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ANALYSIS OF GENDER ROLES AND IMPLICATIONS FOR NATURAL RESOURCE MANAGEMENT IN RURAL COMMUNITIES OF DURANGO, MEXICO.

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Resumen

ANALYSIS OF GENDER ROLES AND IMPLICATIONS FOR NATURAL RESOURCE MANAGEMENT IN RURAL COMMUNITIES OF DURANGO, MEXICO

Reyna Jeanine Soto Graciano, 2025

Esta investigación analiza las dinámicas de género que han influido en el manejo de los recursos naturales en las comunidades rurales de La Ferrería y El Nayar, Durango, México, durante los últimos 50 años. Utilizando un marco teórico basado en la perspectiva de género, la interseccionalidad y la teoría de sistemas rurales, el estudio examina cómo los cambios sociales, la globalización y la nueva ruralidad han transformado los roles de género y el acceso a los recursos naturales.

A través de métodos cualitativos, como la observación participante, las entrevistas semi estructuradas, historias de vida y la investigación documental, este estudio identifica la pérdida progresiva de conocimientos tradicionales y la creciente urbanización de la vida rural. Los resultados revelan que, aunque las mujeres han conseguido una mayor participación en los procesos de toma de decisiones, las barreras estructurales siguen limitando su acceso a la gestión de la tierra y los recursos. Además, el cambio en las perspectivas generacionales, sobre todo entre las personas de 18 a 24 años, indica una creciente desconexión de las prácticas agrícolas tradicionales en favor de enfoques técnicos y académicos.

Este estudio pone de relieve la urgente necesidad de integrar las perspectivas de género en las políticas de desarrollo rural, promoviendo una gestión sostenible y equitativa de los recursos y preservando al mismo tiempo los conocimientos ancestrales. La investigación subraya la importancia de revalorizar el trabajo rural para garantizar la seguridad alimentaria a largo plazo y mantener los vínculos culturales con la tierra.

Palabras clave: Perspectiva de género, gestión de recursos naturales, nueva ruralidad, conocimientos tradicionales, desarrollo rural.

Abstract

ANALYSIS OF GENDER ROLES AND IMPLICATIONS FOR NATURAL RESOURCE MANAGEMENT IN RURAL COMMUNITIES OF DURANGO, MEXICO

Reyna Jeanine Soto Graciano, 2025

This research analyzes the gender dynamics that have influenced natural resource management in the rural communities of La Ferrería and El Nayar, Durango, Mexico, over the past 50 years. Using a theoretical framework based on gender perspective, intersectionality, and rural systems theory, the study examines how social change, globalization, and the new rurality have transformed gender roles and access to natural resources.

Through qualitative methods such as participant observation, semi-structured interviews, life histories, and documentary research, this study identifies the progressive loss of traditional knowledge and the increasing urbanization of rural life. The results reveal that although women have gained greater participation in decision-making processes, structural barriers continue to limit their access to land and resource management. In addition, changing generational perspectives, particularly among participants aged 18 to 24, indicate a growing disengagement from traditional agricultural practices in favor of technical and academic approaches.

This study highlights the urgent need to integrate gender perspectives into rural development policies, promoting sustainable and equitable resource management while preserving ancestral knowledge. The research underscores the importance of revaluing rural work to ensure long-term food security and maintain cultural ties to the land.

Key words: Gender perspective, natural resource management, new rurality, traditional knowledge, rural development.

ACRONYMS

CONAGUA: National Water Commission

CONAFOR: National Forestry Commission

CONAPO: National Population Council

CONEVAL: National Council for the Evaluation of Social Development Policy

FAO: Food and Agriculture Organization

IDEGEO: Research Center for Geospatial Information Sciences

INEGI: National Institute of Statistics and Geography

PHINA: Registry and History System of Agrarian Nuclei

SIGEIA: Geographic Information System for Environmental Research

SRNMA: Secretariat of Natural Resources and Environment

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1. Introduction

Natural resources consist of all environmental elements that can be used, extracted, and managed to obtain goods and services, including inherent ecological processes. In addition to economic purposes, the complex interactions between environmental, social, cultural, economic, and political factors must be considered (López Jiménez and Chan Quijano, 2016).

This concept implies the transformation of raw materials according to the state of science and technology at that time, making the value of natural resources relative and dependent on technical progress (Sánchez, 2019).

The management of natural resources and productive activities related to their utilization are often gendered. Jobs related to fields, agriculture, planting, and hunting are considered masculine, while activities related to childcare, domestic work, wood collecting, and water hauling are primarily considered feminine (Castillo Bastidas, Montaño Fuertes, and Salazar, 2010; Gómez Bonilla, 2011).

In Mexico, during the pre-Columbian era, power relations between men and women were more equal. Especially in cultural groups located in the northern zone (Sonora, Chihuahua), where matrilineal or bilineal kinship structures existed. It is believed that the influence of Spanish conquerors likely caused gender patterns to become asymmetric (Kellogg, 2005).

According to Moore (1991), the processes of colonization, westernization, and international capitalism have transformed gender relations worldwide. Some authors, such as Leacock (cited in Moore, 1991), believe that women make significant contributions to their communities' economies, linking their role not to motherhood but to control over access to resources, working conditions, and the distribution of their work's products.

With the growth of capitalism, traditional economies underwent restructuring, leading to a shift in women's economic activities, the sexual division of labor, and the political and social opportunities available to women (Moore, 1991).

Due to gender dynamics, access to natural resources is limited by power relations between men and women (Soares Moraes, 2006) and, in some contexts, women

have no land rights and cannot make decisions regarding resource management (Gómez Bonilla, 2011).

In addition to differences in activities, there is a reciprocal influence between gender and class systems (Moore, 1991), leading women, particularly in indigenous and rural communities, to face discrimination based on both their gender and social status (Castillo López, Ordóñez Abril, Giraldo Vélez, and Gallego Muñoz, 2020).

Empowering women is essential for achieving gender equality and driving global economic growth through their participation in politics, the economy, and leadership, as well as ensuring equal rights to inherit and own property and land. This aligns with Sustainable Development Goal 5 of the 2030 Agenda (2015).

Women also play a crucial role in natural resource stewardship, yet they often face barriers to full participation. According to the UN Women Annual Report 2019-2020 (2020), increasing women's involvement in biodiversity decision-making is a key step toward ensuring the fair and equitable distribution of benefits from genetic resources, as well as the protection of flora and fauna diversity.

Gender-focused actions are identified to enable more harmonious collective action (Maya and Ramos, 2011). It is necessary to understand the role of women in their communities and identify the tasks they perform. This knowledge can help improve their access to positions that allow them to participate in decision-making and empower them locally.

The gradual appropriation of these spaces reflects how gender equity is emerging in rural communities (Vaca Pardo and Reyes Hernández, 2021). However, external support is still needed to change traditional patterns established by the patriarchal system (García Roces and Soler Montiel, 2010).

In addition to the above-mentioned problems, there are changes resulting from the new rurality, a term that defines the exchange between the rural and the urban, where boundaries are becoming blurred and now form a new way of relating between peri-urban spaces and their populations, whose ideas are changing according to the exchange of experiences and ways of life.

2. Background

Natural resources encompass all environmental elements that can be used, extracted, and managed to derive goods and services, including ecological processes inherent to these elements. This concept extends beyond economic purposes, encompassing complex interactions between environmental, social, cultural, economic, and political factors (López Jiménez & Chan Quijano, 2016).

Consequently, the transformation of raw materials aligns with the state of scientific and technological advancement, making the value of natural resources relative and heavily dependent on technological progress (Sánchez, 2019).

The management of natural resources and productive activities related to their utilization are often gendered. Jobs related to fields, agriculture, planting, and hunting are considered masculine, while activities related to childcare, domestic work, wood collecting, and water hauling are primarily considered feminine (Castillo Bastidas, Montaño Fuertes, and Salazar, 2010; Gómez Bonilla, 2011).

Moreover, the influence of gender and class systems is reciprocal (Moore, 1991), which often leads to dual discrimination faced by women in indigenous and rural communities due to both gender and social status (Castillo López et al., 2020).

In the management of natural resources, it is essential to emphasize the differences in productive activities based on gender. Women's interaction with the environment is unique, differing from men's in meaningful ways within the community management of natural resources. When women are excluded from management processes, their knowledge and perspectives on specific resources are lost (James et al., 2021).

According to Ulloa (2017), women have a unique closeness and knowledge of specific places and beings, allowing them to care for the non-human (flora and fauna) and the territory. This care is centered on the care and continuity of life, expressed at different scales.

3. Problem statement

Rural communities are defined by Llambí (2012) as settlements with a low population density, where the predominant economic activity is agriculture or other

primary activities, and characterized by cultural patterns and lifestyles that are different from those of urban communities. The relationship between society and natural resources is dynamic, evolving over time (Leff, 2006). Therefore, understanding how social changes affect natural resource management, the organization of rural communities, and decision-making processes is essential.

