important for preserving the Moche community's cultural identity (Hernández et al.,

2019). These festivals provide opportunities for community bonding and reinforcing the values and traditions that define Moche heritage.

This region is particularly vulnerable to the impacts of the El Niño phenomenon, which can result in severe flooding, land degradation, and disruptions to local economies (Schroeder, 2020). The Moche people have a rich oral tradition that encompasses stories about their environment like the importance of the ocean, seasonal changes, and historical experiences with natural disasters (Benson & Cook, 2001). La Libertad's native history and vulnerability to El Niño make it a good place to study the link between native storytelling and natural disaster management in an urban area where traditional practices are being replaced with modern way of life.

### **Study Design**

This qualitative research explores the role of native storytelling in El Niño disaster preparedness and management. The study engages Moche community members, particularly parents, to gather insights on traditional narratives surrounding El Niño. The study relies on interviews to solicit experiences and perspectives of those who practice native oral traditions.

### **Data Collection**

Data is collected from interviews with parents and native scholars. Individual interviews with parents from La Libertad are conducted to gather narratives about El Niño and its environmental impacts as well as social challenges associated with disaster prevention, preparedness, and response. These interviews focus on personal experiences with past El Niño events, traditional stories passed down through generations surrounding El Niño and climate change, and their role in educating children about disaster preparedness. The interview participants consist of four parents who are my relatives, all of whom were born and currently

reside in La Libertad. The interviews were conducted online via video calls, providing a flexible environment for participants to share their narratives.

Interviews with experts are conducted to solicit a broader academic and cultural perspective on how traditional storytelling can be used to prepare children for disaster management and integrate that knowledge into formal education. The experts were identified through academic recommendation and personal connections. One expert is Peruvian and is related to the Moche community by heritage and holds a Master's degree in Education with a focus on Peruvian History. The other expert is American, part of a native community, and holds a Ph.D. in Natural Resources. One expert was interviewed in person, while another, located in Peru, was interviewed online. These interviews were scheduled during the weeks of data collection, allowing for flexible timing that accommodated the participants' availability. This approach enabled a rich exchange of ideas on the role of traditional storytelling in disaster management and its integration into formal education.

### **Data analysis**

All interviews are recorded, transcribed, and translated. The data are coded and thematically analyzed following Braun and Clarke's (2006) framework for thematic analysis, which involves to identify, analyze, and report the patterns (themes) within the data. This analysis follows a deductive approach, as pre-identified themes guided the coding and categorization process, based on previous research (Crabtree & Miller, 1999). This process begins with familiarization, where it is essential to read and re-read the data, noting initial ideas. Then, generating initial codes, coding relevant features. After that, it is essential to search for themes through code collection into potential themes and gathering all relevant data for each theme. Data was analyzed according to the following identified themes: Knowledge transfer actors, The knowledge transferred, Environmental impacts, Social challenges, Economic

impacts of El Niño, Traditional practices to prevent natural disasters and Suggestions from the parents to keep traditional knowledge alive. Finally, the results are presented, selecting vivid examples, providing a detailed narrative of how the themes answer the research questions, and linking them back to existing literature.

## Results

### *Knowledge transfer actors*

Four Moche parents were interviewed on their traditional knowledge on El Niño and climate-related disaster preparedness. The traditional knowledge transfer was reported between different generations. For example, interviewees reported receiving knowledge from parents and grandparents: *“I use the stories my grandparents and parents told me to teach my son about the El Niño phenomenon.”*

Table 1. Table of themes and subthemes identified from the interviews with Moche parents.

Themes	Sub-themes				
<b>Knowledge transfer actors</b>	Parents & grandparents				
<b>The knowledge transferred</b>	Holistic understanding of the natural world	Separate natural elements	Natural processes	Myths	Signs of nature
<b>Environmental impacts</b>	Changed rivers	Destroyed farmland	Unpredictable sea		
<b>Social challenges</b>	Digital media age	Social disconnectedness	Lost art of storytelling	Lost connection to the past	
<b>Economic impacts of El Niño</b>	Increased food prices				
<b>Traditional practices to prevent natural disasters</b>	Tree planting to protect the soil	Care for livestock	River cleaning and drainage	Reducing waste	
<b>Suggestions from the parents to keep traditional knowledge alive</b>	Climate change education in schools	Emergency response	Invite elders to school to share their knowledge	Create programs for practical skill sets	At-home education

