DEPARTMENT OF POLITICAL SCIENCE

UNDERSTANDING ENVIRONMENTAL STEWARDSHIP THROUGH GOVERNANCE AND PSYCHOLOGY

A Study of the 48 Cantones of Totonicapán and Its Social Foundations

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Abstract

This study[1] explores how the psychological drivers of trust, social norms and collective identity support governance mechanisms in the Indigenous communal system of 48 Cantones of Totonicapán, Guatemala. Drawing on three of Elinor Ostrom's institutional design principles (monitoring, collective decision-making and enforcement), the study applies a matrix framework that links governance mechanisms to internal behavioral drivers, exploring how they interact to sustain environmental stewardship.

Using a qualitative case study approach, the research is based on semi-structured interviews, direct observations, and document analysis. The methodology combined deductive coding, guided by the proposed matrix, with inductive identification of emergent themes. While the findings confirm that psychological drivers play a central role in governance, they also reveal symbolic and moral dimensions not captured by the initial framework. Concepts such as k'axk'ol (service with sacrifice), symbolic legitimacy, and relational forms of authority emerged as key to participation and compliance.

The study shows that governance and conservation in the 48 Cantones is not only institutional and psychological, but also cultural and intergenerational. Trust, norms, and identity do not merely support governance; they constitute its foundation. At the same time, certain environmental challenges, such as waste management, fall outside the moral-symbolic structure that sustains forest and water protection.

By integrating theory-driven analysis with culturally situated insights, this thesis contributes to both insights on environmental psychology and common pool resource governance.

Keywords: Environmental stewardship, governance, trust, social norms, Indigenous institutions

"El poder del pueblo está en el servicio comunitario"
"The power of the people lies in community service"
-Commemorative plate, Natural Resources Board, 48 Cantones

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1. Research problem

Understanding the mechanisms that sustain indigenous governance models is crucial in environmental governance research, especially when investigating cases where local communities have effectively managed communal resources over extended periods. Indigenous governance models refer to locally rooted arrangements through which indigenous communities organize decision making and regulate communal life according to their cultural norms, values and customary practices. The 48 Cantones of Totonicapán, an indigenous governance system in Guatemala, provides a compelling example of such a model, having maintained control over extensive communal forests and water resources for five centuries.

While much of the literature on common pool resource (CPR) governance focuses on institutional structures, rule enforcement, and the design of monitoring systems (Agrawal, 2001; Cox, Arnold and Villamayor-Tomás, 2010; Ostrom, 1990), there remains a critical gap in understanding the psychological drivers that shape environmental behavior within these governance frameworks. Some research has recognized the role of psychological factors such as trust, social norms and collective identity in fostering compliance and long-term cooperation (Keizer and Schultz, 2018; Van der Werff, Steg and Keizer, 2013), however, the literature has not yet fully examined how institutional structures and psychological drivers interact in indigenous governance systems.

This study addresses that gap by proposing an integrated conceptual framework that combines Ostrom's (1990) governance principles of monitoring, collective decision making and enforcement mechanisms with the psychological drivers of trust, collective identity, and social norms to examine how these factors interact to promote effective environmental stewardship. This framework is guided by the research question "How do the psychological drivers of trust, identity, and social norms support the effectiveness of governance structures in promoting environmental stewardship within the 48 Cantones of Totonicapán?".

To explore this question, the thesis draws on theoretical insights from both Ostrom's institutional governance and environmental psychology. The aim of the study is twofold; first, to explore how the psychological drivers of trust, social norms and collective identity interact with governance structures to sustain the management of CPR within 48 Cantones of Totonicapán, and second, to propose a theoretical matrix that integrates these drivers with Ostrom's institutional principles of monitoring, collective decision making and enforcement.

To provide readers with a clear understanding of the context in which these dynamics unfold, the following section introduces the governance system of 48 Cantones of Totonicapán before turning to the theoretical framework that guides the analysis; Section 3 develops the theoretical framework, introducing the matrix that links Ostrom's governance principles with the psychological drivers of trust, social norms, and collective identity. Section 4 outlines the methodological approach, including data collection, coding and analysis strategies; Section 5 presents the main findings of the research, while Section 6 offers a theoretical and analytical discussion. The thesis concludes with reflections on the broader implications of the findings and avenues for future research.

2. The 48 Cantones of Totonicapán, Guatemala

Guatemala is divided administratively into 22 departments and 340 municipalities. The department of Totonicapán, located in the western highlands, is known for its strong indigenous identity, with approximately 97% of the population identifying as Maya K'iche' (Instituto Nacional de Estadística, 2019); specifically, the municipality of Totonicapán is home to the indigenous governance system known as 48 Cantones. This system encompasses a wide network of communities known as *cantones* and functions autonomously alongside but separate from formal state institutions (Junta Directiva de Bienes y Recursos Naturales 48 Cantones et al. 2021). 48 Cantones is responsible for local governance, resource management, and environmental protection, particularly the conservation of forests and water.

The 48 Cantones governance model is notable for its effectiveness in environmental stewardship, where resource management is not treated as a separate function of governance but as one of its core responsibilities. The communal forest, its water sources and the land itself are not only seen as resources to be managed, but they are deeply intertwined with cultural and spiritual identity, reinforcing an obligation to protect and sustain them for future generations (Junta Directiva de Bienes y Recursos Naturales 48 Cantones et al. 2021; Charchalac, 2025).

Figure 1: Totonicapán Department. (Wikimedia Commons, 2025)

The historical resilience of the organization is tied to its capacity to resist external pressures and adapt to changing political scenarios. During the colonial period, k'iche' leaders negotiated with Spanish authorities to defend communal land rights. In the 19th century, leaders Atanasio Tzul and Lucas Ak'iral got the legal recognition of collective territory in colonial courts, although these victories would later be challenged, during the Liberal Reforms, 48 Cantones kept autonomy in their decision-making processes and control over communal resources (Ixchíu, 2014; Junta Directiva de Bienes y Recursos Naturales 48 Cantones et al. 2021)

At the heart of their governance system is the management of the *Komon Juyub*, a 22,000 hectare communal forest that has been considered one of the best preserved ecosystems in Guatemala (Junta Directiva de Bienes y Recursos Naturales 48 Cantones et al., 2021); the conservation of this forest is not enforced by external authorities but sustained by deeply embedded social norms, collective responsibilities, and a rotational leadership system within the indigenous governance (Charchalac, 2025). Participation in governance is not voluntary nor remunerated; it is a civic obligation grounded in the principle of *k'axk'ol,* which in k'iche' means "service with sacrifice" (Ixchíu, 2014). Because of this principle, governance and environmental care are seen as communal duties.

The organizational structure of 48 Cantones centers on communal assemblies, rotating leadership, and collective enforcement; biweekly council meetings bring together the communal mayors, legal stewards (*alguaciles*), and members of the Natural Resources Board to deliberate on land use, environmental regulation, and conflict resolution (Ixchíu, 2014; Junta Directiva de Bienes y Recursos Naturales 48 Cantones et al. 2021). Annual leadership rotation prevents perpetuation in power for individuals and reinforces the spirit of shared responsibility. Authority is symbolized by a ceremonial staff *(vara)* passed on during the handover *(entrega de consignas)* in which outgoing leaders transfer responsibilities through documented protocols, oral transmission, and guidance during fieldwork (Charchalac, 2025).

Figure 2: Close up of Komon Juyub in Totonicapán Municipality. (Junta Directiva de Bienes y Recursos Naturales 48 Cantones, 2021)

One of the defining characteristics of the system is its model of enforcement, as 48 Cantones maintains environmental protection through community-based regulation and monitoring. Compliance is kept through shared values, informal monitoring, peer pressure and collective vigilance; when someone violates the expected behavior or causes harm to the common forest, social consequences such as public reprimands and restrictions on access to water, roads, or sewages serve as enforcement tools, reinforcing social cohesion and dissuading violations (Ixchíu, 2014).

Despite growing population pressures, the Komon Juyub Forest remains largely intact, due not only to the governance mechanisms but also to its spiritual significance, the forest is considered sacred and many in the community refrain from exploiting its resources beyond what is necessary for subsistence, as it holds ceremonial and ancestral importance (Charchalac, 2025). Komon Juyub is also home to over 1,500 natural water sources, which provide essential resources for local communities and sustain major river systems that extend beyond Totonicapán (Junta Directiva de Bienes y Recursos Naturales 48 Cantones et al. 2021). These resources are governed through collective water committees responsible for regulating access, monitoring contamination, and organizing maintenance; rituals, annual forest walks, and ceremonial practices reinforce the interconnectedness of spiritual, environmental, and governance commitments (Charchalac, 2025; Ixchíu, 2014)

The case of the 48 Cantones offers a critical perspective on indigenous governance and environmental stewardship that shows that sustainable resource management does not necessarily require centralized state control but can instead emerge from locally embedded governance mechanisms. At the same time, important questions are raised about the conditions under which collective governance structures can last and adapt over time, and what other elements come into play in the management of CPR. This thesis proposes that beyond institutional arrangements, psychological drivers may play a vital role in supporting governance structures, shaping individual and collective engagement in resource management. These dynamics, central to the analytical focus of this study, will be further explored in the following discussion on the theoretical foundations of community resource management.

3. Theoretical Framework

The management of common pool resources (CPRs) presents a complex challenge, as it requires balancing the demands of individual users with the collective need for sustainable resource management. Elinor Ostrom's work on the governance of CPRs has redefined the understanding of how communities can effectively manage shared resources without resorting to external regulation or privatization. Ostrom (1990) challenged the assumption that CPR inevitably lead to overexploitation, demonstrating through numerous field studies that local communities can develop governance systems capable of maintaining sustainable resource use.

Ostrom (1990) identified eight design principles that contribute to the success of CPR management, including the need for clearly defined boundaries, monitoring systems, collective decision making and enforcement mechanisms. These principles outline the key institutional features that enable communities to organize effectively, monitor resource use and resolve conflicts, all while avoiding the degradation of resources by creating structures that encourage accountability, collaboration, and compliance (Ostrom, 2009). While these principles emphasize structural mechanisms, Ostrom's later work, including Trust and Reciprocity: Interdisciplinary Lessons for Experimental Research (2003) highlights the importance of trust and reciprocity to foster cooperation.

Experimental studies have shown that trust builds through repeated interactions, where individuals observe others adhering to rules and reciprocating behavior, creating a virtuous cycle that strengthens governance (Ostrom and Walter, 2003). These insights underscore the role of psychological factors in enabling governance mechanisms to function effectively.

The 48 Cantones of Totonicapán, Guatemala closely align with many of Ostrom's design principles (Ostrom, 1990). Community members actively engage in forest patrols, resolve conflicts through assemblies, and enforce sanctions to deter violations. While the institutional structures of the 48 Cantones are robust, the long-term success of this system cannot be attributed solely to governance principles; psychological drivers, including trust, social norms, and collective identity, play an equally vital role in fostering cooperation and ensuring compliance with governance rules.

Although factors such as trust have been explored in some contexts (e.g., Ostrom and Walker, 2003), much of the existing literature either isolates these psychological drivers in experimental settings or examines them in real-world contexts without fully integrating them into broader

governance frameworks (Laerhoven and Ostrom, 2007; Breen, 2013). This creates a gap in understanding how psychological drivers interact systematically and support governance principles to reinforce sustainable resource management. For example, trust, while studied extensively in experimental research, has not been analyzed in depth within indigenous systems like the 48 Cantones, where cultural practices and communal responsibilities add layers of complexity to its role in governance. This gap is central to the present research, which aims to explore this intersection within the specific context of an indigenous governance system.

The success of CPR governance systems like the 48 Cantones of Totonicapán relies not only on robust institutional frameworks but also on the psychological factors that motivate individuals to participate in and sustain collective action. While trust, social norms and collective identity have each been studied in relation to CPR (Ostrom and Walker,2003; Laerhoven and Ostrom, 2007), their combined role in supporting institutional structures remain underexplored. While Ostrom's principles provide a structural foundation for resource management, understanding the role of psychological mechanisms behind individuals' decisions and actions help illuminate the deeper motivations that sustain these systems and support local governments. Rather than compare the importance of each psychological driver, the focus is on how they interact with institutional arrangements.