In Mexico, according to INEGI, rural communities are all villages with a population of less than 2,500 inhabitants, creating a dichotomous division that does not allow for a complex characterization of rurality (Soloaga, Plassot, & Reyes, 2021).

The rural communities are mostly defined as vulnerable due to the lack of services like running water, electricity and the lower levels of education (Ruíz Meza, 2010). According to Soloaga, Plassot, & Reyes (2021), small producers struggle to compete in the market due to globalization and its economic impact. As a result, rural communities need to diversify their activities, which has led to an increase in female participation in the labor market.

Access to and exploitation of natural resources have historically been unequal, with gender disparities contributing to women's limited access to natural resources and land ownership (Gómez Bonilla, 2011).

To address this inequality, following the Mexican revolution, peasants were granted shares of the land they worked on, and approximately 92% of rural communities were organized as ejidos, or communally owned land parcels (Candelas Ramírez, 2019).

Until 1971, women were legally excluded from becoming ejidatarias (landowners within ejidos) and were barred from participating in ejidal representative bodies (Vázquez García, 2001). This could be considered as a clear indication of the gender disparity in the Mexican countryside.

The rural communities depend on natural resources, so women's knowledge of these resources can help identify opportunities to enhance community resilience. More than half of the studies carried out in different countries, with varied ecosystems and cultural environments, agree that women are usually excluded from

decision-making in conservation and management of natural resources, due to cultural or social norms (James et al., 2021).

These inequalities are exacerbated by migration, as male outmigration often leaves women as primary managers of household resources without the necessary legal or social recognition. Some authors suggest that this can result in the feminization of poverty and feminization of the rural communities (Ayala-Alfonso, 2015; Vizcarra, Thomé & Rincón, 2013) although there is still insufficient research on this topic.

The lack of participation in decision-making not only undermines their potential contributions but also perpetuates a cycle of poverty and vulnerability in rural communities. At present, it is believed that a new rurality is emerging in the Mexican countryside, characterised by shifts in power and gender relations, lifestyles and values associated with the countryside, the development of agro-industry, and the growth of intermediate territories between the rural and the urban (Soloaga et al, 2021).

Due to the changing dynamics of rural communities and gender roles, another worrying phenomenon is the loss of traditional practices associated with the culture of the community (Lepofsky, 2009).

As Leff (2006) posits, the concept of nature encompasses not only its monetary or economic value, but also a process of resignification in which the diverse visions and values acquired by those who inhabit it and the differences with respect to the globalized world converge.

4. Justification

The focus of this thesis are the communities of El Nayar and La Ferrería, in the municipality of Durango, a region where research on community and natural resource relationships remains limited.

By analyzing how gender dynamics shape sustainability and resilience in these rural communities, this research aims to fill critical knowledge gaps and provide insights that can contribute to more inclusive and equitable decision-making processes in natural resource management.

The traditional knowledge of both older men and women in the community serves as a valuable resource, preserving historical practices and wisdom passed down through generations (Lepofsky, 2009). While women often hold knowledge related to the intimate, everyday management of natural resources, men typically possess expertise in the broader, more visible aspects of resource use, such as agricultural and forestry practices.

Integrating the knowledge and life experiences of both men and women into natural resource management can offer a more comprehensive and balanced approach, leading to enhanced resilience and sustainability in the community.

Given the limited research in this area and the ongoing transformations in rural communities due to the new rurality, this thesis provides an opportunity to explore how these shifts impact gender roles and resource management.

By addressing these gaps, the study can offer valuable information for local policy-making and contribute to the development of more gender-sensitive strategies for supporting rural communities in adapting to socio-economic and environmental changes.

4.1. Research gap

Despite growing interest in the relationship between gender and natural resource-related activities, little research has explored how these dynamics have been affected by new rurality and shifting gender roles, particularly in Durango, Mexico.

Existing studies on gender and rural economies in Latin America focus on broader trends, but there is limited research on how these transformations specifically impact communities such as La Ferrería and El Nayar.

This gap in research is largely due to the importance of forestry activities in the State of Durango, which has concentrated most of the studies in this sector (Universidad Juárez del Estado de Durango, n.d.).

The social and economic shifts in these areas remain underexplored, especially in terms of their consequences for women's participation in resource management and labor distribution.

Given that social sciences research in Durango is still emerging, this study aims to fill this gap by providing a current, localized analysis of gendered interactions with natural resource-related activities.

By analyzing gendered interactions with natural resource-related activities, this research not only offers new empirical insights but also serves as a foundation for further long-term studies on gender, rurality, and social transformations in the region.

Additionally, the findings could contribute to the development of gender-sensitive policies and initiatives aimed at supporting rural communities in adapting to social and structural changes, as well as the context of new rurality.

5. Objectives

5.1. General objective:

- To analyze how gender dynamics, including the roles of men and women, influence natural resource management, and to explore changes in these roles over the last 50 years in the rural communities of La Ferrería and El Nayar.

5.2. Specific objectives:

- Identify the natural resources present in the communities and analyze the productive activities of both men and women.
- Evaluate how the "new rurality" and other social changes over the past 50 years have changed gender roles and men's and women's relationships with natural resources and land management.
- Determine if the women are more involved in the decision-making processes over the past 50 years and identify barriers and opportunities.

6. Conceptual framework

6.1. Introduction

The theoretical framework of this research provides the conceptual and analytical basis for understanding gender dynamics, natural resource management and social

change in rural communities in Durango, Mexico. Through approaches such as feminist political ecology, intersectionality and rural systems theory, this framework allows us to analyze how gender inequalities and power relations influence the sustainability and resilience of rural communities.

6.2. Gender

Simone de Beauvoir (1949) had already stated in The Second Sex that “one is not born, but rather becomes, a woman” this author mentions that gender is constructed.

The term gender can be misunderstood and confused with sex; the concept of gender refers to the social and cultural constructs that assign different roles, responsibilities, and expectations to men and women based on their biological sex. These constructs are not neutral but reflect and perpetuate power relations that influence the distribution of resources and opportunities (Butler, 1990).

Scott’s (1986) definition is more appropriate to the framework of this research, as gender designates the social relations between the sexes and, therefore, when mentioning gender, it does not refer solely to the female role. The author highlights two bases for understanding the concept of gender: first, it emphasizes social relations, which indicates that the sexes are understood and constructed from a historical and cultural perspective related to society, leaving aside biological determinism; the second important factor is the relationship of "power," as it defines hierarchies and inequalities between men and women, reinforcing systems of domination and control.

6.3. Political Ecology

Political ecology is emerging as a theoretical-practical field in response to conflicts arising from the unequal distribution of natural resources and the appropriation of nature, challenging the economic and globalized vision of the environment and proposing a perspective that integrates power relations, culture and sustainability (Leff, 2003).

Derived from political ecology is feminist political ecology, which, according to Rocheleau et al. (1996), examines the intersections between gender, power, and

the environment, focusing on how social and political structures influence access to and control over natural resources. They also mention that ideologies shape the relationships between gender, knowledge, environment, and development, and these factors generate gendered access to information, knowledge, resources, and technologies to improve livelihoods. Additionally, they emphasize the structural differences in the positions occupied by men and women.

6.4. Interseccionality

The concept of intersectionality, developed by Crenshaw (1989), examines how multiple axes of oppression (gender, class, ethnicity, among others) interact to produce unique forms of exclusion and privilege. This approach is essential for analyzing the diverse experiences of women in rural communities, where inequalities are most pronounced.

Although the intersectional approach makes it possible to identify the factors that affect a population, it is not sufficient to merely add oppressed groups or subgroups. It is necessary to advocate for a critical, reflexive, and transversal incorporation of the conditions that perpetuate inequality, so that policies can be designed to promote equality of conditions (Jiménez Rodrigo, 2022).

6.5. Intergenerational relations

Intergenerational relations are defined as interactions between age groups, with a particular emphasis on the transfer of knowledge, values and resources. The dynamics of these relationships are influenced by various factors, including technological advancements, shifts in the world of work, and evolving family structures (Bengtson & Roberts, 1991).

Generational conflicts frequently emerge due to disparities in values, attitudes and expectations between older and younger generations, giving rise to tensions in domains such as employment, politics and culture. This discord can be attributed to preconceived notions about successive generations, which often manifest divergent behaviors when juxtaposed with their predecessors. This lack of understanding between generations has the potential to engender confusion, thereby impeding the efforts to collaborate (Kapoor & Solomon, 2011).

The term generation is used to define groups of people who are in a particular period, who share characteristics, who have lived through common historical events, and whose value systems and attitudes are therefore influenced by events in their environment (Nakagawa & Kobayashi, 2024).

The generations have been named Traditionalists, Baby Boomers, Generation X, Generation Y or Millennials and Generation Z (Springer & Newton, 2020), each with their own characteristics.

6.5.1. Traditionalists or silent generation

The period between 1922 and 1945 saw the birth of a generation that not only experienced the economic downturn of the Big Depression but also the Second World War. This generation has experienced hard times, consequently, its members tend to prioritize the collective over the individual. Moreover, the majority have not embraced modern technology (Kapoor & Solomon, 2011).