### *The knowledge transferred*

- *Holistic understanding of the natural world*

The interviews reported a holistic understanding of nature, seeing everything in the natural world as interconnected. Interviewees reported that nature and climate are not separate



elements but a system in which each component interacts with the other. This perspective focuses on respecting nature while recognizing that maintaining the balance of these elements is crucial for everyone's well-being: *"Nature has a balance, and when that balance is disrupted, we face the consequences."*

- *Separate natural elements*

Parents reported that ecosystem components, like rivers, the sky, the sea, and the land, play essential roles in their daily lives and environmental stability. For instance, the river is viewed as an indicator of significant climate changes; if the river overflows or changes color, it signals that intense rains or other natural events may be approaching. *"The river can warn us," shared one parent, "it's like it lets us know when something big is coming."*

- *Natural processes*

Natural processes, such as floods and heavy rains, are interpreted by the parents as phenomena that nature uses to restore balance. However, these processes also represent challenges, such as intense rain or floods that can destroy crops and impact their homes. Parents reported that understanding how and when these natural processes occur allows them to anticipate their effects and better prepare to protect their families: *"Before, my grandparents would have recognized the signs and warned us about the heavy rains that could flood our home."*

- *Myths*

Interviewees reported that myths are an essential part of the traditional knowledge that parents have received and now pass on to their children. For example, stories explain heavy rains and river overflows as manifestations of the *"anger of the gods"* or responses to human actions. These stories help new generations understand the importance of respecting and caring

for nature: *“These stories make us understand that the land gives us everything, but we must respect it.”*

- *Signs of nature*

Parents reported that observing signs in nature, as animal behavior or changes in the color of the sky, is knowledge passed down from grandparents to younger generations. For example, when birds change their behavior or when the sky changes its shade, they know that a change in the weather is likely: *“Nature sends us signals, and we need to learn to understand them to protect ourselves.”*

### ***Environmental impacts***

- *Changed rivers*

The Moche parents reported how the course of rivers has dramatically changed due to climatic changes, altering landscape and threatening their communities. They described how these changed river flows disrupt the community’s ability to predict and prepare for El Niño events. *“The river has changed, it no longer flows the way it used to, and now it overflows, creating new paths.”*

- *Destroyed farmland*

Parents reported that due to the increase in extreme weather events, the farmland in the region has suffered significant destruction, endangering food security. Heavy rains and floods have wiped out crops, leaving families with reduced harvests and fewer resources. One parent reported: *“El Niño has changed the rivers course, destroyed farmland, and left us without anything to eat.”*

- *Unpredictable sea*

Interviewees reported that the sea, which used to offer a stable source of food and income, has become increasingly unpredictable. Parents observed that changes in sea

conditions make it difficult to safely navigate and predict catches. *“The sea is no longer the same, it used to be calm, but now we don’t know what to expect.”*

### ***Social Challenges***

- *Digital media age*

Parents shared that digital media age has transformed how young people interact with the world, often shifting focus away from traditional knowledge. They reported that the constant access to digital content created a gap between generations: *“Now, young people are always on their phones, and they’re less interested in learning about the land and the nature.”*

- *Social disconnectedness*

Interviewees reported concern over the growing sense of social disconnectedness within their communities, especially among the youth. They noticed that people are spending less time engaging with each other in person, resulting in a separation that makes it harder for younger generations to feel rooted in their community. *“We used to gather and share stories, but now everyone is more isolated,”* shared one parent.

- *Lost art of storytelling*

The interviewees reported that the art of storytelling has faded over time. Traditionally, stories about nature were shared daily, helping younger generations understand their environment. *“Stories were part of everyday life,”* one parent shared, *“but now, they’re rarely told, and our children miss learning these important lessons.”*

- *Lost connection to the past*

Parents reported that the feeling of the connection to the past is fading, as modern influences replace ancestral knowledge. For those who have moved to urban areas, like Lima, the disconnect is even more pronounced. *“Now that I live in Lima, I see that young people don’t feel connected to our traditions or stories anymore.”*

### ***Economic impacts of El Niño***

- *Increased food prices*

The interviewees reported that the extreme weather events lead to increased food prices, which puts a strain on local families. They reported shared that families often find themselves spending more on processed food, which can stretch their already tight budgets. One interviewee reported: *“El Niño affects everything, especially food prices, making it harder for us to provide for our families.”*

### ***Traditional practices to prevent natural disasters***

- *Tree planting to protect the soil*

Moche parents emphasized the importance of tree planting as a traditional practice that helps protect the soil from erosion and degradation. They reported that this practice reflects their commitment to environmental stewardship and helps combat the effects of climate change. *“Planting trees has always been a way for us to care for the land,”* one parent explained.