Trust is a cornerstone of cooperation in CPR governance, it refers to the confidence individuals place in others to act in ways that benefit the group without exploiting the shared resource for personal gain (Steg and Vlek, 2009). Trust in governance systems and community leaders is vital for participation in activities such as monitoring and enforcement. When individuals trust that their leaders will enforce rules fairly and act in the community's best interest, they are more likely to engage in cooperative behaviors, such as forest patrols or reporting violations.

Social norms are the shared expectations regarding behavior within a community and they can function as informal governance mechanisms; norms around pro-environmental behavior, such as conservation practices or rule compliance, are internalized by individuals and guide their actions without formal sanctions (Steg et al. 2013). Social norms reduce the reliance on formal enforcement and help ensure that individuals act in accordance with collective goals, creating a self-regulating system of governance.

Finally, collective identity refers to the shared sense of belonging to a group and the emotional connection that individuals feel toward their community. A strong collective identity increases the motivation to contribute to the welfare of the group even when personal costs are involved (Tajfel and Turner, 1979). Collective identity fosters a sense of shared responsibility for the sustainable management of resources, encouraging individuals to adhere to collective decisions and engage in governance activities; when individuals identify strongly with their community, they are much more likely to participate in activities such as forest patrols, rule enforcement, and collective decision-making, all of which are essential for effective CPR governance.

By integrating the study of these three psychological drivers with Ostrom's principles, this study aims to explore how they interact to sustain the effective management of CPR. Previous studies have been done on the issue of the governance of CPRs with much of the literature focused on the institutional arrangements and structural mechanisms for sustainable resource management. Ostrom's principles have been widely applied across diverse contexts, from small scale fisheries to

large forest commons, demonstrating their adaptability and utility in understanding governance systems (Ostrom, 1990).

However, Ostrom's work also allowed the exploration of psychological dimensions of resource governance, particularly in the case of cooperation and compliance. Ostrom and Walker's (2003) experimental research on trust and reciprocity provides valuable insights into how repeated interactions and shared expectations can build cooperation within CPR settings. These studies highlight the importance of interpersonal dynamics, but their focus on controlled experimental conditions often limits their applicability to complex, real world governance systems.

Beyond experimental contexts, other research has explored psychological drivers in applied settings. Laerhoven and Ostrom (2007) emphasize the role of social cohesion and collective identity in enhancing the resilience of CPR governance. Their work shows how strong identification with a group strengthens an individual's commitment to collective goals, particularly during times of resource scarcity. Similarly, Breen (2013) focuses on collective identity as a critical driver of resilience in CPR systems, identifying the attributes of affective commitment and identification as essential components of successful resource management. However, these studies often see psychological drivers as distinct factors, without systematically linking them to governance principles or exploring how they interact with institutional arrangements and local governments in diverse cultural contexts.

Research on trust has also highlighted its important role in fostering cooperation and participation in governance activities; studies such as Van Klingeren and Graaf (2021) explore the relationship between trust and heterogeneity in CPR settings, showing that trust reduces the transaction costs associated with cooperation and strengthens collective decision-making processes. However, these studies often prioritize trust as a standalone variable, leaving questions about how it interacts with other psychological drivers, such as norms and identity, to influence governance outcomes.

In addition to the focus on psychological drivers, there has been growing interest in the role of indigenous governance systems in sustaining CPRs. Indigenous systems often incorporate unique social, cultural, and spiritual dimensions into their governance practices, creating a strong foundation for resource stewardship. Much of the literature in this topic has mostly focused on structural comparisons between indigenous and formal governance systems, with a limited exploration of the psychological mechanisms that underpin indigenous governance success; this gap is more evident in the case of Latin America, where studies in environmental psychology and CPR governance remain scarce (Steg and Vlek, 2009). The 48 Cantones of Totonicapán, with its deep-rooted cultural traditions and community led governance structure, provides a valuable opportunity to address this gap by examining the interplay between psychological drivers and governance principles in an underexplored region.

While the studies mentioned above contribute to the understanding of the dynamics of CPR governance, they haven't yet developed an integrated approach that combines psychological drivers with Ostrom's governance principles in a systematic framework. This research seeks to fill this gap by proposing a theoretical matrix that links trust, social norms, and collective identity to Ostrom's governance mechanisms of monitoring, decision making, and enforcement. By focusing

on the 48 Cantones as a case study, this research not only advances theory development but also provides actionable insights for community led resource management systems globally.

The rationale for selecting trust, social norms, and collective identity lies in their important role in motivating individuals to engage with governance systems and adhere to collective goals; trust fosters confidence in the fairness and legitimacy of governance processes so that individuals are willing to cooperate and participate in activities such as monitoring and enforcement (Steg and Vlek, 2009); social norms establish shared expectations for behavior, creating informal rules that guide individual actions and reduce the reliance on formal sanctions (Steg et al. 2013). Finally, collective identity strengthens the emotional connection to the community, motivating individuals to prioritize group welfare over personal interests and engage in collective action (Tajfel and Turner, 1979). Together, these drivers offer a comprehensive perspective on the behavioral underpinnings of effective CPR governance.

The governance mechanisms of monitoring, collective decision making and enforcement were selected for their critical role in securing the sustainability of shared resources; monitoring enables communities to detect and address rule violations, fostering accountability and deterring overexploitation; collective decision making guarantees that governance rules are seen as legitimate and adaptable to changing conditions, increasing the chances of compliance and reducing conflict (Ostrom, 2009); enforcement mechanisms, including sanctions, promote fairness and prevent resource misuse while maintaining social cohesion. These mechanisms are central to Ostrom's principles, yet their effectiveness depends on the psychological drivers that motivate individuals to engage with and support them.

To bridge these dimensions, this research introduces a matrix framework that links Ostrom's governance principles with psychological drivers; by analyzing the interplay between these elements, the framework offers an integrated approach to understanding CPR governance. The selected Ostrom's governance principles: Monitoring, collective decision making, and enforcement mechanisms serve as the structural foundation of the matrix, while the psychological drivers: trust, social norms, and collective identity, serve as the behavioral foundation of the matrix, showing how psychological drivers support governance mechanisms.

Governance principles	Trust	Social Norms	Collective Identity
Monitoring	Trust in fairness encourages participation in monitoring activities.	Norms establish expectations for reporting violations.	Identity fosters a sense of responsibility for ensuring rule compliance.
Collective Decision Making	Trust legitimizes the outcomes of decision making.	Norms align individual preferences with collective goals.	Identity enhances commitment to collective decisions.
Enforcement Mechanisms	Trust in fairness supports acceptance of sanctions.	Norms reduce the need for formal reinforcement.	Identity ensures that sanctions are seen as part of shared responsibility.

This matrix provides a framework to analyze the mutual reinforcement between governance mechanisms and psychological drivers; this can allow a better understanding of the way in which psychological drivers support governance structures in the case of CPR management. By applying this framework to the governance practices of the 48 Cantones of Totonicapán, the study explores how trust, norms, and identity function within an indigenous governance system to sustain resource management.

The proposed matrix serves as both a conceptual and practical tool to examine governance effectiveness; the theoretical foundations guide the research design and shape the methodological approach that follows. The next section will outline how this framework is operationalized and applied, detailing the methods used to investigate the interplay between governance principles and psychological drivers in sustaining resource management.

4. Methodological Framework

This study adopts a qualitative research design to investigate how the psychological drivers of trust, social norms. and collective identity supports the governance mechanisms of monitoring, collective decision-making, and enforcement as outlined by Ostrom's theory (1990). The aim was to understand how internal motivation and shared expectations help sustain long-term environmental governance within an indigenous communal system; therefore, a qualitative approach was well suited to the research question as it allowed an in-depth exploration of meaningful practices and institutional dynamics situated within a cultural and historically grounded context (Creswell and Poth, 2018).

The 48 Cantones of Totonicapán were chosen as a case study due to their long-standing system of community-based governance and resource management; for centuries, this organization has kept communal control over the Kommon Juyub, their protected forest, and their water sources (Elías et al. 2021). These characteristics made it an appropriate case for applying the matrix framework presented in the previous section, which links three of Ostrom's institutional mechanisms from three psychological drivers. Analyzing the case of 48 Cantones through the proposed matrix framework allowed the examination of how these drivers contribute to the functionality and legitimacy of the governance mechanisms of the organization.

The matrix framework provided a structural basis for the research design, it informed the development of the interview guide, shaped the formulation of the observation templates, and guided the construction of an initial codebook. The operationalization table (Appendix B) was used to define indicators for each variable and to make sure that there would be consistency in data collection and analysis; however, while the matrix structured the initial inquiry, the research also followed an inductive logic. As coding and analysis progressed, new themes emerged that extended beyond the matrix, including the symbolic authority of leadership roles and the intertwined nature of nested governance. These concepts were not part of the original analytical design but surfaced consistently across interviews and observations; therefore, this hybrid approach adopted the flexibility of thematic qualitative analysis, which allows theory-driven and emergent coding processes (Saldaña, 2016).

Operationalization of variables

To examine how psychological drivers support governance mechanisms in 48 Cantones, this study operationalized the key concepts from the proposed matrix framework into observable elements. These operationalizations served as the foundation for data collection and analysis, making sure that there was a structured link between the theory and empirical inquiry.

Trust was defined as the belief in the fairness, reliability, and moral intentions of others within the governance system (Ostrom and Walker, 2003). This concept was investigated through the perceptions of fairness in rule enforcement, confidence in the moral and technical competence of communal leaders, and the willingness to report violations or participate in governance activities. These dimensions emerged in interviews through discussions of leadership, legitimacy, and the treatment of others and were observed in governance practices such as forest patrols and communal meetings.

Social norms were defined as shared expectations within the community about appropriate behaviors related to resource use and governance (Steg et al. 2013). The study explored how norms shaped adherence to rules governing forest use, reactions to violations, and the reinforcement of expectations through social feedback. Norms were evident in practices like assemblies, informal sanctions, and community discourses surrounding honor and reputation; they were assessed through interviews, observations of collective events, and document analysis of community regulations and directives.

Collective identity was defined as the emotional and psychological connection individuals feel toward their community, emphasizing shared values and cultural traditions (Tajfel and Turner, 1979). It was operationalized through expressions of belonging, references to communal responsibility, and participation in collective governance. Interview questions inquired about individuals' motivations for involvement and their identification with the 48 Cantones as a governing body. Observations of rituals and assemblies were used to contextualize identity as enacted practice.

Each of Ostrom's (1990) governance mechanisms was examined through the lens of these psychological drivers. Monitoring was defined as the communal process for overseeing resource use and addressing rule violations; the study analyzed how trust encouraged participation, how norms established expectations, and how identity fostered accountability. Collective decision-making was explored as a participatory process through which rules and actions were developed, focusing on trust in leadership, normative alignment with collective goals, and identity-based commitment. Enforcement mechanisms were analyzed in terms of how sanctions were applied and perceived, with attention to the role of trust in fairness, the influence of norms in minimizing formal enforcement needs, and the effect of collective identity on compliance.

By framing the variables and governance mechanisms in this way, the study secured a structured and transparent approach to data collection and analysis; these operational definitions allowed consistency throughout the research process while remaining grounded in the matrix framework and research question.

Data collection methods

The research is grounded in interpretive epistemology, which prioritizes the meanings that individuals assign to their experiences, roles and institutions; therefore, rather than testing hypotheses or quantifying behaviors, this approach seeks to understand how governance practices are internalized and legitimated through shared psychological and cultural logics (Schwartz-Shea and Yanow, 2012). The researcher's position as a Guatemalan scholar external to Totonicapán but familiar with national socio-political dynamics provided both proximity and analytical distance. Reflexivity was maintained throughout the research process, with attention to the positionality, representational ethics, and the relational dimensions of knowledge production (Banister et al. 1994; Berger, 2015).

Research ethics were guided by the protocols established by the University of Gothenburg, informed consent was obtained from all participants through a formal written form (see Appendix E) which explained the voluntary nature of participation, the right to withdraw at any time and the purposes of data collection. The use of photographs and cited quotes was also discussed with the participants and images included in this study were taken with permission and used in accordance with ethical research practices.