A notable aspect of this generation's social and economic landscape is its higher rate of marriage, which has contributed to a significant increase in the birth rate. The post-war economic climate, characterized by growth in education, transportation, and manufacturing sectors, resulted in significant increases in personal incomes (Eggen & Sturgeon, 2013).

6.5.2. Baby boomers

Those born between 1946 and 1964 are distinguished by a strong adherence to traditional hierarchies and a profound respect for authority figures. This generation has demonstrated a notable resistance to change and a tendency towards multitasking difficulties. However, it is noteworthy that this demographic has also exhibited a rapid adoption of technological advancements, with many individuals utilizing email and blogging platforms (Kapoor & Solomon, 2011).

This generation has been responsible for the invention of innovative technologies that have had a profound impact on society (Whitbourne & Willies, 2013). As this generation enters an older age, different challenges emerge. These include the necessity for care, the aging of the workforce, and the financial sustainability of the

Social Security system. This is further compounded by concerns regarding social instability and cultural changes (Eggeben & Sturgeon, 2013).

6.5.3. Generation X

Born between 1965 and 1980, members of this generation tend to be skeptical about authority, a propensity for self-reliant, and an inclination towards independence. They possess a high level of multitasking ability, but mostly they preferred to work alone, undertaking multiple projects concurrently. However, they are not willing to compromise their personal lives for their professional pursuits (Kapoor & Solomon, 2011).

6.5.4. Generation Y (Millennials)

Born between 1981 and 1999, this generation exhibits distinct physical characteristics, including piercings and tattoos. They have been raised in a technological environment and are comfortable with technology. However, there is a prevalence of a preference for instantaneous feedback, and there is often an association with suboptimal communication and problem-solving skills (Kapoor & Solomon, 2011).

This generation is characterised by its racial and ethnic diversity. Furthermore, it is observed that this generation tends to remain longer with their parents, delaying the conventional milestones of adulthood such as marriage and childbirth. However, this phenomenon enables members of this generation to attain higher levels of education and to increase their participation in the workforce, particularly rising women´s labor participation (Frey, 2018).

A divergence of opinion exists between Millennials and Baby Boomers about their preferences in terms of the workforce. This impact is shaped by economic and technological conditions, and it is therefore important to consider the role of geographic contexts and how these affect generational disparities (Hu & Huang, 2023).

6.5.5. Generation Z (Centennials)

Born between 2000 and 2012, this generation is distinguished by its status as the first to be born in the internet era. They are characterized by their interconnectedness through social media and technology, their open-mindedness, and their embrace of diversity. They are also defined as digital natives (Springer & Newton, 2020).

6.6. Ageism

The term "ageism" was originally coined to denote prejudicial attitudes and behaviors directed towards older individuals. However, the comprehensive definition of ageism encompasses "stereotyping, prejudice, or discrimination against a group based on their age," thereby intersecting with other forms of discrimination and disempowerment, including gender, race, and social status (Butler, 1969; cited in Ayalon and Tesch-Römer, 2018).

Siso Martín (2007) proposed a robust response, acknowledging the paradigm shift from reverential respect for the elderly, based on their wisdom and experience, to ageism or etaism. This devalued conception of the elderly was characterized by the perception that they represented an unproductive force, were a drain on resources, and lacked the competitive values of the new society.

Palmore (1999, cited in Castellano-Fuentes and de Miguel-Negredo, 2010) proposes a classification of ageism into two main categories: positive and negative. In both categories, he identifies various stereotypes that he considers to be misperceptions. Negative stereotypes, as previously mentioned, associate old age with aspects such as illness, frailty, unattractiveness, cognitive impairment, mental disorders, uselessness, social isolation, economic precariousness and depression. Conversely, positive stereotypes encompass characteristics such as benevolence, wisdom, courtesy, political influence, autonomy, financial stability, and contentment, which are often ascribed to the elderly.

According to Palmore (1999, cited in Castellano-Fuentes & de Miguel-Negredo, 2010), stereotypes generate attitudes, which are linked to emotions and, in turn, reinforce those same stereotypes. This process is accompanied by discriminatory

behaviors, whether favorable or detrimental. Taken together, this influences the way older people, old age and ageing as a social phenomenon are perceived.

According to Krekula et al. (2018), the process of ageing is not solely a biological phenomenon indicative of the passage of time; it is also a factor that must be taken into consideration in the context of power relations, given its intersection with other categories such as gender. This intersection, as the author has termed it, can result in what has been referred to as 'multiple marginalization'.

Salgado & Wong (2007) observe that older women worldwide tend to experience greater poverty than men, attributable to various factors. These include the fact that women statistically live longer than men, the tendency to marry older men, and the decision not to remarry in the event of widowhood, resulting in the latter years of life being spent without the financial support of a spouse. This can lead to economic and social vulnerability. Furthermore, a significant proportion of elderly women today did not engage in economic activities that would have enabled them to receive a pension, consequently leaving them reliant on the financial support of their children or other family members.

For instance, recent generations of women have been observed to challenge patriarchal structures through their participation in the labor market and social movements, while older generations may maintain more traditional conceptions of gender.

6.7. Rural resilience

The term "resilience" has been in vogue for some years now, usually used to express the resilience of a society to a catastrophic natural event or crisis. Currently, it is also beginning to be used to define the ability of modern societies to adapt to structural changes resulting from new advances in technology, transportation, socio-cultural and demographic changes, and even the impacts of climate change (Ambrosio-Albalá, 2017).

In the context of the rural environment, it has confronted novel challenges due to the loss of inhabitants, urbanization processes, and the deindustrialization of rural spaces. Additionally, there is a prevailing perception of rural areas as

underdeveloped regions (Matijasevic & Ruiz, 2013). These areas are often regarded as vulnerable and fragile due to their marginalization, poverty, limited access to information resources, discrimination, and ineffective institutions (Mackay & Petersen, 2015).

In addition to the aforementioned factors, it is imperative to consider the implications of evolving market access conditions and the necessity of developing adaptive processes in response to the challenges posed by climate change, particularly its impact on agricultural sectors. This endeavor should be complemented by the pursuit of alternative income opportunities for rural populations, with a focus on the utilization of local resources (Ambrosio-Albalá, 2017).

In rural systems, land degradation due to natural or anthropogenic factors has a critical impact on the resilience of the system (Kelly et al., 2015). Therefore, it is imperative to analyze the limits of sustainable exploitation of natural resources and avoid the point of overexploitation before the impacts become irreversible for the local population (Ambrosio-Albalá, 2017).

The political dimension of community resilience plays a fundamental role in enabling the empowerment of rural populations through their active participation in decision-making processes. Such participation is further strengthened when complemented by the involvement of professionals engaged in social action who demonstrate capacity to acknowledge the value of traditional knowledge systems. Moreover, the effective incorporation of both technical and environmental resources from rural areas, coupled with the meaningful inclusion of local residents, constitutes an essential component of this process. (López Carlassare & Palma García, 2021-2022).

The capacity of the social subsystem to establish and govern conditions that produce economic prosperity, to monitor early warnings signaling environmental transformations, and to facilitate systemic reorganization while anticipating both endogenous and exogenous changes with disruptive potential - while simultaneously preparing for contingencies - constitutes the fundamental determinant of rural system resilience (Ambrosio-Albalá, 2017).

6.8. New Rurality

Rural socio-ecological systems are distinguished by their strong interconnection between social and ecological subsystems, as well as relative isolation from political-administrative decision-making centers. Despite their geographical isolation, external actors wield significant influence over local resource utilization and production strategies of local agents (Ambrosio-Albalá, 2017).

One of the most significant transformations has been the declining role of agriculture as the foundation for industrial development. This shift precipitated the exclusion of rural producers from domestic markets, triggering a reduction in agricultural incomes that ultimately contributed to the impoverishment and depeasantization of rural populations. Faced with diminished economic prospects, agricultural workers increasingly resorted to pluriactivity as a means of supplementary livelihood support (Rubio, 2002).

The self-governance systems of rural communities (referred to as the ejidal commissariat in ejido contexts) hold significant importance for territorial management and decision-making processes when addressing challenges related to sustainable resource management. However, these systems also face structural changes derived from globalization and neoliberal policies, which have affected the capacity to respond to the challenges already mentioned and new ones (Campos et al., 2013).

According to Kay (2009), four primary factors have contributed to the transformation of rurality into its new form.

1. Rural activities occurring outside of farming contexts

The inhabitants of rural communities engage in a variety of activities to generate income, including service sector employment, commercial activities, rural tourism, and transportation services. This economic diversification leads to a migration of these individuals from their rural communities (Kay 2009).

This pluriactivity has caused a process of "deagrarianization" since most of the income received by rural dwellers no longer comes from agriculture (Rubio, 2002).

Off-farm activities can be categorized into two distinct types. The first type encompasses activities that necessitate greater training and capital, resulting in higher incomes. The second type comprises marginal activities, characterized by low productivity and minimal income. This is primarily due to the highly vulnerable state of the poorest farming households, who often accept employment out of necessity (Kay, 2009).