- *Care for livestock*

Interviewees reported that caring for livestock is another crucial traditional practice that has been passed down through generations. The Moche parents reported that raising animals is essential for their livelihood: *“From a young age, I was taught how to care for our animals.”* Interviewees also highlight that livestock provides not only food but company and a connection to their heritage and it should be taught to the younger people too: *“People need to learn how to protect the soil and care for the livestock since kids.”*

- *River cleaning and drainage*

Interviewees reported that river cleaning and maintaining drainage systems are vital traditional practices for the Moche community, helping to prevent flooding and maintain the

health of local ecosystems. Parents shared: *“Cleaning the river is something we do together as a community; it’s our responsibility.”*

- *Reducing waste*

Parents reported the importance of reusing materials and minimizing unnecessary waste in their daily lives. They reported that this principle not only reflects respect for nature but also fosters a sense of responsibility toward future generations. *“We learned from our grandparents to use everything wisely,”* one parent shared.

### ***Suggestions from the parents to keep traditional knowledge alive***

- *Climate change education in schools*

The Moche parents reported how strongly they advocated for incorporating climate change education into school curricula to equip future generations with the knowledge they need to understand environmental challenges. *“Our children should learn how climate change affects us directly,”* one parent stated. They reported the importance of schools teaching students about the mechanisms of climate phenomena and their impacts on Peru: *“When the sea warms up, it can change the climate throughout the country.”*

- *Emergency response*

Parents reported the importance of training in emergency response to prepare children for unexpected natural disasters: *“Schools should teach kids what to do in case of floods or earthquakes.”* They reported how providing students with the tools and knowledge to respond effectively to emergencies can save lives and reduce panic during critical situations.

- *Invite elders to school to share their knowledge*

Interviewees reported that inviting elders to schools to share their experiences and wisdom could help to bridge the generational gap and preserve traditional knowledge: *“Elders have so much to teach about the land and our history.”* They reported that bringing elders into

the classroom can enrich students' understanding of their culture and the environment, creating a valuable connection between past and present: *"It is necessary to invite the elders of the community to give talks to children about how their ancestors handled natural disasters."*

- *Create programs for practical skill sets*

Parents reported that creating programs focused on practical skills is relevant to their community, as planting, fishing and farming. *"We need programs that teach children the skills they will actually use here (Moche community),"* one parent explained. *"Schools should even create programs where children learn practical skills, for example, farming."*

- *At-home education*

Parents reported the importance of continuing education at home, where families can reinforce lessons learned in school and share their cultural knowledge. *"We must persist in teaching our children about our traditions and how to care for our land."* Moche parents reported that prioritizing education at home, families can ensure that children grow up with a strong understanding of their roots, nature responsibility, and the practical skills needed to prosper in a changing world.

### ***Interviews with experts***

- *An expert in native resiliency*

The American expert on native resiliency reported significant concerns about the effectiveness of schools in incorporating traditional wisdom about climate phenomena: *"I don't know of any school [in the U.S.] that is really incorporating native knowledge in a meaningful way."* He also empathized the missed opportunity in educational policies that fail to recognize and value experiences. He reported some small efforts, such as teaching children to plant seeds, but it was highlighted that these initiatives are just a beginning. The primary challenge identified was the lack of interest from younger generations, who often lose their connection

to traditional oral stories due to their modern and urban lives. He reported that *“Traditional knowledge is often passed down from grandparents to grandchildren, but parents, because of migration and detachment from their own communities, tend to skip this step.”* Additionally, the expert reported that hands-on experiences and involving elders in education are essential for effective teaching and could provide students with valuable perspectives on nature and disaster preparedness.

These perspectives hold crucial knowledge about living in harmony with the environment: *“They hold the real knowledge about how to live and how to read the signs of the nature.”* To conclude, the expert emphasized the critical need for a change in educational mindset to totally embrace traditional knowledge as an essential complement to scientific approaches. He argued that this change would enable students to gain a more holistic understanding of climate resilience, merging ancestral wisdom with modern insights.