Fieldwork was carried out in February 2025. Fifteen semi-structured interviews were conducted with a range of participants that included current members of the governance boards of the 48 Cantones, a former authority, community residents from different cantones, a woman serving in a leadership role, and a representative of the Ministry of Environment and Natural Resources. The interviews were designed to explore perceptions of rule enforcement, participation, trust, community identity, and social norms, as well as the values that sustain collective governance. All interviews were conducted in Spanish, audio recorded with consent and transcribed by the researcher. During the coding, the selected excerpts were translated into English to add them into the coding table and to be cited in this thesis. The translation was done with special care taken to preserve the tone, intent, and cultural nature of the citations.

The coding process followed a hybrid structure: an initial codebook was developed based on the matrix framework, the operationalization table, and the guiding research question to make sure that the core variables (both psychological drivers and governance mechanisms) guided the analysis; however, as the coding progressed, additional codes were introduced inductively in the main categories, while also some new categories emerged. This reflected emergent themes such as gendered access to symbolic authority, the nuances of ad honorem service, and relational enforcement practices. The final codebook and the coded dataset reflect both deductive alignment with the theoretical framework and inductive responsiveness to emergent themes observed during fieldwork (Appendix F).

In addition to the interviews, two direct observations were conducted, one during a forest monitoring patrol and one during a meeting of the Natural Resources Board. These provided valuable insights into governance as a lived practice, illustrating how institutional expectations are enacted, negotiated, and symbolically reinforced in public settings. Observational notes were taken following the observation guide to document verbal and nonverbal interactions, collective rituals, and expressions of trust or legitimacy during governance activities. Notes from the observations

were added to the memos that emerged from the axial and thematic analysis of the coded data, which resulted in the design of the findings and analysis section.

Document analysis complemented the primary data by offering institutional and historical context, press reports and articles, institutional reports, and academic literature were reviewed to trace the characteristics and public narratives that support the legitimacy and structure of 48 Cantones. By complementing interviews and observations with document analysis, it was possible to corroborate the findings from the fieldwork and contextualize them within broader patterns observed through the history of 48 Cantones.

Together, these three data collection methods provided a robust strategy for examining the psychological and institutional foundation of governance.

5. Findings and Analysis

This chapter presents the core findings of the research, based on in depth interviews, field observations, and document analysis conducted in the Totonicapán municipality between January and February 2025. Rather than treating governance as a static structure, the findings are focused on how governance is lived, interpreted, and sustained through identity, trust, norms, and collective practice.

The chapter is organized around thematic sections that reflect both the original analytical framework, specifically the role of psychological drivers of trust, social norms, and collective identity, as well as the emergent patterns that arose inductively through the coding process and axial and thematic analysis. Special attention has been paid to the symbolic, moral, and spiritual dimensions that support environmental stewardship in 48 Cantones, revealing governance as an embodied social reality. Where relevant, interview quotes and excerpts from key documents are integrated to illustrate and support the findings.

5.1 Collective Identity as the Moral and Cultural Foundation of Governance

A foundational element that emerged across interviews and document analysis is the extent to which governance in Totonicapán is not only institutional but also cultural, moral and spiritual; the practice of community service known as k'axk'ol, the protection of natural resources and the structure of the 48 Cantones are not seen as technical systems but as embodied expressions of identity and belonging. Members of the community described their governance roles not simply in terms of function but as part of a deeper ancestral obligation, anchored in the values passed down through generations.

One interviewee stated "*since we are little, we know that at some point in our lives we have to be a part of our community's government*" (Interview, Community leader, February 2025). This internationalization of service is taught not only in assemblies but also at home, by observing parents and grandparents fulfill their roles. The continuity of identity through governance is not accidental but deliberately cultivated "*trust is an old thing for us,*" another leader said, "*that is the education we were brought up with*", referring to the expectation that children will someday serve, just as their elders did (Interview, Member of the Natural Resources Board, February 2025). Service to the community is thus not a bureaucratic obligation but an identity forming practice, learned and understood early and deeply.

This historical consciousness is often connected to the figure of Atanasio Tzul, invoked not as a distant symbol but as the living origin of community rights and responsibilities; as one speaker puts it, "*the great values that came from Atanasio Tzul... that is highly enrooted in the mentality of our parents, our grandparents, us and our children*" (Interview, Former Authority of 48 Cantones, February 2025). This intergenerational thread reinforces a collective belief that participation in governance is part of defending *el común (the common),* a concept that refers not just to shared lands but to a communal way of life, inseparable from forests, water, and mutual care.

Figure 3: Mural in Totonicapán depicting Indigenous resistance and civic strength; the figure of Atanasio Tzul beside a woman raising the national flag. February, 2025

The forest of Totonicapán is widely referred to as "ours", yet the meaning of that possession is not individualistic; it is understood as sacred, collective inheritance, protected, remembered, and lived. "*The forest is ours, and I see it and I think that this forest is a reflection and reality of the survival of the indigenous people in Guatemala*" writes Andrea Ixchiú, a former authority in a reflective account of her leadership (Ixchiú, 2014).

This deeply relational understanding of territory is grounded in the mayan cosmovision, a worldview in which all beings, forces, and elements are interconnected; while not always named directly, the cosmovision was consistently described by participants as the ethical and spiritual foundation of governance "*all has to be collective, it has to be of service... there is an close relationship between human beings, the Superior Being and mother nature that provides for us*" (Interview, community member, February 2025). In this framing, governance is a sacred structure sustained by reverence, reciprocity, and ritual, service to the community becomes a spiritual and ecological responsibility, part of maintaining harmony between people, ancestors, the divine, and the natural world.

This sense of spiritual geography is materially anchored in what one respondent called the "ABC of the communities: Agua, Bosque and Comunidad (water, forest and community) (Interview, female member of the community, February 2025). These three elements were repeatedly invoked as the triad that sustains life, legitimizes governance and justifies the intergenerational transmission of leadership roles: "*that is what brings the community together, and that is why we have it, then we created a structure of transmitting from one generation to another the governance and the care of the forest*" (Interview, member of the community, February 2025). Through this structure, the moral value of the forest never separates from the moral value of community service.

This relationship to the land is also expressed through metaphor and storytelling, in a ceremony recounted by Ixchiú, an elder tells the children that "*the trees, like us have veins and in those veins flows the blood of the earth, do you know what that is? It's the water*" (Ixchiú, 2014); the forest is not merely seen as a resource but as an alive being, and its care is a sacred trust. Rituals such as the annual march to the sacred site of María Tecún reaffirm territorial rights through offerings and collective remembrance. The collective identity of Totonicapán is thus sustained not only by

symbolic memory but by lived ritual practices, in which the forest is understood as a relational being and the center of ethical life.

Across interviews, observations, and document analysis, the sense of identity tied to k'axk'ol, and forest care is so strong that service is described as something one is born into, an inheritance rather than a choice, and even those who reflected on the hardship of service did so with an underlying recognition of its meaningfulness and legitimacy. This is not to romanticize sacrifice but to highlight how identity, duty, and belief form the moral foundation of governance in the 48 Cantones. It is this foundation that makes the system not only effective but enduring; the final remark given in an interview by an authority of the Natural Resources Board concludes that because of teachings acquired by every community member in childhood, "*this is why this organization has lasted so far*" which shows that their governance model endures not only because of its structure but because it is embedded in a culture of intergenerational teaching, trust, and identity.

5.2 Norms, Trust and the social fabric of Governance

The 48 Cantones are sustained not only by formal rules or visible hierarchies but by a deeply internalized set of social norms and trust relationships that reinforce every aspect of participation, leadership, and enforcement. These norms are not abstract, they are taught through daily life, reinforced in community settings, and expected of every individual. Participants consistently described trust and accountability as emerging from moral reputation, social responsibility and transparent leadership rather than from official status alone.

One of the clearest expressions of this is the vetting process for leadership positions, as one interviewee stated, "*when a person is not deemed honorable… we don't assign them the position, they might get a lower position in the structures, but not the decision making positions that direct the destiny of the community and certainly not the ones where the destiny of 48 Cantones is decided*" (Interview, community member, February 2025). The idea that authority is earned through community reputation, not ambition or credentials, appeared repeatedly, leadership positions are not open to anyone simply by desire, they must be granted through collective trust, confirmed through public service history and personal behavior.

This trust is maintained through continuous accountability; a current authority stated, "*One must communicate, consult… socialize, and lead the collective decisions around what things can be done and what things can't be done*" (Interview, Former Authority of 48 Cantones, February 2025). The legitimacy of leadership rests not on unilateral decision-making, but on the ability to hold dialogue, listen, and reach consensus. Consultation is not just a procedural requirement; it is a moral expectation enforced by assemblies and community scrutiny; failure to consult can lead to loss of confidence and even resistance from below.

Importantly, these norms are internalized from early life, several interviewees emphasized that children are raised to understand their future service roles; one respondent explained "*since we are little we start finding that love for service for k'axk'ol, my child has said to me: when I grow up I also want to be a mayor, I want to help, I want to be like you and do the things that you do*" (Interview, Female Authority, February 2025). This early socialization transforms service from an external

imposition into a source of pride and identity; these intergenerational transmissions of trust and service create a continuity of norms, upheld by example and lived expectation.

However, this internalization is not always purely voluntary, there is also moral pressure built into the system, especially from those who have fulfilled their roles; one interviewee described it bluntly: "*I have worked, therefore my children and my neighbour and my friend they must do it too.* *"Everyone recognizes the benefits, but this is a sacrifice too"* (Interview, community member, February 2025). In this case, trust in the system is partially sustained through shared sacrifice, those who have contributed expect others to do the same and feel authorized to demand it, which creates a form of horizontal social enforcement where compliance is achieved through solidarity, memory, and moral obligation. This creates an environment where participation is not optional; it is expected and morally binding. To fail to serve is to fail the community, and that failure is remembered.

This logic appears in small, everyday situations too, during a forest walk, a child gets scolded for stepping into a communal spring with dirty shoes, with the mother exclaiming that everyone is drinking from that water. and he must show respect (Ixchiú, 2014). This kind of correction, though informal, illustrates how community norms are enforced through shared responsibility, often without the need for formal intervention. The lesson here is clear, even children are accountable to the common.
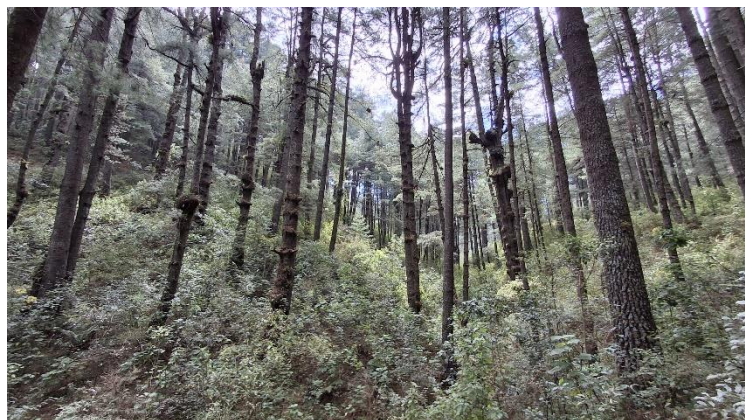
Figure 4: The Kommon Juyub communal forest. February 2025.

At the center of this governance system lies a principle of reciprocity according to which everyone gives so they can receive. Service is deeply taxing, and several interviewees spoke openly about the physical, emotional. and financial costs of it, but at the same time, service is what grants them legitimacy, pride. and belonging. As one former authority described it "*K'axk'ol is its name in K'iché, but translated to Spanish. it means service with pain"* (Ixchiú, 2014) but even in its difficulty, service is a moral cornerstone of identity. Those who fulfill it are remembered and respected, those who avoid it or perform it dishonorably have to repeat the year of service or are marked by the community in other ways.

Trust is not a side effect of the structure, it is the structure. It is embedded in how people are chosen, how decisions are made, how norms are enforced, and how legitimacy is granted. The 48 Cantones do not rely on external systems to enforce participation or leadership standards, instead they rely on a robust social fabric, woven from memory, obligation, stories and shared history and this fabric represents the invisible infrastructure of governance. and without it, the system could not function.