2. Work flexibilization and feminization of rural labor

The use of new technologies has led to a decrease in permanent jobs for a certain sector of the peasantry, thereby resulting in an augmentation of temporary laborers who exhibit more time flexibility (Kay, 2009).

This labor market flexibility has increased female employment opportunities, as women demonstrate greater willingness to accept temporary positions with lower remuneration. This trend reflects persistent gender divisions in domestic labor, wherein women continue to bear primary responsibility for household duties while male participation in care work remains limited (Kay, 2009; Deere, 2006).

3. Rural-urban interactions

The traditional demarcation between rural and urban spheres has progressively blurred through increasing bidirectional interactions. This phenomenon manifests in two primary dimensions: (1) rural laborers engaging in urban employment (with notable gender stratification - males predominantly in construction sectors and females in service industries), and conversely, (2) peri-urban residents participating in seasonal agricultural work during harvest periods. (Kay, 2009).

Llambí (2012) mentions that the process of suburbanization has been triggered by the increased consumption of rural spaces by the construction, tourism, leisure and environmental industries. This has led to a decline in the occupational structure of rural communities, as employment in agriculture has decreased, and there have been changes in cultural patterns and rural lifestyles, as they have been transformed into more urbanized styles that are considered modern.

Rubio (2002) defines it as a process that has ruralized the urban periphery and urbanized rural communities. Despite this closer relationship between the rural and

the urban, rural communities continue to have below-average economic incomes, higher rates of poverty, and fewer opportunities (De Ferranti et al., 2005).

4. Migration and remittances

The economic precarity of low-income populations, exacerbated by indebtedness and globalization processes, has intensified migratory flows. While some migration patterns involve circular movement to nearby urban centers, recent years have witnessed a marked increase in international migration. This is part of the survival strategy of the family group; often the youngest members are sent to other cities or countries, and they send remittances when they manage to reach the destination (Kay, 2009).

These migratory dynamics have precipitated sociocultural transformations through the bidirectional exchange of customs, practices, and lifestyle norm (Rubio, 2002).

7. State of art

7.1. Gender and natural resources in Mexico

During the pre-Columbian era power relations between men and women were more equal, especially in cultural groups located in the northern zone of Mexico (Sonora, Chihuahua) where matrilineal or bilineal kinship structures existed. It is believed that the influence of Spanish conquerors likely caused gender patterns to become asymmetric (Kellog, 2005) and according to Moore (1991) the processes of colonization, westernization, and international capitalism have transformed gender relations worldwide. Scholars such as Leacock (cited in Moore, 1991) argue that women’s economic contributions to their communities are substantial, contending that these derive not from maternal roles but rather from women’s agency in controlling resource access, labor conditions, and the distribution of productive outputs.

With the growth of capitalism, traditional economies underwent restructuring, leading to a shift in women's economic activities, the sexual division of labor, and the political and social opportunities available to women (Moore, 1991). Due to gender dynamics, access to natural resources is limited by power relations between

men and women (Soares Moraes, 2006). In some contexts, women have no land rights and cannot decide on resource management (Gómez Bonilla, 2011).

In addition to activity differences, there is a reciprocal influence between gender and class systems (Moore, 1991) leading women, particularly in indigenous and rural communities, to face discrimination based on both their gender and social status (Castillo López, Ordóñez Abril, Giraldo Vélez, and Gallego Muñoz, 2020).

Considering this, national governments comprising the United Nations membership have enacted multilateral agreements and strategic frameworks, most notably through the adoption of the 2030 Agenda for Sustainable Development.

Development models often assume a paternalistic view where women are considered recipients of programs and actions. A paradigm shift is needed to empower women as agents of individual and community change and social transformation (Maya and Ramos, 2011). Activities performed by women are undervalued and made invisible because greater value is placed on paid activities carried out outside the home (Moore, 1991: p. 60).

Although there have been changes in women's participation in productive activities, with them taking on increasingly active roles, men are not equally involved in domestic work (Gómez Bonilla, 2011). Due to these gender disparities and differences in their perception of reality, men and women are affected differently by community development projects (Soares Moraes, 2006).

These new forms of work, in which the relationships between men, women, and nature are analyzed; consider new possibilities for access to and control of natural resources. Additionally, they provide elements for developing strategies and policies for the use of natural resources in rural communities. Gender-focused actions are identified to enable more harmonious collective action (Maya and Ramos, 2011).

It is necessary to understand the role of women in their community and identify the tasks they perform. This knowledge can help improve their access to positions that allow them to participate in decision-making and empower them locally. The gradual appropriation of these spaces reflects how gender equity is emerging in rural communities (Vaca Pardo and Reyes Hernández, 2021).

However, external support is still needed to change traditional patterns established by the patriarchal system (García Roces and Soler Montiel, 2010). Community capacity in the management and utilization of natural resources is an area of interest because it is part of strategies for social and environmental justice. Ideally local populations should achieve social, environmental, and economic well-being through their own knowledge and organizational processes, without excluding the state (Ruiz Rivera and Salgado Hernández, 2021).

However, while community management is a noble goal in theory, there are certain limitations. For instance, there can be a lack of recognition of the actual conditions of society, culture, and the local ecological environment. This means that national political and economic processes that impose regulations may not work everywhere. Additionally, there is often no clear point for the intervention of different government levels, making it challenging to grant communities greater management power (Fabricius et al., 2004). Furthermore, there are often broad outlines of what should be done in the community but there is a lack of detailed instructions on how to do it (Gruber, 2010).

Many communities also lack the necessary skills to accomplish the proposed goals of community management (Ruiz Rivera and Salgado Hernández, 2021). In addition, it is important to note that there are local and community-level differences based on gender.

More than half of the studies conducted in various countries, with diverse ecosystems and cultural environments, agree that women are often excluded from decision-making in the realm of conservation and natural resource management due to cultural or social norms (James et al., 2021).

A Western-centric androcentric view prevails in the world, where sociocultural constructions influence the assignment of biased roles. Male jobs and attributes are considered superior to female ones. Women are often responsible for the invisible tasks carried out at home without pay (García Roces and Soler Montiel, 2010).

Within community management of natural resources, it is essential to emphasize the differences in productive activities based on gender. Women interact differently with the environment compared to men. If they are excluded from natural resource

management their knowledge and perspectives on specific resources are lost (James et al., 2021).

According to Ulloa (2017), women have a unique closeness and knowledge of specific places and beings, allowing them to care for the non-human (flora and fauna) and the territory. This care is centered on the care and continuity of life, expressed at different scales. For this reason, various movements related to environmental justice and territorial-environmental struggles are led by women, which the author calls "territorial feminisms".

7.2. Rural communities and the ejido

Rural communities in Mexico are typified by a population of less than 2,500 inhabitants (INEGI) and a subsistence economy based on agricultural activities, which represent one of the economic pillars. This makes these communities highly dependent on climatic factors and their variability (Campos et al., 2013).

In Mexico, due to the conditions of poverty of these communities, intensive exploitation has been carried out. Consequently, it is considered necessary to safeguard the natural resources of the communities, as it is considered important for the protection of biological diversity and genetic diversity in situ (Ramírez et al., 2016).

Any substantive analysis of Mexican rural communities must necessarily incorporate the ejido tenure system as a foundational analytical category. This distinctive landholding institution was formally institutionalized on January 6, 1915, marking the return of the ejido lands to the original indigenous populations (Candelas Ramírez, 2019). Another effect that should be considered is that the peons, who were tied to the haciendas through the system of debt, were freed and given the status of peasants with their own land (Reyes Morales & Gijón Cruz, 2007).

Despite the good intentions of the Agrarian Law, the first distributions benefited large producers, and it was not until the 1934-1940 and 1970-1976 administrations that peasants were favored (Reyes Morales & Gijón Cruz, 2007). Limitations were

imposed on the full domain to prevent the sale and hoarding of rural property. The agrarian distribution was terminated in the 1990s (Candelas Ramírez, 2019).

According to Candelas Ramírez (2019: p.6) the ejido is:

> "A society of social interest, integrated by Mexican peasants by birth, with initial social patrimony comprised by the lands, forests, and waters that the state grants them free of charge in inalienable, non-transferable, non-seizable, and imprescriptible property; subject to the modalities of use and exploitation established by law. Its purpose is the integral use of its natural and human resources through the personal work of its partners for their own benefit".