- *An expert on Peruvian history*

The expert on Peruvian history reported that specific myths from the Peruvian coast play a crucial role in teaching children to respect nature. One important myth involves the “Apus” (mountain spirits): *“These stories communicate that the land is alive and deserves respect, installing a sense of responsibility in kids.”* Another significant myth is La Sirena de la Huacachina, a mermaid known for protecting the oasis. The expert reported, *“It is believed that she protects the waters of Huacachina, and those who disrespect the oasis may never return from its depths.”* He reported that parents in the Peruvian coast, pass down these myths during family gatherings and communal events, often complemented by rituals such as offerings to the Apus. Also, the expert reported that children find these myths relatable, they usually express fascination with the mermaid story and the reverence for the mountains and rivers that the Apus symbolize. However, he acknowledged that the relevance of these myths

has changed in modern society due to the rise of digital media, which sometimes distracts children from local narratives.

Despite this, the expert reported that there is a great potential to preserve native traditions by incorporating them into education in ways that blend traditional storytelling with practical lessons: *“If we teach these stories in classrooms alongside conservation activities, children may find a deeper appreciation for their heritage and their natural environment.”* He reported that educators should use creative engagement, such as art and community projects, to connect students with the lessons these myths carry.

## **Discussion**

This study analyzed the role of native storytelling in El Niño and natural disaster preparedness by interviewing four people in La Libertad and two experts, one in the U.S. and one in Peru. The findings highlight the importance of traditional knowledge passed down through generations using storytelling. This cultural element plays a central role in knowledge transfer, reinforces cultural identity and fosters a deep understanding of nature’s interconnectedness, particularly in the context of El Niño.

An important finding in the study is the role of intergenerational knowledge transfer. The study found that grandparents serve as primary natural knowledge transfer agents. The narratives grandparents share, often rooted in myths, ancestral practices, and observations of natural signs, help younger generation understand how to prepare and respond to environmental changes and disasters. According to Gadgil et al. (2000), traditional knowledge, primarily passed down through grandparents, plays a critical role in preparing for natural phenomena. For example, the Peruvian expert reported that Peruvian grandparents usually use stories about unusual animal behavior or changes in wind or sea patterns to predict the onset of El Niño. These narratives provide actionable knowledge, such as when to reinforce homes or relocate



livestock to mitigate the impact of floods. The role of Peruvian grandparents, as keepers of family traditions, plays a crucial role in connecting the past with the present by preserving ancestral knowledge that shapes cultural identity. Through their stories, they bridge generations, ensuring that traditional wisdom adapts to modern challenges while remaining rooted in historical experiences (Berkes, 2008). Grandparents' wisdom provides valuable insights into managing environmental risks such as determining the optimal times for planting (Mendoza, 2020). Grandparents' wisdom provides valuable insights into managing environmental risks, such as determining the optimal times for planting or harvesting crops to avoid losses during extreme weather events, as well as, planting trees to protect the soil and river cleaning and drainage (Mendoza, 2020).

In contrast, generalized knowledge, often derived from scientific sources and formal education, tends to be more abstract and less connected to the daily experiences of local communities, making it obsolete in the time of environmental crisis as climate change (Gadgil et al., 2000), while localized knowledge as the native wisdom passed down through generations offers unique perspectives into how native communities adapt to climate disasters (Gadgil et al., 2000). This contrast is also reflected in the perspectives that experts interviewed shared, who mentioned that although scientific knowledge has its own value, it does not always effectively resonate with local communities as ancestral knowledge do it, since scientific knowledge doesn't educate them on their local environment.

According to Berkes (2008), storytelling serves as a bridge between ancestral wisdom and modern scientific knowledge, helping younger generations connect emotionally and practically to their environment. As Cohen (2019) suggests, storytelling is not just a cultural tradition but a method of encoding environmental wisdom, making complex ecological relationships more accessible and relatable. For example, one parent recalled a story passed down from their grandparents about a El Niño event that occurred in 1997. The story described

how the local river swelled and flooded nearby cities. The lesson told in the story was the importance of building stronger barriers along the river and knowing about timing agricultural practices to avoid planting during the flooding seasons. Another example involved a myth about the "crying mountains," a tale about the erosion of soil during the rainy season. A Moche parent mentioned that this story made children aware of the importance of soil conservation practices, such as planting tree vegetation to keep the earth in its place.