5.3 Gender, resistance, and expanding participation

Although the governance system of the 48 Cantones is rooted in collective service, responsibility and tradition, the experiences of service are shaped in somewhat different and sometimes unequal ways between genders; women's participation in community leadership has expanded significantly in recent decades, and their presence in assemblies, boards, and even executive positions shows a gradual yet meaningful transformation. However, this participation still confronts visible and invisible boundaries, moments where inclusion stops just short of equality and where traditional norms define the conditions of access.

Many women interviewed spoke of the dual weight of leadership and caregiving. Fulfilling a role such as vice president or mayor is understood not as a replacement of domestic responsibilities, but an addition to them, as one authority currently serving in the directive board stated "*This is a very demanding role for us as women. Beyond the service to our community, we must not neglect our roles within the family. This is not just my experience, it's the*

Figure 5: Vice President of the Board of Natural Resources of the 48 Cantones. February 2025

experience of all women in these positions" (Interview, Female Authority, February 2025). This perspective does not frame family roles as burdens but it highlights how women leaders are expected to perform full civic and domestic labor in parallel, a reality that remains largely unacknowledged in broader discourses on participation and different from the expectations on men.

At the same time, women's leadership can be seen not only as a role but as a form of quiet resistance, an act of expanding what is possible within structures of traditional governance. One interviewee described how her service was driven by the need to prove that women can mediate, guide, and represent, not only in their communities but across cantones. Others emphasized that women's contributions often take place in the most foundational and overlooked spaces: in childhood, education, daily forest use, and early transmission of values. As one leader expressed "*It's a very important role for us Indigenous women, because we are the pillar of our communities, we are the ones who pass on the love for our forests, who pass on our beliefs, our culture, our traditions, so we always care for Mother Nature because we know we will pass her on to future generations"* (Interview, Female Authority, February 2025).

An interviewee described women as "*the invisible power*" of the 48 Cantones (Interview, community member, February 2025), those who teach the youngest children the geography of the forest, the meaning of medicinal plants, the names and location of sacred places and the boundaries of safe walking. These practices are not ceremonial but foundational; through early socialization, women instill not only environmental knowledge but also a sense of place, identity,

and responsibility. In this sense, motherhood is not merely biological and familial but also political and pedagogical. The forest is not protected only by boards or assemblies, it is also protected in kitchens, on footpaths, and in the memory of children who learn from their mothers where the forest begins and what it means.

However, the limits of gender inclusion are clear and deeply entrenched; while women have for a few years now, occupied positions such as the vice presidency of the directive board of 48 Cantones and they have also actively served as mayors, delegates, and sheriffs, in the current government period, there is one board -from the five boards that form the government of 48 Cantones- where their presence is notably absent, the Natural Resources Directive Board. Through the interviews with the members of this board, it was understood that usually women are excluded from it, and although this exclusion is not mandated by a written rule, it has been enforced through a web of protective and gendered norms; one authority from this board mentioned "*it's not that women can't give orders or participate in decisions, everyone has a voice and a vote. But when we have to go to the forest to put out fires, we can't bring them along, we tell them it's better to stay behind*" (Interview, Natural Resources Board, February 2025).

However, according to document analysis, in the past there has been presence of women on this board. In 2014, a young maya k'iche' woman was appointed as the president of the Natural Resources Board, becoming the first woman to hold that position (Ixchíu, 2014). Her appointment was celebrated as a breakthrough in gender inclusion, yet her leadership was not mentioned by any of the male interviewees who discussed gender boundaries of the board for this study.

Gender boundaries also have a spiritual foundation; during one of the field observations at a forest monitoring, I was guided by forest authorities through part of the communal forest and at one point we reached a river; while some of the men crossed the river directly, I was redirected along another path. At the time, I did not question the decision; it was only later, through interviews, that I learned of a local belief that women should neither jump over rivers nor approach water springs, because it is said that these acts may cause the water to dry up. Though not spoken aloud in that moment, the belief was enacted; this illustrates how gendered exclusion in the 48 Cantones is not only a matter of physical labor or social norms but also part of a broader cosmovision that assigns different spiritual roles, permissions, and constraints to women and men. Access to sacred places is structured not just by governance but by ancestral meaning too.

Still, change is visible, some of the interviewees manifested that they approach water springs without any issue; they also noted that women now regularly attend assemblies, speak publicly and take on roles that were not common two decades ago, one interviewee recalled how in the late 1990s, when the first woman was elected as mayor of the Canton of Xantún, people mocked the decision by saying "*there must be no more men left in Xantún",* but nowadays, women are active in all of the Cantones and in some places, they hold up to half of all community service positions (Interview, Former Authority of 48 Cantones, February 2025). These are not isolated cases, and they signal a slow but real transformation in gender participation in 48 Cantones.

In Totonicapán, gender is not a binary of tradition and change, but a landscape in continuous change; women's leadership is expanding the meaning of service not by dismantling the system but by embodying new possibilities within it. Their resistance is often quiet, grounded in care and rooted in long histories of nurturing not only families but forests. In a governance model built on

memory, moral obligation, and territory, their work is both visible and invisible and utterly indispensable.

5.4 Governance in motion: strengths, frictions and the weight of service

The governance model of the 48 Cantones is a living system, structured, multilayered and deeply participatory; it starts at the level of the paraje and extends upward through the cantones to the larger assembly of the 48 Cantones, with each community retaining autonomy while contributing and participating in collective decision-making. This decentralized and coordinated structure allows for a high level of responsiveness to both local and shared needs. Each paraje sends representatives to its canton, and in turn, each canton sends delegates to the assembly of the 48 Cantones. Leadership roles are assigned annually through community consensus that involves service lists where every member of the community who is of age or has gotten married signs up.

The formal structure of the 48 Cantones is organized through five main boards: the Directive Board of Mayors, the Natural Resources Board, the Baths Board. and two rotating boards of Alguaciles, divided into first and second fortnight. The Directive Board of Mayors is the highest representative body, composed of selected community mayors from different cantones, and it plays a key role in coordinating large-scale initiatives and external representation. However, this board doesn't have hierarchical control

Figure 6: Members of the Board of Natural Resources of the 48 Cantones during a governance session. February, 2025

over the entire structure, in practice, the main authority lies with each canton's mayor. As one interviewee noted "*The directive board represents us, but they don't command us, each community decides for itself*" (Interview, community member, February 2025). This dynamic reflects a governance model rooted in autonomy, not top-down decision making, a model in which trust, identity, and legitimacy flows from the base upwards.

As presented previously in point 5.2, the process of selection of authorities is not arbitrary, as several interviewees explained, the community evaluates not only willingness but moral character; someone who is known to be dishonorable will be required to fulfill their K'axk'ol but they won't be entrusted with leadership roles. This distinction reveals that trust is tiered and earned, and more importantly, that service is universal but authority is selective.

Sanctions and enforcement are a core part of this moral order, they are not just punitive but an expression of shared values. When someone violates community rules, particularly around environmental misuse, sanctions are imposed through assembly decisions; one interviewee described a case of illegal logging: "*The forest guards see it, they call the board, we call the alcalde. The person is then invited to a hearing and we issue a fine based on the diameter of the tree they cut (...) no one wants to be punished or placed in that situation, but if the law is applied as it should be, because it's a collective decision, they have to obey*" (Interview, Natural Resources Board, February 2025). Sanctions variate from for example, cutting off water to the person who violated rules and his

family, closing his access to roads, or charging them a fine. The sanctioning mechanisms operate in a relational enforcement with assemblies, peer pressure, and localized moral consensus. Fines are used not to generate profit but to provide for the community by paying for a new roof for the school, the repairing of a road, or investment for reforestation.

The legitimacy of the sanctions rests on the principle that everyone knows the rules and that everyone will one day be held accountable under them. These are not laws written and forgotten, they are discussed, voted, and repeated in community assemblies. *"Community assemblies exist. Everyone here knows that there are set dates and schedules — just as we work here, it's the same in every community. For example, on the 23rd of this month, we have an assembly in Xantún, and we're finishing the review of an internal community regulation. When that regulation is finalized and signed by everyone, it goes into effect."* (...) "*They* (the neighbours) *approve, reject, modify or adjust what we propose, the goal is to carry out the will of the people"* (Interview, Community leader, February 2025). This makes governance a continuous and cyclical process of service, consultation, and correction.

Still, the system is not free of tensions, some interviewees mentioned some challenges in terms of scale and participation, noting that, for example, assemblies at the level of the whole of 48 Cantones would carry out larger issues such as not being able to handle all concerns at once, or simply keeping the attention of all the participants "*We can't hold one assembly for all of 48 Cantones, now everything is done by sectors, by parajes and only the big issues go to 48"* (Interview, Community leader, February 2025). The fragmentation of collective discussion and decision-making is seen, and both necessary and strategic to preserve responsiveness to local issues; in each paraje, between 3 and 4 mandatory assemblies are held annually, where leaders present reports and neighbours raise concerns. These meetings are binding, as decisions are approved and passed upwards only when consensus has been reached.

However, among the important findings from the interviews, it became clear that the 48 Cantones governance and system does not operate in isolation from its social and ecological surroundings. A representative from the Ministry of Environment and Natural Resources, reflecting on the work of the 48 Cantones noted both strengths and weaknesses. On the one hand, he noticed that *"no other indigenous system in Guatemala has been able to protect its forest in this way"*, while on the other hand, he warned that this success may also carry unintended regional consequences. Because 48 Cantones have been so effective at protecting their forests, the demand for firewood and timber has shifted to neighbouring municipalities, where governance is weaker or fragmented, *"The deforestation is happening just outside their borders, and the burden of conservation is not being shared"* (Interview, MARN Representative, February 2025). This reflects a broader challenge in environmental governance: when strong protection is enforced locally but not regionally, conservation in one area can unintentionally displace environmental degradation onto others, especially when demand for firewood or timber continues and is redirected toward less protected territories. In this case, neighboring municipalities like Santa María Chiquimula, which lack similar governance structures to those of 48 Cantones, are now facing increased deforestation as the demand for timber is diverted to their territories.

The representative from MARN also noted that while 48 Cantones have shown strong commitment to protecting the forest and safeguarding water resources, other dimensions of environmental

stewardship remain under addressed. Issues such as wastewater treatment, solid waste management, and urban runoff are not governed with the same concern; the reasons for this disparity were not directly explored in this research and remain uncertain. It is possible that these issues are not yet fully integrated into local environmental priorities or that they lack the symbolic or spiritual weight that forest and water protection carry in communal discourse. Regardless of the reason, the absence of structured governance around these challenges represents an important area for future reflection and potential growth within the broader environmental agenda of Totonicapán.

5.4.1 The social fabric of 48 Cantones and the weight of service

While the 48 Cantones have a formal structure of rotating boards and assemblies, their ability to function over time relies on something deeper, the *tejido social* or social fabric, that binds individuals and communities together. Built on trust, expectation, interdependence and cultural memory, the social fabric acts as the psychological and relational base that enables the 48 Cantones to function across generations.

To further understand this broader social fabric, it is useful to consider a conceptual diagram developed by Asociación CDRO, a development organization that works with community-based initiatives in the region. While the CDRO model called *Sistema Pop (*Pop System) was not created specifically to represent the 48 Cantones, it offers a visual language for understanding how community-based relationships and coordination create the conditions for indigenous governance to emerge and endure.

The *Pop System* diagram developed by CDRO uses color coded categories and a circular format to reflect the interwoven structures of authority and community in the Totonicapán municipality, at its center, and in red, is the community assembly, the space where consensus is built and decisions are made. Radiating outward are community actors, thematic committees, municipal linkages and intercommunity networks; this diagram rather than presenting a linear or top-down structure, shows a relational governance where responsibilities are shared, dialogue flows in multiple directions and symbolic authorities, such as elders and ceremonial leaders, coexist with practical actors like health committees and youth groups at the same level.
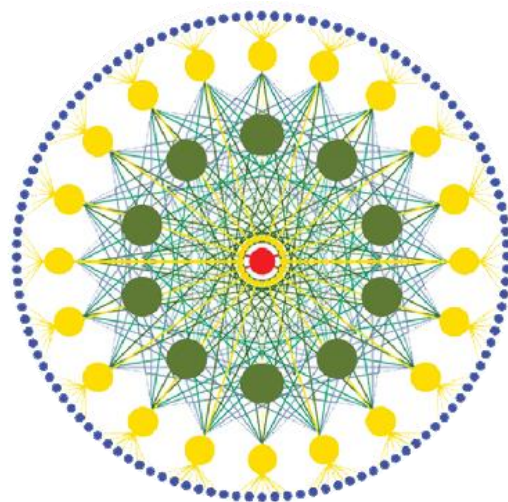
Figure 7: Pop System Diagram (CDRO, 2025)

This diagram does not show the 48 Cantones authority system but only the communal organization, which would mean in this case that the governance of 48 Cantones is built up on 48 communities organized each of them as shown in the diagram. This image mirrors the logic that interviewees repeatedly described, in which governance is not only institutional but also cultural, based on service, memory, mutual obligation, and the ability to consult and be consulted. The image

supports the argument that governance in 48 Cantones is sustained as much by relational trust, collective identity, and cultural cohesion as by official structures and rules.