The social property that constitutes the ejido can be divided into two different categories, as we can see in Figure 1:

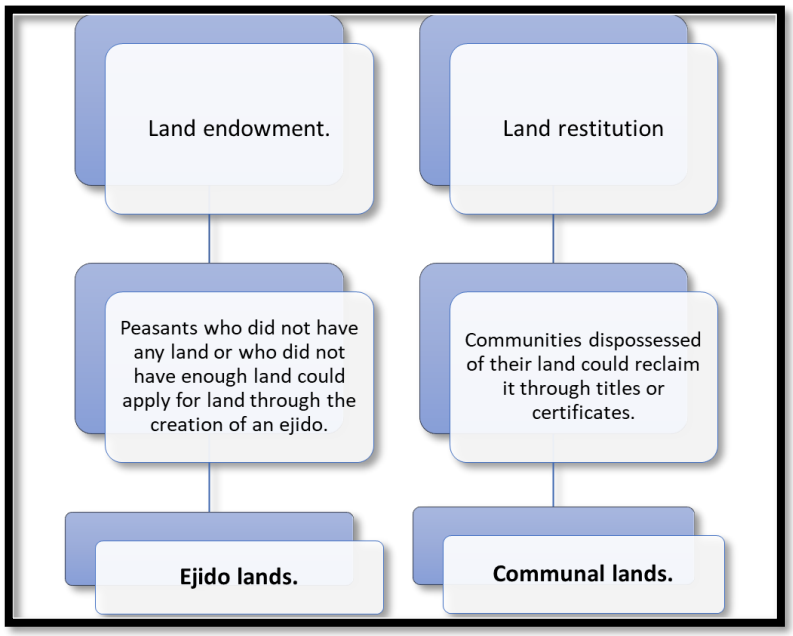

FIGURE 1 TYPES OF EJIDO, AUTHOR´S ADAPTATION FROM FERNÁNDEZ MOYA (2012)

The purpose of the ejido was to provide justice to the native peoples who had been dispossessed of their lands or had been victims of unfair treatment by landowners, to obtain sovereignty and food security for the rural communities of the Mexican Republic, as well as to promote agricultural and forestry activities in the national

territory (Candelas Ramírez, 2019), and to take advantage of non-renewable resources, such as mining (Fernández Moya, 2012).

The ejidos have an assembly in which all ejidatarios participate. The representative bodies are the Ejidal Commissariat, which is comprised of a president, secretary, and treasurer, and the Oversight Council, which is comprised of a president and two secretaries (CONAFOR, 2012; Candelas Ramírez, 2019).

The importance of the ejido is such that in 2018, 51% of the country's total area was under the social property regime, equivalent to 99,250,000 hectares (Candelas Ramírez, 2019). According to INEGI (2020), 21% of the Mexican population belongs to rural communities. In addition, 80% of Mexican forests and jungles are also social property (CONAFOR, 2012).

According to CONEVAL (2023), as of 2022, 43.5% of the Mexican population was living below the poverty line, with 12.1% experiencing extreme poverty.

7.3. *Threats Facing the Rural Sector in Mexico*

In Mexico, climate change has led to stronger hurricanes, landslides caused by the slope and topography of the Mexican mountains, desertification in the northern part of the country, and increased cases of dengue fever and malaria due to changes in rainfall patterns (Ruíz Meza, 2010; Conde-Álvarez & Saldaña, 2007).

According to Cuervo-Robayo et al. (2020), the average temperature increase is 0.2°C in the Mexican territory between the years 1970 and 2000, while Murray-Tortarolo (2021) indicates a 0.71°C increase over the last 70 years. Both authors agree that the northern part of Mexico is becoming warmer. They also note that the wet season is becoming wetter, and the dry season is becoming drier.

The rural economy relies heavily on agriculture, making communities highly dependent on crops and the climatic conditions that affect them. The management of the land is a crucial factor in determining the methods of exploitation. However, due to globalization and neoliberal policies, the ability of communities to address current environmental challenges has been diminished (Campos et al., 2013).

Furthermore, rainfed production is the primary agricultural activity for most subsistence farmers in the country (Munguía-Aldama et al., 2015). According to Altieri and Nicholls (2009), approximately 55% of smallholder households worldwide are below the poverty line, making them particularly vulnerable.

Ruíz and Meza (2012) cite Saldaña and Sandberg, to report that between 1980 and 2005, the agricultural sector suffered significant economic losses due to weather-related disasters, accounting for 80% of all losses caused by natural disasters.

Ruíz-Corral et al. (2011) project a +2°C temperature anomaly during the May-October growing season by 2051, which will likely render rainfed maize cultivation nonviable across significant agricultural zones. In addition, precipitation during these months is projected to decrease by about 4%, resulting in a less favorable water balance.

Compounding these challenges, rural communities face accelerated demographic aging coupled with youth outmigration, resulting in three critical consequences: precipitous land dispossession through parcel sales, erosion of agrobiodiversity in traditional cropping systems and, intergenerational rupture in traditional ecological knowledge transmission (Lazos-Chavero & Jiménez Moreno, 2021).

8. Methodological framework

8.1. Case of study: La Ferrería and El Nayar, Durango, Mexico.

The state of Durango is situated in the northwestern region of the Mexican Republic, encompassing an area of 123,364 square kilometers, representing 6.3% of the country's total territory. Despite its expansive territory, the state occupies the 31st position in terms of population density, with an average of 15 inhabitants per square kilometer (State Development Plan 23-28, 2023).

The settlement was formally established on July 8, 1563, under the command of Captain Francisco de Ibarra, whose expedition was driven by the identification of substantial mineral reserves, most notably the iron deposits at Cerro de Mercado (Gallegos C., 1963). This development precipitated the creation of the Camino de la Plata (Silver Road), a critical colonial trade artery linking northern and central

Mexico, primarily to facilitate the transport of silver extracted from the prolific mining districts of Zacatecas and Durango (Ganot Rodríguez & Peschard Fernández, 1997).

The Ferrería de Piedras Azules (Piedras Azules Ironworks) was established in 1826 as Mexico's first post-independence iron smelting facility. Commissioned by Governor Santiago Baca Ortiz, the complex reached an operational workforce of 150 laborers by 1843 (Sánchez Díaz, 2009).

Nevertheless, it should be noted that this is not the first instance of human settlement in the region. Pre-colonial records indicate the presence of the Guadiana Branch of the Chalchihuita culture between 950 and 1150 CE. This culture is known for its pyramidal structures and the discovery of domestic and ceremonial objects, as well as ceramic, stone, and copper pieces (Ganot Rodríguez and Peschard Fernández, 1997).

In contrast to the community of La Ferrería, the community of El Nayar lacks significant historical remains. However, due to the proximity of both communities and the extensive research conducted in the area, objects such as clay pots (cajetes) and ceramic dishes have been discovered during excavations of funerary offerings (Punzo Díaz et al., 2017).

As posited by Punzo Díaz et al. (2017), the Calera phase, spanning the historical period from 1150 to 1350, saw the abandonment of the sites. This is regarded as the decline of the Chalchihuites culture in the communities of El Nayar and La Ferrería, as well as in other settlements. Consequently, there was no cultural exchange with the Spanish during the period of the conquest.

8.1.1. Geographic location

The study area was delineated using official ejido boundary polygons sourced from Mexico's Padrón e Historial de Núcleos Agrarios (PHINA, 2024) geospatial registry. Figure 2 illustrates the geographical distribution of the study sites, highlighting the ejidos La Ferrería (Cuatro de Octubre) and El Nayar.