In addition to the results that indicate the continued importance of traditional storytelling in local environmental knowledge, the study also identified several challenges that undermine these traditions. Both parents and experts reported a concerning shift in youth focus toward digital media, which can distract from ancestral teachings, limiting opportunities for face-to-face interaction. Young people are spending more time on social media, isolated and consuming content unrelated to their cultural heritage, leading to a decline in oral transmission of knowledge. This shift reduces the likelihood of younger generations hearing these important stories and learning from them directly. This aligns with the existing research indicating the role of modernization and urbanization in eroding the culture among the native and rural communities (Schroeder, 2020). These studies highlight how this trend contributes to the erosion of traditional practices, weakens social ties and reduces the effectiveness of community responses to disasters. For example, a native expert emphasized that traditional knowledge is often passed down from grandparents to grandchildren, but parents, due to urbanization and detachment from their root, tend to skip this step. This demonstrates that there is currently a lack of meaningful connection to cultural heritage, making them less likely to benefit from the natural wisdom mentioned in these stories. Bridging the gap between modernity and tradition is therefore essential to ensure that the Moche community and similar communities can continue to be connected to their ancestral knowledge in the face of climate-driven natural disasters (Schroeder, 2020).

This challenge is also reflected in the educational system, where experts reported that traditional knowledge is often overlooked, missing a critical opportunity to incorporate native perspectives on climate adaptation and resilience into the standardized school curricula. This educational gap dates back to the colonial legacy of Peruvian schools since the curriculum always prioritizes Spanish culture, often at the expense of native traditions. The predominance of the Spanish language, Catholic teachings, and European history leave no room for traditional knowledge systems to be formally recognized in Peruvian schools' teachings. This is further reflected in the suppression of native languages, where students are discouraged for speaking their native tongues, reinforcing the notion that Spanish was the language of progress (Baker, 2001). Additionally, the educational system emphasized a European perspective that downplayed or ignored the achievements of pre-Inca and Inca civilizations, and taught Catholicism as the dominant spiritual framework and undermining native spiritual practices (Vega, 2005). Traditional environmental knowledge, essential for natural disaster preparedness, was excluded from the curriculum, leaving students with no understanding of how their ancestors managed land and nature. In urban areas, children from native communities were often encouraged to adopt a "modern" lifestyle, contributing to a disconnect from their heritage.

However, in the Peruvian Amazon, government initiatives like the “Escuelas de Campo” give an opportunity to local elders to share their ecological knowledge with younger generations through agricultural trainings in rural areas (SENASA, 2021). Such initiatives should be more widely implemented throughout the country as the results from this study indicate that these kinds of opportunities and hands on activities are the ones that parents want for their children. Even though the institutionalization of traditional knowledge in formal education in Peru is currently inefficient (Mendoza, 2020), there are some positive examples of this around the world. For example, in Australia, programs have been implemented to incorporate Aboriginal and Torres Strait Islander perspectives into school curricula (Beresford

et al., 2012). Organizations like “Reconciliation NSW” play a important role in promoting reconciliation through education (Reconciliation NSW, 2020). They create resources, as theory lessons and hands-on activities to help educators teach students about Aboriginal cultures and environmental knowledge. One of their programs is the inclusion of Aboriginal perspectives in STEM subjects, where students learn how traditional knowledge performs sustainable practices as water management and land stewardship (Beresford et al., 2012).

The results of these initiatives have been transformative since schools that actively participate in these programs report increased cultural awareness among students, improved engagement in learning, and strengthened relationships between schools and Aboriginal communities (Reconciliation NSW, 2020). This type of programs shows the great potential for Peru to adopt similar strategies, integrating traditional knowledge into education, preserving cultural traditions and equipping students with practical tools for disaster preparedness.

In conclusion, this study shows the importance of combining traditional knowledge with modern education to strengthen disaster resilience and preserve cultural heritage in the Moche community. By integrating storytelling and hands-on practices, future generations can be equipped to face climate challenges while honoring traditional knowledge.

### **Limitations**

First, the number of participants was limited, with only four parents and two experts interviewed. This small sample size restricts the ability to generalize the results to the broader population of the Moche community or other native communities. A larger and more diverse sample could provide a more comprehensive understanding of the role of storytelling in disaster preparedness and knowledge transfer.

Second, the study focused on just one Peruvian region, La Libertad. This geographic limitation means that the findings may not be fully representative of other regions in Peru or

of native communities with different cultural practices and environmental contexts. Different regions may have unique ways of passing down traditional knowledge or responding to natural disasters, which could affect the applicability of the study's conclusions to other areas.

Finally, the research concentrated on one specific natural phenomenon, El Niño. Even if it is a significant event in the context of the Moche community, does not encompass the full range of natural disasters that may affect the region. Expanding the focus to include other disasters, such as earthquakes, floods, or droughts, could provide a more comprehensive view of how traditional knowledge is applied across various types of environmental challenges.