This cultural and political autonomy has been consciously protected, as noted in document analysis. In a study made by organization Ulew Che Ja it is stated that *"The communities* (the cantones that form 48 Cantones) *have wanted to remain out of the reach of the national government which is why they haven't wanted nor even tried to obtain legal identity"* (Ulew Che Ja, 2008). The refusal to seek legal recognition as a juridical entity is a strategic decision given that by avoiding incorporation into the state's legal and institutional apparatus, 48 Cantones preserve their capacity for self-governance, clearly separated from the influence of changing administrations, political parties, and political interests. This decision reflects a broader desire to maintain governance as an internally rooted, community-controlled system, while also being a counterbalance to centralized power by defending communal and territorial interests over top-down decisions or economic agendas that do not align with their values.

At its core, what sustains 48 Cantones is not so much institutional formality as the moral architecture of obligation and memory, the word k'axk'ol itself conveys this duality, as in its literal translation means "painful service" *"There's no salary, you leave your job, your family and it's hard. But it's something you must do, that's how we survive as a community"* (Interview, community member, February 2025) *"We're expected to make the effort for whatever role we're given"* (Interview, Community leader, February 2025). Others describe it as a payment, a kind of moral debt repaid to the community that raised you, and a visible enactment of social reciprocity *"There's a shared awareness among everyone that a community must be organized if and only if everyone contributes their grain of sand, it means serving one another"* (Interview, Former Authority of 48 Cantones, February 2025), the ideal remains clear, belonging requires contribution.

Very importantly, governance is not limited to rules, meetings or titles; it also lives in the symbols that carry collective memory like the *vara*, the ceremonial staff of office, *"When people see you with the vara, they treat you with respect, they know you're going to solve something. And the vara must stay straight, because we must be straight too"* (Interview, Female Authority, February 2025). The staff is not just a mark of authority, it is a reminder that authority is earned through service and service is grounded in rectitude, honorability, and fairness.

The governance of 48 Cantones is not just a political arrangement, it is a form of collective life, anchored in territory, memory, trust, and mutual obligation. It is sustained not by hierarchy, but by belonging; its structure is responsive and deeply embedded in local practice, but not without limits. It can protect forests but not entire regions and watersheds, and it can sanction misuse but cannot eliminate externalities. Still, it has endured, shaped, and sustained by generations of participation and continues to offer insights into how environmental governance can emerge from within the social fabric of the community itself.

5.5 The Case of 48 Cantones in Context: Absence of Shared Governance

While this research focuses on the governance system of 48 Cantones, it is important to place the findings within a broader national context, to illustrate what can happen in the absence of similarly strong communal structures. Lake Atitlán is a region with a high concentration of indigenous communities, rich cultural traditions and increasing environmental pressures.

Despite its ecological and cultural significance, Lake Atitlán has suffered severe environmental degradation over the past decades (AMSCLAE, 2020). Although multiple actors, including non-governmental organizations, state agencies, and local municipalities, have launched interventions, governance remains fragmented, and there is no cohesive environmental authority with the capacity or legitimacy to enforce communal resource protection.

The contrast with Totonicapán is not meant to idealize one region or dismiss the complexities of another one; rather, it highlights how the presence or absence of a rooted governance system shapes both environmental outcomes and the possibilities of collective action. In Atitlán, economic interests, particularly those related to tourism, often outweigh long term stewardship; several local actors have attempted to mobilize around lake protection, but without a structure like that of 48 Cantones that is grounded in collective identity, obligatory service and moral authority, such efforts face substantial limitations.

The comparison with Lake Atitlán doesn't aim to be a critique of other communities, but just a contextual reminder of the power of collective identity, autonomy, and local legitimacy; in Totonicapán, governance is not isolated from culture, it is embedded in cosmovision, memory, ritual, and service. Where such cohesion is lacking, even the best environmental intentions may struggle to gain support; what 48 Cantones reveal is that environmental governance is not only a matter of rules or resources but of how communities see themselves, how they organize, and how they sustain shared meaning over time.

6. Discussion

6.1 Revision of the Matrix Framework considering the findings

This section addresses the central research question of this study: *how psychological drivers such as trust, identity and social norms support the effectiveness of governance structures in promoting environmental stewardship?* By systematically revisiting the matrix framework considering the empirical findings, the mechanisms through which behavioral and institutional dimensions co-produce the governance success in environmental stewardship in 48 Cantones are explored.

The matrix framework proposed in this study was designed to bridge the structural principles outlined by Elinor Ostrom (1990) and the psychological drivers identified in environmental psychology literature (Steg and Vlek, 2009; Steg et al., 2013; Tajfel and Turner, 1979). By mapping three key psychological variables: trust, social norms, and collective identity, against three of Ostrom's design principles: monitoring, collective decision making, and enforcement, this framework aimed to illuminate the mechanisms through which governance is not only institutionalized but also internalized. The findings from the 48 Cantones of Totonicapán offer empirical grounding for this framework, showing how psychological motivations animate the governance structures from within.

The matrix was not intended as a static tool but as a conceptual scaffold to investigate the lived practices of governance in 48 Cantones; as such, this section revisits the framework considering the empirical findings and engages in a systematic analysis of how each intersecting component interacts with each other. What emerges is not only a validation of the framework but a more complex understanding of its internal dynamics and possible extensions.

Governance principles	Trust	Social Norms	Collective Identity
Monitoring	Trust in fairness encourages participation in monitoring activities.	Norms establish expectations for reporting violations.	Identity fosters a sense of responsibility for ensuring rule compliance.
Collective Decision Making	Trust legitimizes the outcomes of decision making.	Norms align individual preferences with collective goals.	Identity enhances commitment to collective decisions.
Enforcement Mechanisms	Trust in fairness supports acceptance of sanctions.	Norms reduce the need for formal reinforcement.	Identity ensures that sanctions are seen as part of shared responsibility.

a. Monitoring; Trust, norms and identity in action

In Ostrom's formulation, monitoring is essential to detect rule violations and ensure compliance; however, as she later acknowledged (Ostrom and Walker, 2003) monitoring is only likely to be successful when individuals trust both the process and the people involved. In 48 Cantones, monitoring, whether in the form of forest patrols or community oversight is not just a technical practice but an expression of shared moral responsibility; community members participate in monitoring not because they fear sanctions but because they trust that others also participate and that any report of violations will be treated with fairness and seriousness.

The integration of trust with monitoring practices is particularly salient in 48 Cantones, where oversight of forest use and communal resources is not externally imposed but emerges from communal expectations and the moral authority of leaders. Rather than viewing monitoring as a neutral administrative function, it becomes an ethical practice supported by shared values and reputational trust. This evidence supports Ostrom's emphasis on monitoring (1990) but moves beyond her structural conception by showing that, in this case, it is trust: earned, sustained, and transmitted across generations and upwards through the governance structures that gives monitoring its effectiveness. As Ostrom later acknowledged, "monitoring is costly and is only likely to be undertaken when individuals trust that others are also contributing to monitoring efforts" (Ostrom and Walker, 2003, p.17).
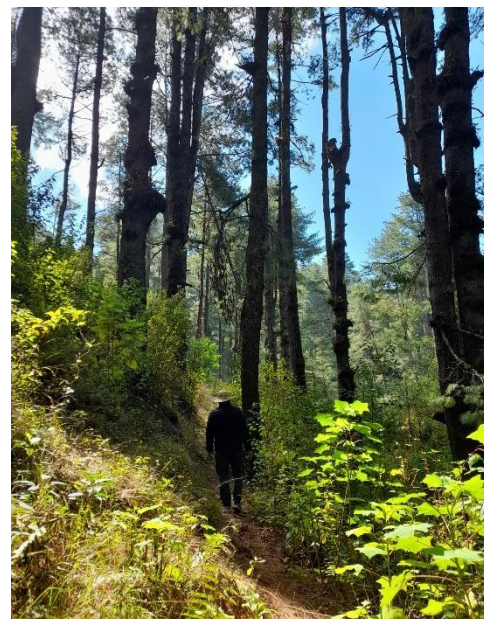

Figure 8: Forest guardian walking through the Komon Juyub communal forest during a monitoring patrol. February 2025.

Social norms also shape how monitoring is enacted, in Totonicapán there is a widespread expectation that one must protect the forest because "everyone drinks the same water" or "walks the same paths". These expressions are more than

sayings, they encode powerful informal rules about what is acceptable and what isn't. The norm of respect for communal goods is enforced horizontally, often without formal intervention as was shown in the example of children being scolded for stepping in water with dirty shoes, indicating that monitoring is socially distributed and embedded in daily life.

These findings support Steg et al. (2013) argument that social norms function as informal regulatory systems that reduce the burden on formal institutions; when norms are strong and widely shared, individuals internalize expectations and regulate themselves, early childhood learning and socialization of how one ought to behave and use CPR is key for horizontal enforcement. In Totonicapán, monitoring is not the exclusive role of elected forest guards, but a generalized social function that is made possible by widely accepted communal norms and everyday peer vigilance.

Finally, the sense of collective identity further strengthens the monitoring process; to protect the forest is not simply a behavior, it is an expression of who one is as a member of the 48 Cantones. The connection to the land, the water, and the figure of Atanasio Tzul creates a sense that failing to monitor is not only a neglect of duty but, actually, a betrayal of community memory and shared values. This finding aligns with social identity theory, which holds that individuals derive part of their self-concept from group membership and act in ways that maintain group norms and values (Tajfel and Turner, 1979). In this context, the act of monitoring and protecting the forest is not only about following the expected behavior, but a performative affirmation of belonging that signals loyalty to the group, commitment to its survival, and alignment with the ancestral ethics that are the base for the legitimacy of the organization.

b. Collective Decision Making: Legitimacy, alignment and commitment

Trust plays a critical role in legitimizing decisions. In 48 Cantones, the process of decision making is collective, often involving multiple layers of consultation from the paraje to the canton and up to the assembly of the 48 Cantones. The willingness to accept a decision, even those that impose a sanction or a fine, is based on the trust that it was made transparently and that everyone else is held to the same standard. As Ostrom (2009) notes, collective choice arrangements are most successful when all voices are heard and users believe that the rules reflect local needs and values. The findings confirm that participation in a multilevel decision-making structure and the widespread belief that decisions are made for the common good are based on an underwritten but specific kind of trust, not just in the procedure but in the moral character of those leading the communities and the organization. As one interviewee explained, "We don't give authority to just anyone." Decisions are legitimate when they are made by those who have proven themselves through an honorable life and k'axk'ol.

Social norms also play a foundational role in facilitating collective decision-making processes, in assemblies and governance meetings, the norm of consultation is not merely procedural but perceived as a moral duty. Leaders are expected to consult their communities not because rules dictate it but because failing to do so violates a deeply ingrained cultural expectation of collective engagement. This aligns with the literature on norms as informal behavioral regulators (Cialdini and Goldstein, 2004; Steg et al., 2013), but the Totonicapán case reveals how norms are embedded within a broader moral and spiritual economy. Norms around decision-making are reinforced through community feedback, collective memory, and the visibility of service,

suggesting that their durability comes from the extent to which they are internalized rather than enforced.