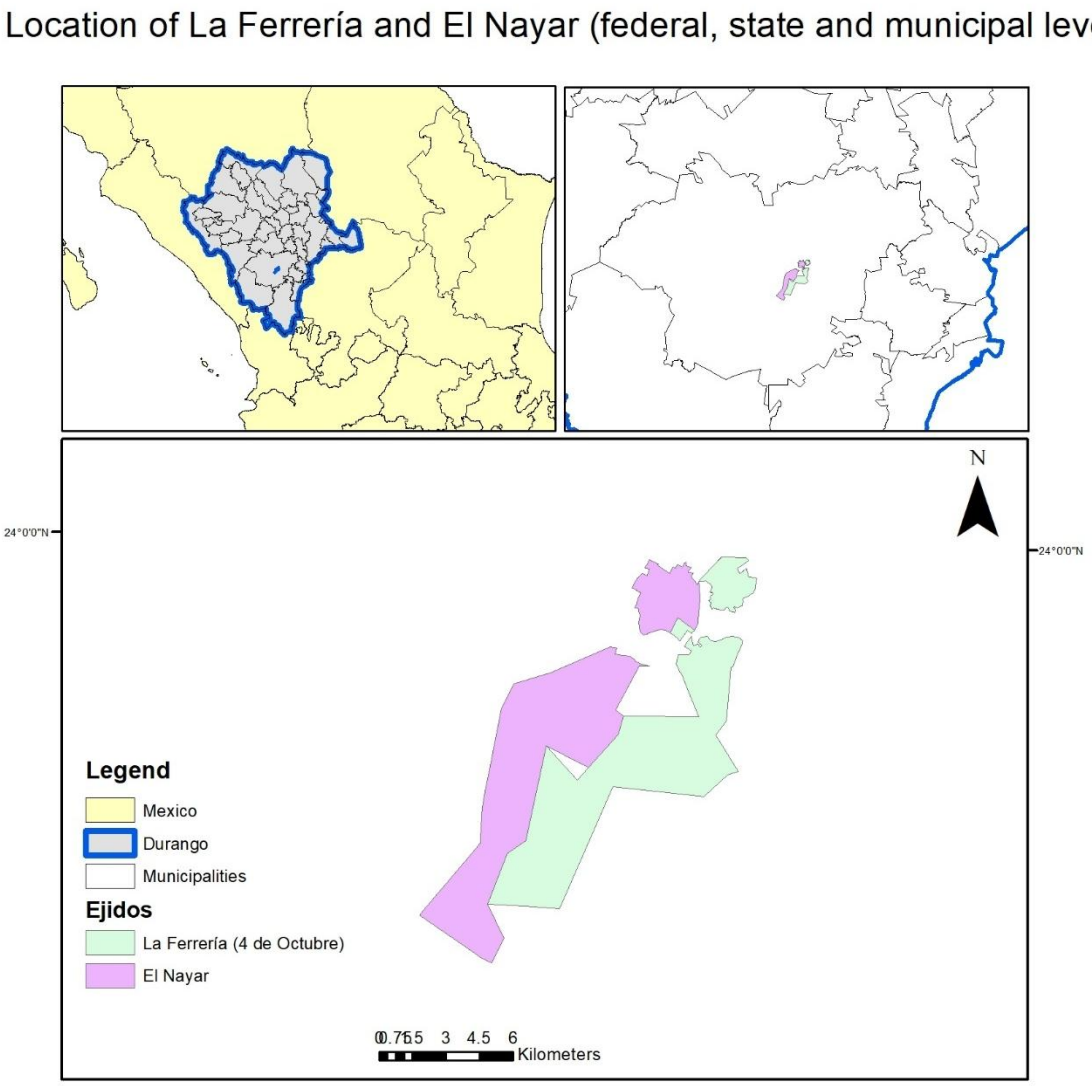

FIGURE 2 LOCATION OF LA FERRERÍA AND EL NAYAR, ELABORATED BY THE AUTHOR (PHINA, 2024; INEGI, 2018).

8.1.2. Physical description

The study area is part of the Cenozoic geological era, with predominant rock types being extrusive igneous rocks of Neogene origin (Sistema de Información Geográfica para el Estado de Investigación Ambiental [SIGEIA], 2024). The main soil types identified in the area are:

Leptosol (LP): Characterized by thin layers, often found in steep or elevated terrains with medium to high altitudes. These soils are typically shallow, with underlying rock close to the surface or highly stony (Food and Agriculture Organization [FAO], 2016; SIGEIA, 2024).

Luvisol (LV): Contains higher clay content due to soil-forming processes, which lead to the development of an argillic horizon in the subsurface. These soils commonly appear on young geomorphological surfaces, are fertile, and suitable for agriculture (FAO, 2016; SIGEIA, 2024).

Regosol (RG): Weakly developed soils often found in eroded areas or zones of accumulation, particularly arid and semi-arid or mountainous areas. Due to low water retention capacity, irrigation is essential for agriculture, making them more suitable for extensive grazing (FAO, 2016; SIGEIA, 2024).

Vertisol (VR): Heavy clay soils formed from rock weathering, typically found in tropical and subtropical climates with alternating wet and dry periods. These soils are often used for extensive livestock farming, as their physical properties and moisture regimes limit agricultural management (FAO, 2016; SIGEIA, 2024).

Phaeosem (PH): Soils characterized by a dark, humus-rich horizon, generally found in warm to cold areas with sufficient moisture to allow percolation, although dry seasons cause the soil to desiccate. These soils are excellent for agriculture, being both porous and fertile (FAO, 2016; SIGEIA, 2024).

Kastanozem (KS): Brown soils high in organic matter, usually found in areas with relatively cold winters and hot summers, and in plains and rolling grasslands. Agricultural activities face limitations due to low moisture, thus requiring irrigation, and additional precautions are necessary to prevent secondary salinization. They are also suitable for extensive pastoral use (FAO, 2016; SIGEIA, 2024).

8.1.3. Climate

Two climate types have been identified in the study area,based on Köppen's climatological classification, modified by Enriqueta García for Mexico (2004):

Semi-arid (BS1hw): Characterized as a semi-arid, semi-warm climate with an average annual temperature above 18°C. Rainfall occurs during the summer and winter seasons. This climate type is typical in areas near the decline of the Sierra Madre Occidental, north of the 23° latitude (García, 2004; SIGEIA, 2024).

Temperate C(wo): This is a temperate subhumid climate with an average annual temperature between 12°C and 18°C. The coldest month records temperatures between -3°C and 18°C, while the warmest month has temperatures below 22°C, marking it as one of the driest climate subtypes in Mexico (García, 2004; SIGEIA, 2024).

These climatic conditions significantly influence the natural resource management strategies in the region, particularly in terms of agriculture and water resource availability, which are closely linked to seasonal temperature and precipitation patterns.

8.1.4. Hydrology

The study area is situated within the Guadiana Valley aquifer, which is currently overexploited and partially restricted. Only groundwater usage for domestic, industrial, and irrigation purposes is permitted (Comisión Nacional del Agua [CONAGUA], 2024).

As illustrated in Figure 3 the study area lies within Hydrological Region 11 (Presidio-San Pedro Basin), characterized by perennial fluvial systems (predominantly low-order streams), lentic water bodies of limited areal extent and restricted floodzones.

The main surface watercourse is the Tunal River, which can be observed in Figure 3 highlighted in color green, this fluvial system maintains continuous annual baseflow, distinguishing it as the sole perennial stream in the local hydrological network (CONAGUA, 2024).

The study area contains approximately 7,442 meters of perennial streams, which include the El Tunal, Chico, and El Cajón rivers. Intermittent streams extend for about 83,659 meters and flow only during the rainy summer season (CONAGUA, 2024; SIGEIA, 2024).

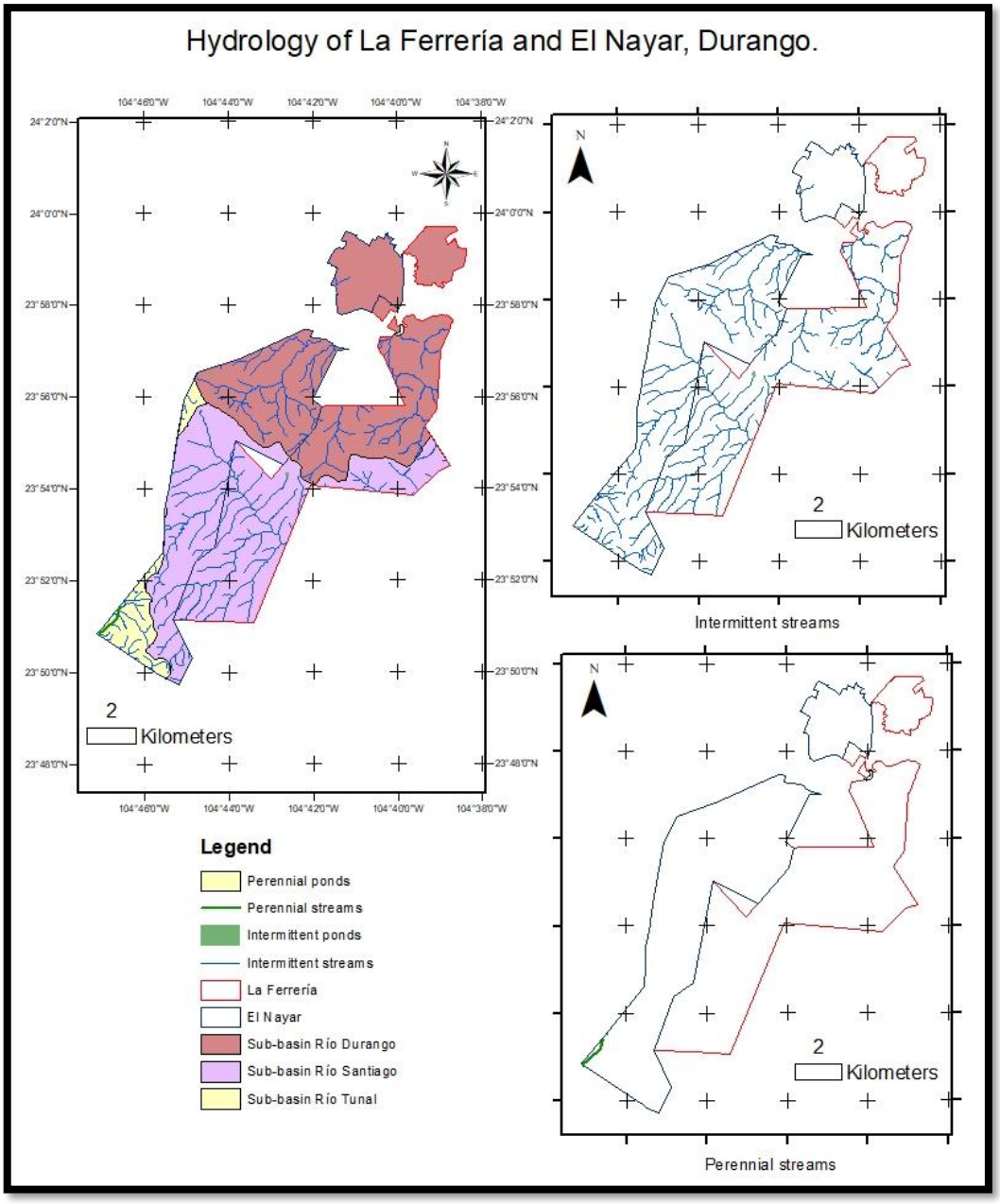

FIGURE 3 HYDROLOGY OF THE STUDY AREA, ELABORATE BY THE AUTHOR BASED ON DATA FROM INEGI (2010; 2018).