### **Conclusion and Recommendations**

This study set off to answer the questions of how intergenerational knowledge transfer, contributes to natural disaster preparedness and management in Peru, through this methodology. The results indicate the importance of intergenerational knowledge transfer in natural disaster preparedness and management. Specifically, the importance of storytelling, passed down through generations, as a critical tool in helping communities respond to environmental changes, such as those caused by El Niño.

While traditional knowledge passed down through storytelling remains a vital tool in disaster preparedness, the study indicates that this resource is constantly at risk due to the lack of involvement of younger generations.

The study highlights the need to reconcile modernity with tradition. Integrating traditional knowledge into public life can help communities with natural disaster preparedness and management. This can be achieved via re-structured school curricular, community service, and community-engaged learning. Specifically, the following activities can be undertaken to achieve a better integration of modern and traditional knowledge:

- weekly workshops on weekends

- combining storytelling with practical activities, in collaboration with local elders and family members
- creating gardens with native plants
- organizing community clean-ups

Future efforts should focus on digitalizing oral histories so that younger generations can access these stories easily. By preserving the localized knowledge of the environment, more people can become aware of the importance of sustainable practices and be better equipped to adapt to climate change impacts.

This study provided valuable information on the role of traditional story telling in natural disaster preparedness and management in Peru. Future research can focus on additional localized efforts of empowering people with the resources and knowledge available within the local community to continue building resilience and sustainability in the face of climate change.

## References

- Agencia Andina. (2023). Atypical increase in temperature in the coastal regions of northern Peru. [Photograph]. Agencia Andina. <https://andina.pe/agencia/noticia-que-es-fenomeno-nino-cuando-llegaria-y-cuanto-duraria-su-presencia-peru-947472.aspx>
- Baker, C. (2001). Foundations of bilingual education and bilingualism (3rd ed.). Multilingual Matters.
- Bayer, A. et al. (2014). The 1997–1998 El Niño as an unforgettable phenomenon in northern Peru: a qualitative study. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4317261/>
- Beery, T., Sandberg, M., & Lundmark, C. (2020). Nature connection, outdoor recreation, and environmental concern: How are these interrelated? *Urban Forestry & Urban Greening*, 48, 126567. <https://doi.org/10.1016/j.ufug.2019.126567>
- Bell, I. et al. (2023). Education for disaster resilience: Lessons from El Niño. <https://www.sciencedirect.com/science/article/pii/S0016718523002452>
- Berkes, F. (2009). Sacred ecology: Traditional ecological knowledge and resource management (2nd ed.). Routledge.
- Beresford, Q., Partington, G., & Gower, G. (2012). Reconciliation and Aboriginal Education in Australia: Perspectives and Practices. Sydney: Allen & Unwin.
- Benson, Elizabeth P. and Cook, Anita G.. Ritual Sacrifice in Ancient Peru, New York, USA: University of Texas Press, 2001. <https://doi.org/10.7560/708938>
- Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3 (2). pp. 77-101. ISSN 1478-0887 <http://eprints.uwe.ac.uk/11735>
- Burke, S. E. L., Sanson, A. V., & Van Hoorn, J. (2018). The Psychological Effects of Climate Change on Children. *Current Psychiatry Reports*, 20(5). <https://doi.org/10.1007/s11920-018-0896-9>
- CENEPRED. (2020). Análisis de riesgos ante el fenómeno El Niño en el Perú. Centro Nacional de Estimación, Prevención y Reducción del Riesgo de Desastres (CENEPRED). <https://sigrid.cenepred.gob.pe/sigridv3/documento/11609>
- CIIFEN. (2015). El Niño 1997-1998 phenomenon. Centro Internacional para la Investigación del Fenómeno El Niño (CIIFEN).
- Contreras, D. (2023). El Niño global ya es una realidad: ¿Estamos preparados para su impacto? Instituto de Ciencia y Tecnología, Pontificia Universidad Católica del Perú.

<https://inte.pucp.edu.pe/noticias-y-eventos/noticias/el-nino-global-ya-es-una-realidad-estamos-preparados-para-su-impacto/>

Covey, R. A. (2006). *How the Incas built their heartland: State formation and the innovation of imperial strategies in the Sacred Valley, Peru*. The University of Michigan Press.

Crabtree, B. & Miller, W. (1999). *Doing qualitative research*. SAGE Publications.