Collective decision-making also draws its strength from a shared sense of identity. Participating in assemblies or voting in internal regulations is not just an exercise of governance but also a reaffirmation of communal belonging. Decisions are not framed as a "majority win" but as expressions of communal will and the concept of "the common", which refers not just to shared property and goods but shared life. Compliance with collective decisions is made possible because individuals see themselves as part of a whole that transcends individual preferences. According to Laerhoven and Ostrom (2007), strong collective identity enhances the capacity of communities to adapt to new challenges through inclusive and flexible decision-making; for 48 Cantones, adaptability is supported by a strong communal identity that generates commitment to consultive processes and strengthens the perceived legitimacy of outcomes.

c. Enforcement Mechanisms: Reciprocity, legitimacy, and shared responsibility

Sanctions in 48 Cantones are accepted when they are perceived as fair, proportionate, and aligned with communal values. This acceptance is only possible because of the deep trust in assemblies, leaders, and the procedural fairness of the system. Enforcement is relational, and it is based on the confidence that others will be judged and treated similarly. Ostrom (1990) emphasized the importance of graduated sanctions, arguing that they signal fairness and allow for proportionality. In 48 Cantones, this principle is embedded in community practices and is sustained by a moral trust in the authority issuing the sanction. Individuals obey because they recognize the moral foundation of the rule and its enforcement.

Social norms reduce the need for formal enforcement. Shame, moral disapproval, and social memory are powerful tools for horizontal enforcement; an individual who violates forest rules may face a fine, but the more lasting consequence is reputational. The community remembers dishonorable behavior, and that memory can affect future access to leadership. Ostrom's (1998) insights on the power of informal sanctions to support compliance are noticeable in 48 Cantones, where informal norms not only precede formal enforcement, but they enable it. Formal sanctions are effective because they are backed by informal moral consensus.

Collective identity also proves indispensable to explain the functioning of enforcement mechanisms. Ostrom (1990) emphasized the importance of graduated sanctions for rule-breaking, and this principle is indeed present in the 48 Cantones system. The legitimacy of sanctions in this case does not come only from their severity or consistency, but also from the shared identity that underlies them; violations are not seen as infractions against an abstract law but as betrayals of collective values and damages to something that belongs to everybody. The moral authority to sanction derives from the fact that everyone will one day be on the receiving end, and the collective identity reinforces this sense of mutual accountability. The data from 48 Cantones suggest that identity might be the most powerful mechanism for sustaining enforcement since it connects individual behavior to communal survival and moral legitimacy.

What emerges from this empirical engagement with the matrix is not simply a confirmation of the framework but a dynamic view of its inner workings. Trust, norms and identity are not discrete variables as they overlap and reinforce each other across governance mechanisms; trust facilitates

monitoring but it is also supported by the norm of transparency and sustained by collective identity, norms are learned through identity forming practices like k'axk'ol and expressed through trust in governance processes, identity is shaped by participation in decision-making and reinforced through trust in fellow community members. This triangular reinforcement makes governance not only more effective but also more resilient and sustainable.

The findings from the research confirm the core premise of the matrix, governance principles do not operate in isolation from psychological factors, instead, they are embodied and enacted through them. This echoes Steg and Vlek's (2009) proposition that environmental behavior must be understood through an interactionist model where structural, contextual and psychological factors co-produce outcomes. By systematically linking these domains, the matrix framework provides a tool not only for analysis but also for design, offering pathways for strengthening governance through targeted attention to trust-building, norm development and identity reinforcement.

The matrix is not simply a descriptive model, it is more a lens through which to understand how indigenous governance operates from the inside out, rather than separating rules from beliefs or institutions from culture, the framework aims to demonstrate that in systems like 48 Cantones, these distinctions collapse into a cohesive whole, as it will be further discussed in section 6.3. Governance is not just about what people do, it is about who they are, how they relate to one another, and what they believe their obligations to be. This insight marks a theoretical contribution that will be expanded in the next section.

6.2 Contribution to Theory Development from the 48 Cantones

Elinor Ostrom's work revolutionized our understanding of common-pool resource (CPR) management by demonstrating that communities are capable of crafting robust, self-governed institutions that protect shared resources without centralized authority (Ostrom, 1990). Her eight design principles remain foundational in environmental governance research and have been applied across diverse socio-ecological contexts, however, the findings from the case of 48 Cantones show that governance is not merely a matter of institutional architecture, it is also a cultural, psychological and moral system embedded in lived histories, symbolic meanings and social expectations.

The case of 48 Cantones confirms many of Ostrom's institutional insights; it features nested governance, locally crafted rules, transparent monitoring, and effective sanctioning, each operating without state enforcement. These mechanisms are, in this case, anchored to an indigenous worldview where community service is sacred, forests are alive, and legitimacy stems from memory, sacrifice, and participation. In this way, 48 Cantones do not just "fit" Ostrom's framework, they expand it, they show that institutional success doesn't rest only on rational design principles, but on ancestral continuity, cosmovision, and moral obligation.

This calls for an expansion of CPR theory, while Ostrom later incorporated psychological concepts like trust and reciprocity into her insights (Ostrom and Walker, 2003), her primary framework remains institutional; it is analytically powerful but perhaps not so inclusive of cultural and behavioral elements. It does not fully account for the affective, symbolic, and historical dimensions that shape why people comply, participate, and sacrifice for communal goals. The 48 Cantones case suggests that any theory of durable governance must integrate not just formal mechanisms

and behavioral incentives, but also the emotional, cultural, and spiritual infrastructure that gives governance its meaning and legitimacy.

One of the most important contributions of this research lies in the analysis and theorizing of the role of k'axk'ol, the concept of "service with sacrifice" that is more than just a civic duty; it is a form of moral identity formation. In 48 Cantones, to serve is to belong; k'axk'ol builds legitimacy through memory and expectation instead of laws and rights, transforming governance from a system to a cycle where one generation teaches the next both the rules and reverence for their beliefs, "the common" and their organization. This idea challenges dominant theories that assume governance participation is voluntary and driven by rational cost-benefit analysis; in this case, participation is obligatory, but not in the sense of coercion; it is obligatory in the sense of being spiritually and morally woven into the social fabric. This expands the theory beyond collective action towards collective becoming.

Figure 9: Commemorative plaque placed by the Natural Resources Board of the 48 Cantones in 2021, marking the completion of a communal kitchen. The inscription reads: "The power of the people lies in community service". February 2025.

Additionally, this research shows that in this case, governance mechanisms are not just strengthened by psychological drivers; they are constituted by them. In the original Ostrom framework, trust or identity might be seen as enabling conditions, but for 48 Cantones, they are foundational. Trust is not just a facilitator for institutional functioning; it is the institution. Social norms are not informal supplements to formal rules; they are the basis on which rules gain force, and identity is not background but the actual frame within which participation, leadership, and enforcement are understood.

This observation aligns with insights by Laerhoven and Ostrom (2007) who argued for greater attention to social cohesion and affective bonds in CPR governance, and even then, the case of 48 Cantones pushes further, proposing that we need a theory of governance that is relational, moral and intergenerational, not just procedural and transactional. A standard model of compliance of rule + incentive = behavior is insufficient to explain a system where individuals leave their jobs for a year of unpaid service, guided by stories, symbols, and ancestral memory, because this is not compliance in the instrumental sense, but compliance as inheritance and commitment.

The matrix framework proposed in this thesis responds to this theoretical need by providing a structure that systematically links psychological drivers to institutional mechanisms, however, the findings suggest that even this framework may benefit from refinement. Rather than treating trust, norms and identity as external support to Ostrom's mechanisms, they could be re-conceptualized as internal logics that both enable and define governance practices. In this sense, the matrix can evolve from an analytical grid into a theory of relational governance, where institutional effectiveness depends on the quality and depth of social relationships, shared obligations and cultural legitimacy rather than on formal mechanisms alone.
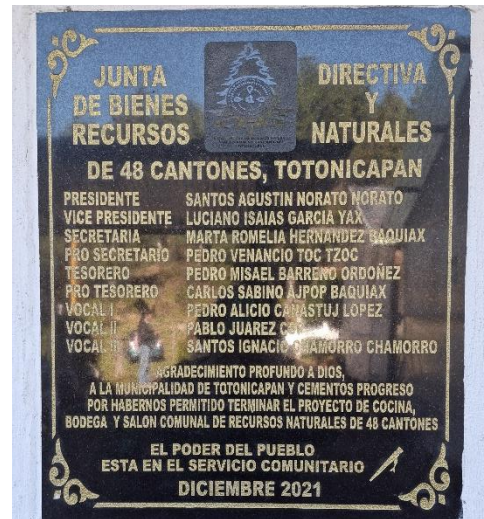
Finally, this thesis contributes to CPR theory by demonstrating the potential of indigenous governance systems to teach what mainstream governance theory has yet to fully understand. Indigenous institutions like 48 Cantones are not "traditional" in the sense of being outdated, they are dynamic, resilient, and profoundly sophisticated. Their success challenges assumptions that robust governance requires legal recognition, centralized enforcement, or bureaucratic formalization. The refusal of 48 Cantones to obtain juridical identity may be precisely what allows them to maintain independence from volatile political agendas and external interference. This opens a crucial theoretical space, one where autonomy, not incorporation, becomes the condition for sustainable governance.

48 Cantones pushes the boundaries of existing theory by showing that governance is not just an institutional form, but a relational and symbolic field. Trust, norms, and identity are not marginal, they are the material of governance itself. Any theory that seeks to explain environmental stewardship must recognize the meanings people assign to land, water, leadership, and service. Governance in this sense is not only what people do, but also how they belong, how they remember, and how they continue to be.

6.3 Limitations of the Framework and Findings beyond the matrix

The matrix framework proposed in this thesis has proven effective in explaining how psychological drivers support governance mechanisms within 48 Cantones; however, several empirical findings emerged that do not "fit" into the framework's analytical reach. These findings highlight areas where the framework can be refined, expanded or complemented; this section discusses four of those areas, each of which reveal the need for broader conceptual tools to fully capture the dynamics at play.

6.3.1 *Gender and Symbolic Authority*

One critical area where the matrix reaches its analytical limit is in the role of gender; while the framework accounts for the ways that norms, trust, and identity support collective governance, it does not fully address how these same drivers can reproduce exclusion. In the case of 48 Cantones, formal governance roles, particularly within the Natural Resources Board, are often limited to men; this exclusion is not articulated as discrimination but as cultural tradition, linked to ideas about strength, spiritual suitability, and the symbolic nature of service.

Figure 10: Varas or ceremonial staff that signals authority. February 2025.

This suggests that psychological drivers are not inherently inclusive because they also depend on the traditional beliefs of the communities. Norms and identities can both support participation depending on how they are culturally configured; in 48 Cantones, governance legitimacy is tied to symbolic authority, which remains unevenly distributed in some cases. This insight calls for an extension of the matrix to incorporate power and access as analytical dimensions acknowledging

that drivers like identity and trust operate within historically shaped boundaries of participation. A future version of the framework could integrate a gender-relational category.

6.3.2 *Local stewardship, regional displacement*

Another insight that challenges the scope of the matrix is the regional impact of localized conservation success. While 48 Cantones have managed strong forest protection through internal governance mechanisms, interview data and external commentary point to a paradox: this very success may be contributing to deforestation in neighbouring municipalities. When access to forest resources is restricted in 48 Cantones, neighbouring communities with weaker institutions may face increased extraction pressure, especially in contexts where firewood markets or agricultural land use are uncoordinated.

This observation is not captured within the matrix, which is focused on internal dynamics of governance; however, it shows the importance of scale and independence in environmental governance, no community governs in isolation as environmental outcomes often depend on interactions across administrative and ecological boundaries. This would suggest a need for a nested or extended dimension of the framework, that examines not only how psychological drivers sustain internal mechanisms, but how these systems interact with external pressures. Theories of polycentric governance (Ostrom, 2010) offer partial guidance here, but the 48 Cantones case shows that even successful local systems may require regional coordination mechanisms to avoid unintended externalities.

6.3.3 *Blind spots in Environmental Stewardship*

A third area where the framework shows limitations is in its implicit assumption that all environmental domains are governed equally, in the case of 48 Cantones, forests and springs receive intense communal protection, backed by spiritual beliefs and ancestral narratives; however, issues such as solid waste, wastewater management and urban environmental degradation appear to be largely absent from community governance. These environmental domains lack the symbolic resonance that forests and water hold and are therefore less likely to be integrated into collective norms, obligations, or identity.

This finding shows that environmental stewardship is not only a function of governance structure or psychological motivation but is also shaped by cultural valuation. Elements of the natural world that are considered sacred or emotionally significant are more likely to be protected, while those that are seen as mundane or unimportant may fall outside the sphere of moral responsibility.