According to CONAGUA (2024), the average annual recharge volume for the aquifer is 131.9 million cubic meters, whereas the annual groundwater extraction volume is 145,324,352 cubic meters. Currently, new water concessions are not granted due to a water deficit of 20,824,352 cubic meters per year.

According to the Ecological Zoning Plan of the Municipality of Durango (2013), the quality of surface water has been compromised by wastewater treatment plants, leading to an increase in undesirable aquatic flora such as water lilies.

8.1.5. Land use and vegetation

According to the National Institute of Statistics and Geography (INEGI, 2013), the ejido polygons contain the following types of vegetation associations, as shown in Figure 4:

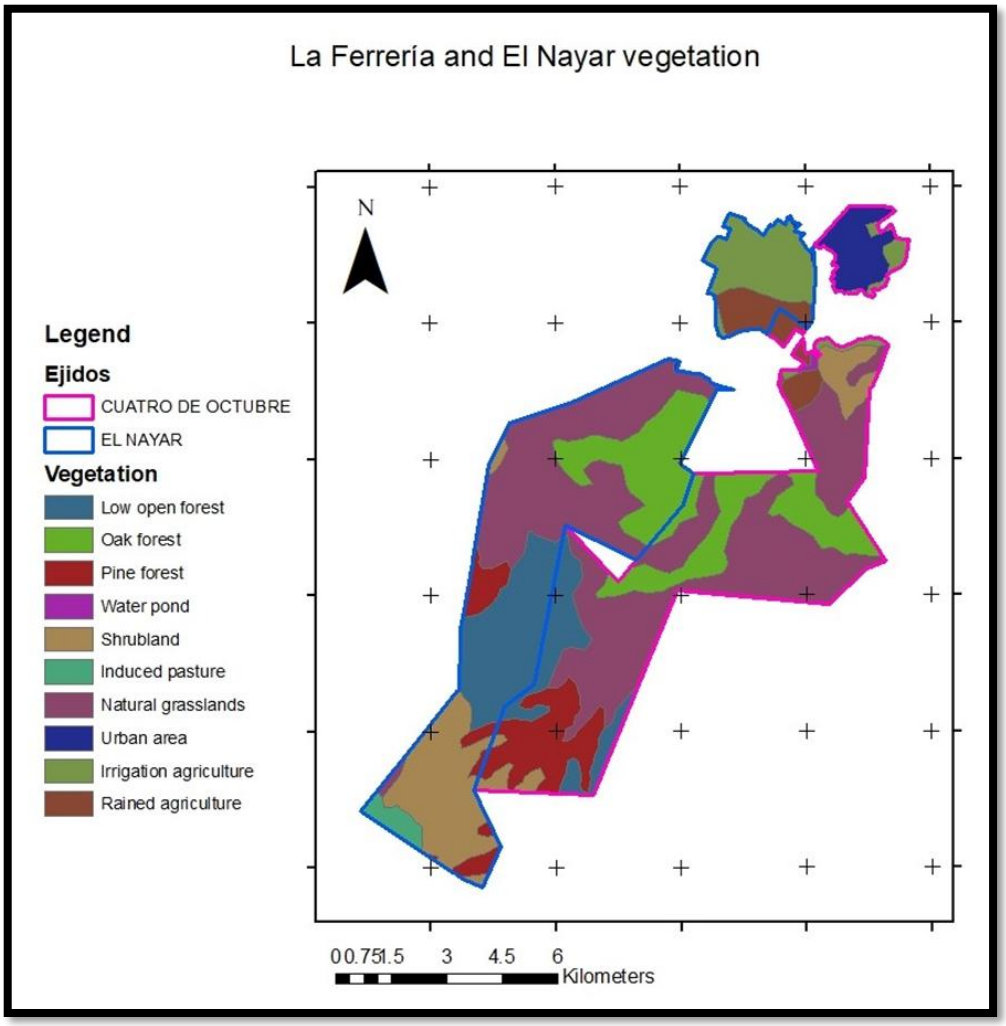

FIGURE 4 VEGETATION OF THE STUDY AREA, ELABORATE BY THE AUTHOR BASED ON DATA FROM INEGI (2010; 2013).

Woodland - Low open forest: This vegetation type is typically found at altitudes between 1,900 and 2,500 meters above sea level, occupying transitional zones

between temperate, semi-humid mountain forests and the shrublands and grasslands of the high plateau. It is characterized by a semi-arid temperate climate with summer rainfall. Representative species include pinyon pine (*Pinus cembroides*), various oak species (*Quercus chihuahuensis, Q. grisea, Q. eduardii, Q. emoryi*), juniper (Juniperus deppeana), catclaw (*Mimosa aculeaticarpa var. biuncifera*), sotol (*Dasylirion spp.*), prickly pear cactus (*Opuntia spp.),* and grasses (*Elyonurus barbiculmis, Heteropogon contortus, Schizachyrium cirratum, S. sanguineum and Trachypogon secundus*) (González Elizondo et al., 2006).

Pine oak forest: These communities consist of a mix of pines and oaks, commonly including *Pinus cembroides*, *P. chihuahuana*, *P. engelmannii*, *Quercus chihuahuensis*, *Q. grisea*, *Q. oblongifolia*, *Q. eduardii*, and *Q. emoryi*. In drier areas, cacti, palms, and grasses may also be present (González Elizondo et al., 2006).

Pine forest: This forest type is dominated by *Pinus cembroides* and is typically found on slopes and mesas in the lower parts of mountain ranges (González Elizondo et al., 2006).

Shrubland: These shrub-dominated communities, where cacti are particularly abundant, are usually found in hilly and rocky terrains (González Elizondo et al., 2006)

Natural grasslands: This ecosystem is dominated by herbaceous species, primarily grasses. Grasslands often coexist with shrublands and woodlands, allowing for the presence of cacti, pinyon pine, and various oak species (González Elizondo et al., 2006).

Induced pasture, urban areas, irrigated agriculture, and rainfed agriculture are also present within the study area, reflecting human modifications to the landscape (INEGI, 2013).

According to Hernández Chavarría et al. (2022), the study area is characterized by relatively low agricultural productivity compared to other regions in the state of Durango, as only 24% of the plots have access to irrigation. The most common crops in the area include forage oats, forage corn, grain corn, and beans.

The General Ecological Land Use Plan (2016) classifies the study area within two ecological regions: the Southern Durango Plateau and the Sierras and Plains of Durango. The environmental policy for this territory is defined as “sustainable use.” Based on environmental attributes and land suitability, the primary development activities considered optimal include forestry and, to a lesser extent, livestock, mining, agriculture, and urban settlements (SRNMA, SEMARNAT, 2016; SIGEIA, 2024).

8.2. Methodological approach

The research approach used in this study is qualitative, with interviews as the primary research tool for engaging with key community members (Oriol, 2004).

Qualitative research approaches are characterized by their exploration of social and human phenomena from an interpretive perspective, emphasizing an understanding of participants' subjective realities and experiences. Unlike quantitative methods, qualitative research does not aim to generalize findings but rather to provide an in-depth analysis of the meaning and context surrounding the observed phenomena (Denzin & Lincoln, 2018).

This approach employs techniques such as interviews, observations, and text analysis to capture individuals' perceptions, emotions, and behaviors. As Creswell (2014) points out, the researcher in qualitative studies acts as the primary instrument of data collection, requiring a reflexive and flexible approach to adapt to the dynamics of the field.

A central aspect of the qualitative approach is its focus on context. According to Marshall and Rossman (2016), the data collected are interpreted not only in terms of what is said, but also by considering the cultural, social, and temporal contexts in which they occur. This makes the qualitative approach a powerful tool for studying complex problems where human interactions are key.

In addition, qualitative methods often employ an inductive approach, where patterns, categories, and theories emerge from the analysis of collected data rather than being imposed beforehand (Merriam & Tisdell, 2015). This process facilitates the

discovery of new insights and knowledge, particularly in contexts where little is known about the phenomenon under investigation.

To address the research objectives, the following methods will be used, in alignment with the established goals.