De la Torre Ugarte, D. (2024). Fenómeno El Niño: ¿Cómo se prepara Perú frente al golpe climático? [Interview]. Centro de Investigación de la Universidad del Pacífico (CIUP). <https://ciup.up.edu.pe/analisis/daniel-de-la-torre-ugarte-fenomeno-el-nino-como-se-prepara-peru-frente-al-golpe-climatico-entrevista/>

Gadgil, M., Berkes, F., & Folke, C. (2000). Indigenous knowledge for biodiversity conservation. *Ambio*, 29(8), 151-156. [https://doi.org/10.1639/0044-7447\(2000\)029\[0151:IKFBC\]2.0.CO;2](https://doi.org/10.1639/0044-7447(2000)029[0151:IKFBC]2.0.CO;2)

Hanna, R. & Oliva, P. (2016) *Implications of Climate Change for Children in Developing Countries*. *Implications of Climate Change for Children in Developing Countries* on JSTOR.

Haynes, K., & Tanner, T. (2023). Children's participation in community-based disaster risk reduction and adaptation to climate change. *Journal of Environmental Studies*. [https://sussex.figshare.com/articles/journal\\_contribution/Children\\_s\\_participation\\_in\\_community\\_based\\_disaster\\_risk\\_reduction\\_and\\_adaptation\\_to\\_climate\\_change/23484194?file=41193023](https://sussex.figshare.com/articles/journal_contribution/Children_s_participation_in_community_based_disaster_risk_reduction_and_adaptation_to_climate_change/23484194?file=41193023)

Howe, C., & Barrientos, R. (2021). Transforming risk into resilience: Adaptive strategies of vulnerable populations to climate change in the Peruvian Andes. *World Development*, 146, 105612. <https://doi.org/10.1016/j.worlddev.2021.105612>

Jansen, B. J., & Wachinger, G. (2021). Integrating participatory approaches in climate risk management: Insights from local communities in Bolivia and Peru. In L. Reyes-García & A. Pyhälä (Eds.), *Hunter-gatherers in a changing world* (pp. 653–671). Springer. [https://doi.org/10.1007/978-3-030-45697-9\\_36](https://doi.org/10.1007/978-3-030-45697-9_36)

Mercer, J., Kelman, I., Taranis, L., & Suchet-Pearson, S. (2010). "Framework for integrating indigenous and scientific knowledge for disaster risk reduction." *Environmental Hazards*, 9(4), 358-368.

Mendoza, J. (2020). Indigenous Knowledge and Education in Peru: Challenges and Opportunities. *Journal of Latin American Studies*, 52(4), 45-60.

Ministerio de la Producción. (2023). *Plan de prevención y reducción del riesgo de desastres 2023-2024*. Centro Nacional de Estimación, Prevención y Reducción del Riesgo de Desastres (CENEPRED). [https://sigrid.cenepred.gob.pe/sigridv3/storage/biblioteca//16547\\_plan-de-](https://sigrid.cenepred.gob.pe/sigridv3/storage/biblioteca//16547_plan-de-)



prevencion-y-reduccion-del-riesgo-de-desastres-2023-2024-del-ministerio-de-la-produccion.pdf

Moseley, M. E. (2001). *The Moche of Ancient Peru*.

Murillo, A. et al. (2021). Proposal for an Early Warning System Against Flood Risks in the Urban Area of Milagro Canton, Ecuador. In: Ahram, T., Taiar, R., Langlois, K., Choplin, A. (eds) *Human Interaction, Emerging Technologies and Future Applications III. IHiet 2020. Advances in Intelligent Systems and Computing*, vol 1253. Springer, Cham. [https://doi.org/10.1007/978-3-030-55307-4\\_94](https://doi.org/10.1007/978-3-030-55307-4_94)

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), 1-13.

Peru Top Tours (2010). *Map of La Libertad, Peru*. Peru Top Tours. [https://www.perutoptours.com/index1211\\_mapa\\_departamento\\_la\\_libertad.html](https://www.perutoptours.com/index1211_mapa_departamento_la_libertad.html)

Pretty, J. (2003). Social capital and the collective management of resources. *Science*, 302(5652), 1912-1914. <https://doi.org/10.1126/science.1090847>

Rebecca Nthogo Lekoko. Story-Telling as a Potent Research Paradigm for Indigenous Communities. <https://journals.sagepub.com/doi/epdf/10.1177/117718010700300206>

Reconciliation NSW. (2020). *Reconciliation in Education: A Guide for Schools*. Sydney: Reconciliation NSW.