It also raises a deeper question about motivation; the strong protection of forests and water in Totonicapán does not necessarily emerge from abstract ecological concern or global environmental discourse; instead, it seems to be rooted in spiritual duty, ancestral continuity, and direct dependence. In this case, care for the land is not necessarily framed as "sustainability" but as a moral obligation, and elements like waste or wastewater may be neglected not due to ignorance or apathy, but because they do not carry the same symbolic or spiritual significance. This could suggest that what is recognized as "environmental stewardship" operates here through a different moral and cultural logic, one that prioritizes protection based on meaning rather than management, which would have an important implication for environmental psychology, as

recognizing this difference becomes essential to interpret environmental behavior in culturally situated ways.

Additionally, the selectivity in environmental actions can pose challenges such as the presence of garbage in communal forests or unmanaged wastewater in urban areas. The lack of integration of these domains into collective responsibility undermines the broader goals of environmental stewardship, and what emerges is a system of care that is both deeply rooted and selectively applied, highly effective in some areas, yet incomplete in others.

6.3.4 *Social Fabric and Nested Governance*

These findings converge around a broader insight, that governance in 48 Cantones is not only supported by psychological drivers but also by a deeply woven social fabric, a network of relational, moral, and symbolic commitments that underpins the formal governance system. This logic is partially captured in the diagram inspired by the *Pop System* developed by Asociación CDRO (2025), which shows governance not as a top-down but as emerging horizontally from community life. The structure of 48 Cantones reflects a multi-level system, consistent with Ostrom's (1990) insights on nested enterprises, materialized through reciprocal service, symbolic legitimacy, and intercommunal coordination rather than formal legal authority. Each community/canton operates as an autonomous unit of governance with its own leadership and service obligations, which are then integrated through ascending layers of coordination to the communal board and finally the assembly of 48 Cantones and their 5 boards.
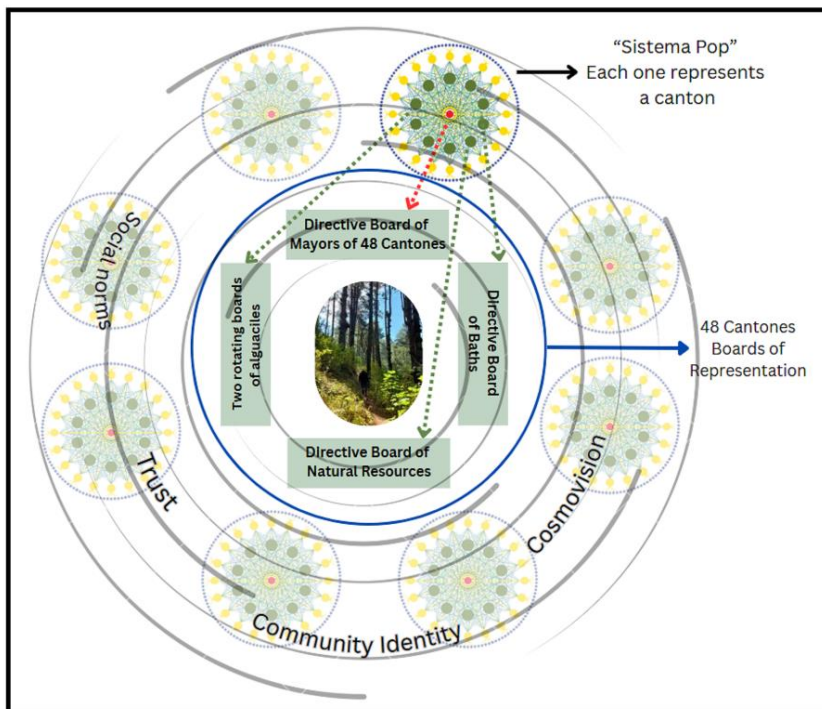
Figure 11: Governance, social fabric and psychological drivers in 48 Cantones: This diagram illustrates the governance structure of 48 Cantones of Totonicapán and the psychological drivers that sustain it. Inspired by the "Sistema Pop" model by Asociación CDRO (see Figure 7), it shows how trust, norms, identity and cosmovision form the social fabric beneath community-led governance. While the system includes 48 communities, only eight are depicted here as an example. (Diagram created by the author)

In this model, trust circulates horizontally and vertically, from the family to the paraje, to the canton and ultimately to the overarching collective; social norms act as the thread that links behaviors and expectations across levels, while collective identity serves as a binding force,

reinforcing belonging at each scale. What emerges is a form of culturally embedded nested governance, where legitimacy does not rely on formal law or bureaucratic hierarchy, but on reciprocity, shared service, and moral memory. The matrix helps make these relationships visible, but it is the social fabric dense with meaning and interconnection that sustains the system from below.

7. Conclusion

This research began with the question of how psychological drivers, specifically trust, social norms, and collective identity, support the effectiveness of governance structures in promoting environmental stewardship. The case of 48 Cantones of Totonicapán was selected for its recognized effort to protect forest and water resources through communal governance, making it a compelling context in which to explore the interaction between behavioral motivation and institutional design. Theoretically, the goal was to apply a matrix framework linking three of Ostrom's (1990) governance mechanisms with insights from environmental psychology, but as the research progressed, it became clear that governance in 48 Cantones is not only sustained by structural and psychological mechanisms, but also by moral obligation, historical memory and symbolic meaning. These dimensions were not assumptions but emerged inductively through fieldwork, analysis, and reflection.

The matrix developed in this study provided a useful analytic tool to examine how the governance principles of monitoring, collective decision-making, and enforcement are not implemented in isolation, but enacted through strong networks of trust, norms, and identity. Monitoring is effective because it is grounded in relational trust and social responsibility; decision-making gains legitimacy from a strong sense of communal belonging and cultural expectations of consultation; enforcement works because sanctions are perceived as fair and meaningful within a shared moral world. What the case of 48 Cantones reveals is that these psychological drivers are not just supports of governance, but that they are constitutive of it. Trust is not a condition for cooperation but a form of embedded accountability; norms are not secondary to rules but are the ground on which rules are based; identity is not a background variable but the thread that binds actors to the system they sustain.

These findings confirmed the value of the matrix framework while also revealing its limitations; some dimensions of the governance system of 48 Cantones, like the service with sacrifice known as *k'axk'ol,* for example, do not fit easily into existing theoretical models. In this case, participation is not based on rational incentives or voluntary interest, instead, it is a moral and social obligation that defines one's legitimacy and identity within the community. Governance is a cycle in which individuals serve, are remembered and held accountable, and pass on moral duty to the next generation, and this calls for a deeper reconceptualization of governance as a process of collective construction.

Similarly, Ostrom's insights on nested governance are strongly present in 48 Cantones, materialized through interlinked social obligations and intertwined coordination that ascends from families, to parajes, to cantones and finally to the assembly of 48 Cantones; this system does not operate through formal institutional layering but through relational dynamic grounded in community bonds.

Although this research focused on environmental governance, the political role of 48 Cantones cannot be overlooked; during the 2023-2024 political crisis, they mobilized nationally to defend democratic outcomes, which speaks to the broader legitimacy of the system not only as environmental stewards but as civic actors whose authority is rooted in community service, symbolic leadership and ethical accountability, the governance in 48 Cantones is also a defense of communal life.

Naturally, the study has its limitations as it did not assess long-term ecological impacts and it didn't fully explore gender dynamics or migration, although important findings on these matters emerged during fieldwork and have been included in the findings and discussion sections as they represent important areas for future research. While a brief contextual contrast with other regions, such as Lake Atitlán was included, this research didn't offer a full comparative analysis. Future studies could build on this work by approaching comparative analysis and applying the matrix to other indigenous governance systems to test its adaptability across cultural contexts and it is also important to reevaluate, expand or restructure this proposed theoretical framework to reduce its limitations.

Finally, one of the main contributions from the findings of this study, is that governance cannot be reduced to structures and rules, the case of 48 Cantones shows that working governance is made durable through relationships, obligations and shared histories; and more importantly, environmental stewardship in this context is not primarily driven by policy, but by the social and moral structures that shape how people relate to one another and their environment. The governance practices of 48 Cantones show that the protection of natural resources is closely tied to shared obligations, collective identity, and locally grounded systems of meaning. This example highlights that sustainability is not only a matter of institutional design or individual behavior, but it also depends greatly on how communities define their relationship to land, responsibility, and belonging.

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Appendix A. Glossary

- **48 Cantones:** Indigenous governance system in Totonicapán, Guatemala. Composed of rotating communal authorities, responsible for decision-making, environmental protection and resource management. It operates autonomously from state institutions and it's rooted in tradition maya K'iche'.
- **Atanasio Tzul:** Historic K'iche' leader who led an uprising in the early 19th century and is regarded as symbol of indigenous resistance and autonomy in Totonicapán.
- **Cantón:** An intermediate territorial unit within the 48 Cantones governance system, composed of several parajes. Each canton has its own communal leadership and participates in the broader governance structure through representation in assemblies and boards.
- **Entrega de consignas (Handover):** A ceremonial and administrative handover of responsibilities from outgoing to incoming authorities in the 48 Cantones system. It is done to secure continuity of governance and includes the transfer of records, mandates and moral obligations.
- **K'axk'ol:** A maya k'iche' concept meaning "service with sacrifice", referring to the unpaid, obligatory community service that builds legitimacy and reinforces moral authority within the governance structure.
- **K'iche':** A maya ethnic group of people and language predominant in Totonicapán. The cultural worldview and governance practices of 48 Cantones are deeply rooted in k'iche' tradition and cosmovision.
- **Kommon Juyub:** The communal forest managed by the 48 Cantones, covering over 22,000 hectares and regarded as a sacred and ancestral territory central to community life and spiritual identity.
- **Maya Cosmovision:** A worldview held by many Maya communities that emphasizes spiritual connection between humans, nature and ancestors.
- **Paraje:** A small territorial and social unit within the 48 Cantones system. A *paraje* consists of a cluster of families or households that organize local level governance and service duties. It is the foundational level from which representation and obligations scale up, first to the canton and then to 48 Cantones.
- **Vara:** A ceremonial staff symbolizing authority and legitimacy in indigenous governance. Carried by elected leaders, it represents the moral and symbolic weight of community service.

Appendix B. Operationalization Table

Variable	Definition	Indicators	Data collection methods
Trust	Belief in the reliability, fairness and intentions of others within the governance system (Ostrom and Walker, 2003).	-Perceptions of fairness in rule enforcement. -Confidence in communal leaders and assemblies. -Willingness to report violations or participate in governance activities.	-Interviews with community members and leaders. - Observations of assemblies and forest patrols.
Social Norms	Shared expectations within the community about appropriate behaviors related to resource use and governance (Steg et al. 2013).	-Adherence to rules -Reactions to norm violations -Evidence of norm reinforcement in governance practices.	-Interviews with community members and leaders. -Analysis of directives and community records.
Collective Identity	Emotional and psychological connection to the community emphasizing shared values and cultural traditions (Tajfel and Turner, 1979).	-Expression of pride in the 48 Cantones. -References to cultural/spiritual ties to the forest. -Participation in collective activities.	-Interviews exploring motivations and sense of belonging. -Observations of rituals, assemblies and activities.
Monitoring	Processes by which the community oversees resource use and detects violations (Ostrom, 1990).	-Participation in forest patrols. -Methods of reporting and addressing infractions. -Transparency in monitoring outcomes.	-Interviews with participants about challenges and outcomes. -Observations of patrols and monitoring activities.
Collective decision making	Processes through which governance rules and actions are established collaboratively (Ostrom, 2009).	-Frequency and inclusivity of assemblies. -Perceived legitimacy of decisions. -Adaptability of rules based on community feedback.	-Interviews assessing perceptions of participation and legitimacy. -Observations of assemblies.
Enforcement mechanisms	Mechanisms to ensure compliance with governance rules, including sanctions for violations (Ostrom, 1990).	-Types of sanctions applied. -Perceptions of fairness and effectiveness of enforcement. -Community acceptance of sanctions as legitimate.	-Interviews exploring perceptions of fairness and acceptance of sanctions. -Document analysis of enforcement records.