Rosales-Rueda, M. (2018). The impact of early life shocks on human capital formation: evidence from El Niño floods in Ecuador. *Journal Of Health Economics*, 62, 13-44. <https://doi.org/10.1016/j.jhealeco.2018.07.003>

Schroeder, R. A. (2020). *The Effects of Climate Change on Coastal Ecosystems in Peru*. <https://www.taylorfrancis.com/books/mono/10.4324/9781315265544/digital-storytelling-indigenous-education-yvonne-poitras-pratt>

Schroeder, S. (2020). A Citizen-Defined Vision for the City's Future. A New Contribution to the Discourse of Citizen Participation in Piura, Peru. *IOP Conf. Ser.: Earth Environ. Sci.* 503 012063. <https://iopscience.iop.org/article/10.1088/1755-1315/503/1/012063/pdf>

Schroeder, S. et al. (2022). New guidelines and indicators for smart and sustainable urban projects at local level in developing countries. 55 – 69. <https://www.ceeol.com/search/article-detail?id=1126836>

SENASA. (2021) Escuelas de campo del SENASA atienden comunidades rurales de Loreto. Servicio Nacional de Sanidad Agraria (SENASA).

<https://www.senasa.gob.pe/senasacontigo/escuelas-de-campo-del-senasa-atienen-comunidades-rurales-de-loreto/#:~:text=Las%20Escuelas%20de%20Campo%20tienen,25%20a%2035%20productores%20locales>

SENASA. (2021). Informe sobre Escuelas de Campo en la Amazonía Peruana. Lima: Servicio Nacional de Sanidad Agraria.

Sendai Framework for Disaster Risk Reduction 2015-2030. (2015). UNDRR. <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>

UNEP - UN Environment Programme. Tunza: a way of life. (2013). <https://www.unep.org/resources/report/tunza-way-life>

UNICEF (2015). Climate Change and Environmental Education. A companion to the Child Friendly Schools Manual. <https://www.uncclearn.org/wp-content/uploads/library/unicef31.pdf>

USGS. (2008.). El Niño. U.S. Geological Survey. Retrieved December 9, 2024, from <https://www.usgs.gov/search?keywords=EL+NI%C3%91O>

Vega, A. (2005). La herencia colonial en la educación peruana: El legado de la cultura y religión española en la enseñanza escolar. *Revista de Educación y Sociedad*, 22(1), 35-45

Valera, F. (2023). Programa de Monitores Ciudadanos de Control y su aporte en el control gubernamental a obras públicas en ejecución, *La Libertad: 2018 – 2022*. Universidad Nacional de Trujillo. <https://dspace.unitru.edu.pe/items/57aa7cac-58c1-440e-b5f6-c1eefb4ab0ac>

## **Appendix**

### **Interview Questions**

Audience: Urban parents from La Libertad

1. Have you ever used stories or narratives from your cultural background to teach your children about climate change or natural disasters?
2. What important lessons about the climate and nature did your parents or grandparents teach you? Do you teach these lessons to your own children now?
3. Do you think schools in your area are teaching enough about the El Niño phenomenon? What kind of lessons would be most useful for kids?
4. What changes have you seen in the environment or climate in La Libertad over the years, and how do you explain those changes to your children?
5. Do you think traditional stories or knowledge about natural disasters and the climate are being forgotten in your community? What can be done to keep this knowledge alive for future generations?

Audience: An expert in native resiliency

1. Do you think schools effectively incorporating traditional wisdom about climate phenomena into their teachings? What changes would you suggest?
2. What are the main challenges in keeping traditional stories and knowledge alive in today's education?
3. How has the perception of traditional stories changed in your community with the advancement of technology and modern education?
4. How could involving elders and community members enrich formal education by sharing stories about nature and preparing for disasters?

5. Are you aware of any educational programs that have successfully included traditional narratives?

Audience: An expert in Peruvian History

1. What specific myths from La Libertad do you believe most effectively teach children to respect nature?
2. How do parents in La Libertad pass down these myths to their children? Are there particular practices involved?
3. In your experience, how do children respond to these myths? Do they find them relatable or meaningful?
4. Do you think the relevance of these myths has changed in modern society? If so, how?
5. Can you provide examples of how these myths have influenced local environmental practices or attitudes?
6. What advice would you give to educators who want to incorporate traditional myths into their teaching to promote environmental respect?