Appendix C. Interview Guide

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Interview Guide

Observation Notes

Psychological Drivers' support of Governance Mechanisms for Environmental Stewardship – 48 Cantones Totonicapán, Guatemala

-Introduce myself, the research's purpose and the confidentiality of the responses.

-Get consent to record the interview

1. What is the participant's connection to 48 Cantones?

2. What is 48 Cantones and how does it work towards the forest conservation?

Section 1. Trust: Belief in the reliability, fairness and intentions of others within the governance system (Ostrom and Walker, 2003).

Government members

- What does trust mean to you regarding the community and the governmental structures?
- Can you describe a situation in which you consider that trust played an important role for the community?
- How do you approach enforcing rules in a way that is perceived as fair to everyone?

Local Residents

- What do you think about the decisions made by the governance assembly? Could you share an example?
- In what ways do you think that trust between community members influences participation in forest management?
- When would you feel comfortable reporting a rule violation to the authorities? Would you in any case not report it?

-Do you feel women's perspectives are trusted and valued in governance decisions?

Section 2. Social norms: Shared expectations within the community about appropriate behaviors related to resource use and governance (Steg et al. 2013).

Government members

- What do you think are the shared understandings or unspoken rules about how resources like the forest should be used?
- How are these understandings communicated within the community?
- What happens when someone doesn't follow these shared rules?

Local Residents

- What behaviors do you think are expected of people when it comes to using resources like firewood or water?
- How does the community usually respond when someone breaks the expectations?
Are there particular rules or expectations for men or women when it comes to participating in governance or resource use?

- How is the participation of women in governance or resource use?

-What makes it easier or harder for women to be involved in governance activities?

Section 3. Collective Identity: Emotional and psychological connection to the community emphasizing shared values and cultural traditions (Tajfel and Turner, 1979).

Government members

- How would you describe the sense of community among the 48 Cantones? What brings people together?
- Can you share an example of a practice or tradition that strengthens the community's unity?

Local Residents

- What does being part of the 48 Cantones mean to you? How does it shape how you see yourself?
- How does the connection to the community influence the way you act towards protecting the forest or participating in activities?

-Do you see any particular way in which women contribute to the community's identity and decision making processes?

Section 4. Governance mechanisms

- How does the community monitor the use of forest resources to ensure they are protected?
- What role do trust and cooperation play in how the forest is monitored?
- How are decisions about the forest or other resources made as a group?
- What happens when someone breaks the rules? How are consequences decided and carried out?
- Does everybody accept the consequences? Or how do they usually respond to them? Why?

- Is there anything else you would like to share about the governance of the 48 Cantones or your role in it?

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Observation Notes

Psychological Drivers' support of Governance Mechanisms for Environmental Stewardship – 48 Cantones Totonicapán, Guatemala

Section	Description	Notes
Date		
Time		
Location		
Event		
Participants		
Physical environment	Where is the observation taking place?	
Overall dynamics	What is the mood of the interactions?	

Monitoring

	Observation prompts	**Possible Indicators**	**Emergent Patterns**
Trust	Are community members participating in monitoring activities? Do they express concern in fairness?	Low trust: Few participants join patrols, there is visible reluctance to engage or expressions of skepticism about fairness. High trust: High participation, mutual support and proactive rule enforcement.	Record any visible hesitations, conflicts or demonstrations of mutual support during monitoring.
Social norms	Are norms communicated or enforced during monitoring?	Low norm adherence: frequent rule violations with minimal peer correction. High norm adherence: clear communication of norms and peer accountability during monitoring.	Note informal peer feedback or visible social sanctions for violations.
Collective identity	Do participants express pride or shared responsibility during monitoring? Are cultural symbols or rituals involved?	Weak identity: Minimal engagement, lack of pride in the forest or monitoring tasks. Strong identity: Participants reference shared values and traditions, high emotional investment.	Identify references to shared heritage or emotional engagement tied to monitoring activities.

	Observation prompts	Possible Indicators	Emergent Patterns
Trust	Do participants support or challenge governance decisions? Are there visible expressions of confidence in leaders?	Low trust: Frequent disputes, accusations of unfairness, lack of acceptance of decisions. High trust: Calm, collaborative discussions and general acceptance of decisions.	Document disputes that question decision making.
Social norms	Are assembly protocols and community goals reflected in discussions?	Low norm adherence: Individual preferences dominate discussions, low focus on community goals. High norm adherence: Participants prioritize collective goals and adhere to protocols.	Note if individuals align their preferences with collective goals or if norms are explicitly referenced.
Collective identity	Are cultural values or traditions mentioned during decision-making? Are participants emotionally engaged? Are there any symbols used to confirm collective decisions?	Weak identity: Lack of emotional investment, disengagement during discussions. Strong identity: Regular references to shared heritage, active participation and collective pride.	Highlight symbolic actions or verbal affirmations that reinforce collective identity.

	Observation prompts	Possible Indicators	Emergent Patterns
Trust	Are sanctions accepted as fair and legitimate? How do participans react to enforcement actions?	Low trust: Sanctions are openly criticized and there is resistance to enforcement. High trust: Sanctions are seen as fair, minimal disputes over enforcement.	Observe if there is any kind of resistance, full compliance or support for enforcement actions.
Social norms	What kind of norms are used to address sanctions? Are violations addressed informally by community members?	Low norm adherence: Lack of peer accountability, and a disinterested acceptance is shown. High norm adherence: Most violations are	Observe the role of social norms in these interactions.

		resolved through community mechanisms.	
Collective identity	Do sanctions reinforce shared responsibility or community goals? Are they tied to cultural practices or beliefs?	Weak identity: Sanctions are viewed as imposed or disconnected from community goals. Strong identity: Sanctions are widely accepted as part of the collective responsibility.	Note if sanctions are perceived as aligned with community values, beliefs and goals.

Notes

Limitations or biases	Are there any factors that could have influenced my observations	
Follow up Questions	Any additional questions based on this observation	
Challenges	Visible challenges such as power imbalance or gender disparities	
Strengths	Practices or interactions that seemed particularly effective in fostering governance.	

Appendix E. Consent Form

Información sobre el procesamiento de datos personales con fines educativos en la Universidad de Gotemburgo y consentimiento para participar en el estudio

El Reglamento General de Protección de Datos exige que se le informe sobre cómo se procesan sus datos personales. Este documento describe el propósito del estudio en el que participa y los derechos que tiene como participante.

La Universidad de Gotemburgo es responsable del tratamiento de los datos personales que los estudiantes procesan en el marco de sus estudios. Si tiene preguntas sobre dicho tratamiento, puede ponerse en contacto con la estudiante que realiza el estudio.

Código del Curso	SK2532 Tesis de Maestría
Título del trabajo de investigación	La Psicología del Cuidado Ambiental: Confianza, Normas Sociales, Identidad Colectiva y Gobernanza Local en los 48 Cantones de Totonicapán, Guatemala
Nombre de la estudiante	Lucrecia Cristina Charchalac Ochoa
Correo electrónico de la estudiante	guscharclu@student.gu.se

Propósito del estudio

El propósito de este estudio es explorar los factores psicológicos y de gobernanza que influyen en los comportamientos ambientales dentro de la estructura de gobernanza de los 48 Cantones de Totonicapán. Esta investigación implica la recopilación y el análisis de datos cualitativos a través de entrevistas, observaciones y análisis de documentos.

Los participantes pertenecen a las siguientes categorías:

- *Miembros de la estructura de gobernanza de los 48 Cantones, incluidos autoridades locales y líderes comunitarios.*
- *Residentes locales involucrados en iniciativas de conservación ambiental.*
- *Mujeres de la comunidad, para asegurar diversidad de perspectivas.*

Los tipos de datos personales que se procesarán incluyen:

- *Identificadores generales como género y rol dentro de la estructura de gobernanza o la comunidad.*
- *Opiniones y perspectivas sobre gobernanza ambiental, identidad colectiva y normas sociales, recopiladas a través de entrevistas.*

Sólo las personas involucradas en el trabajo que la estudiante realiza con fines educativos en la Universidad de Gotemburgo tendrán acceso a sus datos personales (la estudiante y su supervisor/examinador).

Sus datos personales serán procesados únicamente durante la realización del trabajo con fines educativos. Una vez finalizado el estudio, la estudiante eliminará los datos personales. Esto significa que sus datos no podrán ser solicitados como documentos públicos.

La excepción a esto es si su nombre, en calidad de figura pública entrevistada, forma parte del propio trabajo de tesis. En este caso, la tesis será un documento público.

Si desea leer una descripción más detallada de sus derechos conforme al GDPR y encontrar los datos de contacto del Delegado de Protección de Datos de la Universidad y de la Autoridad Sueca de Protección de Datos por favor visite: Processing personal data | University of Gothenburg

Su participación en este estudio es voluntaria y puede retirar su consentimiento en cualquier momento antes de la entrega del trabajo. El consentimiento se otorga al participar en la entrevista.

Consentimiento específico:

En la mayoría de los estudios basados en entrevistas, los participantes son anonimizados o se utilizan seudónimos. Sin embargo, en algunos estudios es relevante mencionar el nombre de la persona que proporciona información para el trabajo de la estudiante, por ejemplo, si usted es una figura pública. A continuación, puede otorgar su consentimiento para que la estudiante mencione su nombre como fuente:

_____

Nombre	Fecha	Comunidad	Número de teléfono	Firma

Appendix F. Codebook

Data Codebook

Research Question:

How do the psychological drivers of trust, identity, and social norms support the effectiveness of governance structures in promoting environmental stewardship within the 48 Cantones of Totonicapán?

Codes and Definitions:

1. Trust
Definition: Belief in the reliability, fairness, and intentions of others within the governance system.
Indicators:

- **Fairness_Perception:** Perceptions of fairness in rule enforcement.

- **Leader_Confidence:** Confidence in communal leaders and assemblies.

- **Willingness_Participate:** Willingness to report violations or participate in governance activities.

- **Social_trust:** Generalized trust in other community members to act in ways that respect collective well-being.

2. Social Norms
Definition: Shared expectations within the community about appropriate behaviors related to resource use and governance.
Indicators:

- **Rule_Adherence:** Adherence to governance rules.

- **Norm_Violations:** Reactions to norm violations.

- **Norm_Reinforcement:** Evidence of norm reinforcement in governance practices.

- **Descriptive_norms:** Perceptions of what is commonly done by others in the community.

3. Collective Identity
Definition: Emotional and psychological connection to the community emphasizing shared values and cultural traditions.
Indicators:

- **Pride_Cantones:** Expression of pride in the 48 Cantones.

- **Cultural_Ties:** References to cultural/spiritual ties to the forest.

- **Collective_Participation:** Participation in collective activities.

- **Identity_formation:** Processes through which individuals develop a sense of belonging and shared identity with 48 Cantones.

- **Internal_diversity:** Differences within the collective identity of 48 Cantones, specifically between cantones.

4. Monitoring
Definition: Processes by which the community oversees resource use and detects violations.
Indicators:

- **Patrol_Participation:** Participation in forest patrols.

- **Reporting_Methods:** Methods of reporting and addressing infractions.

- **Monitoring_Transparency:** Transparency in monitoring outcomes.

5. Collective Decision Making
Definition: Processes through which governance rules and actions are established collaboratively.
Indicators:

- **Assembly_Frequency:** Frequency and inclusivity of assemblies.

- **Decision_Legitimacy:** Perceived legitimacy of decisions.

- **Rule_Adaptability:** Adaptability of rules based on community feedback.

6. Enforcement Mechanisms
Definition: Mechanisms to ensure compliance with governance rules, including sanctions for violations.
Indicators:

- **Sanction_Types:** Types of sanctions applied.

- **Fairness_Effectiveness:** Perceptions of fairness and effectiveness of enforcement.

- **Sanction_Acceptance:** Community acceptance of sanctions as legitimate.

- **Accountability:** Mechanisms and perceptions related to holding individuals or leaders responsible for their actions.

7. Gender Roles in Governance

Definition: Participation of men and women in decision-making and resource management.
Indicators:
- **Access_to_Positions** – Availability of leadership roles for women within governance structures.

- **Community_Work** – Roles and responsibilities of women in community labor and governance.

- **Gender Barriers:** Structural, cultural or social obstacles that limit women's participation.