Table 1*. Objectives and methods (Author, 2024).*

General objective:		
To analyze how gender dynamics, including the roles of men and women, influence natural resource management, and to explore changes in these roles over the last 50 years in the rural communities		
Specific objectives	**Methods**	**Description**
Identify the natural resources present in the communities and analyze the productive activities of both men and women.	• Participant observation. • Semi-structured interviews and life stories. • Triangulation of information.	Field visits to analyze the current state of the community, determine productive activities, and compare collected information with official sources and land use maps.
Evaluate how the "new rurality" and other social changes over the past 50 years have changed gender roles and men's and women's relationships with natural resources and land management.	• Documentary research. • Semi-structured interviews and life stories. • Triangulation of information. • GIS analysis.	Research on governmental census portals and historical documents to identify changes over time, comparing these with interview data. GIS analysis using satellite images to identify urban sprawl growth in the city of Durango.
Determine if the women are more involved in the decision-making processes over the past 50 years and identify barriers and opportunities.	• Semi-structured interviews and life stories. • Triangulation of information	Through interviews, identify gender roles, decision-making participation, and potential barriers faced by women over time, corroborating with documentary sources.

8.3. Methods

8.3.1. Participant observation

Visits were made to these communities, and the participant observation technique was employed to analyze social dynamics and describe events and behaviors within the selected social context (Marshall & Rossman, 1989, cited in Piñeiro Aguiar, 2015).

Using this technique requires patience, active observation, and conducting informal interviews with residents to learn about their activities and document as many details as possible in field notes (Piñeiro Aguiar, 2015). Key individuals in the community, who were related to important actors, were contacted. A guide was available in each of the two communities.

8.3.2. Semi-structured interviews and life stories

For this research, life stories were used with women whose age and time in the community allowed for the identification of significant changes in the role of resource management activities.

The life story approach gives the subjects of the research their own voice. As Rivas Flores (2009, p.19) states, "knowledge is essentially a form of narration about life, society, and the world in general." The significance of using the experiences of social subjects lies in the fact that it enables us to interpret how they live their culture and how they perceive it, allowing everyday events to connect us with the cultural context.

The interviewees contribute their knowledge of their reality through their own stories, reflecting the social, cultural, and political context. This methodological approach focuses on the objects of study and the way they collectively construct their vision of the world and their own reality, starting from their perspective (Prados Megías et al., 2017).

The life story technique is qualitative and provides information about events and customs to reveal who the person is, including their relationship with their social environment, context, customs, and the situations in which the individual has

participated. This technique enables the exploration of the realities and contexts the interviewees have experienced (Chárriez Cordero, 2012).

The interviews focused on the changes over time in the activities and management of natural resources, considering gender and how it affects the division of labor within the household, the social context, and how the interviewees have experienced these changes.

The interviews were conducted with individuals over the age of 18 residing in the communities. According to Article 34 of the Mexican Constitution (2024), Mexican individuals who lead honest lives and have reached the age of 18 are considered citizens of the Mexican Republic. After identifying the key stakeholders, semi-structured interviews and life stories were conducted using a guide with questions on various topics of interest.

The unit of analysis is the interview and life history. The interviews were analyzed using discourse analysis methodology, a qualitative and multidisciplinary approach that incorporates various disciplines, including sociology, anthropology, and social psychology (Sayago, 2014).

The interview is semi-structured, meaning that not only the questions established in the guide will be asked, but the interviewer may also explore certain topics in more depth or skip others, depending on the situation.

Furthermore, the pace of the interview may influence its content. In some cases, interviewees may deviate from the established sequence of topics and questions, addressing them in a different order or at a later point in the interview.

To facilitate the interview process, Table 2 was prepared with a classification scheme outlining the points to be addressed and the questions to be asked to obtain the necessary information (Figueroa Díaz, 2009).

Table 2. *Script for the interview (Author, 2025).*

• Demographic data	• Name • Age • Gender (masculine, feminine, non-binary). • Marital estatus

	• Education level • Place of birth • Do you belong to any indigenous ethnic group? • Are you an ejidatario?
• Relationship with the community's natural resources (productive activities carried out).	• When you were a child, what kind of farm-related activities did you do? • How were household activities and agricultural or livestock activities divided based on your gender? • What do you currently do? • Are your productive activities related to livestock, agriculture, or timber rights? • Do you actively participate in activities related to livestock management, farmland, or forestry activities? • Do you consider that agricultural and forestry activities are currently profitable? • Do you consider that your productive activities have changed in the last 20 years? • If yes, what do you think has influenced this change?
• Changes in the dynamics between men and women within the family environment.	• Are you the head of the household? • Who do you live with in your household (nuclear, extended and composite)? • Do you consider that there should be family activities designated by being male or female? • Do you think that the activities performed by men and women in the family environment have changed? (the age of the interviewee will be considered to define if there are changes during their childhood, adulthood and old age in the case of people older than 60 years old). • How did your gender influence decision-making within the household?
• Community abandonment and migration.	• Have you or any of your immediate family members migrated or left the community? • To which city or country? • Did they decide to leave legally or illegally? • For what reason did they decide to migrate?
• Future prospects	• What do you think will be the future relationship of the people of the community with the resources (agricultural land, livestock, forest resources, backyard agriculture)? • Do you consider that they will continue to carry out activities such as agriculture or livestock or that there will be changes? • Do you think that the fact that young people have access to higher levels of education affects their relationship with agricultural or forestry activities? • Do you think that the level of education can influence how primary activities are carried out within the community?

	• Would you personally consider working in something related to farming, livestock or forestry?
• Ejido-level participation and decision-making.	• Do you have ejido rights? • How many years have you been an ejidatario? • How did you obtain your ejido rights (inheritance, purchase)? • Do you consider that you actively participate in decision-making? • Have you been part of the ejidal commissariat? • Do you agree with the way in which the ejido's common plots and forestry land are managed? • Do you think there have been changes in women's management and participation in your time as an ejidatario?
• Additional questions for the ejidal commissariat.	• What position do you hold within the ejidal commissariat? • How long have you been an ejidatario? • How did you obtain your ejido rights? • How is the management of agricultural plots carried out? • What about forestry management? • Do you think there are enough women involved in decision-making regarding ejido management? • What was it like before, from your perspective?

To analyze the responses in depth, the audio of the interviews will be recorded using a smartphone, with the prior authorization of the interviewee. A field diary will also be used to take notes on important issues or details that may be of interest when interviewing other participants.

8.3.3. Triangulation of information

Qualitative research is distinguished by its focus on the interpretation and analysis of emerging knowledge, as well as its reliance on non-standardized data collection methods. This inherent characteristic necessitates the integration of supplementary methodologies to assist in verifying the collected data (Santa Cruz et al., 2022).

Triangulation is a valuable strategy that enhances the validity of findings, facilitates a deeper understanding of the phenomenon under study, and helps enrich the data set (Jiménez Chávez, 2020).

Data triangulation enables the comparison of different sources and methodologies from multiple perspectives. It is important to compare sources based on qualitative methods to maintain consistent conditions and facilitate the confrontation of data. Consequently, the verification process aligns more closely with the realities of the research, as the objective is to clarify the complementary components of the phenomenon under study (Santa Cruz et al., 2022).

The information gathered was contrasted with official articles and statistics. When comparing different research studies that had not been previously consulted, and observing that they reached the same conclusion, this finding increases the level of confidence in the information (Denzin, cited in Jiménez Chávez, 2020).

8.3.4. Field research

The interviews were conducted in the communities of La Ferrería and El Nayar, Durango, with participants interviewed in person. The interviews took place during the months of March and April 2024.

To contact the interviewees, we were assisted by four guides: Engineer Alberto Ponce and Mrs. Cynthia Lerma, who were our contacts in the community of La Ferrería, and Mrs. Gloria Barraza and Mr. Edgar Santillán in El Nayar.

These guides, who are part of the community, helped us connect with key figures, such as members of the ejidal commissariat and elderly individuals who have spent most of their lives in the communities. They accompanied us throughout the fieldwork.

Despite the guidance of community members, many residents chose not to participate in the interviews due to a certain mistrust of sharing their opinions and views on the management of the ejido's resources. They feared reprisals for discussing the issues they face in the management and administration of the ejido, as some unresolved problems from previous years persist. Similarly, many individuals were reluctant to share their personal stories due to past insecurity in the community, which made it difficult for them to open the doors of their homes and share their experiences with strangers.

8.3.5. Treatment of the information

The analysis of tacit and empirical knowledge derived from life stories presents significant challenges due to its subjective nature, which is shaped by factors such as the interviewee's perspective, culture, education, and personality.

To facilitate this analysis, interviews were recorded and reviewed to identify and prioritize the key themes that emerged in each session. This methodological approach, as demonstrated in the study by Lorenzo and Farré (2009), enabled the reconstruction of a thematic pattern related to the research topic.

The interviews were manually transcribed into a Microsoft Word document (DOCX) following the question classification scheme used to guide the interviews (Figueroa Díaz, 2009). These transcriptions were then imported into NVivo 14 for further analysis.

To ensure data integrity, the steps outlined in the University of Puerto Rico's (2023) video tutorial, Introduction to the Use of NVivo for Qualitative Data Analysis, were followed. The data were then organized in accordance with Del Castillo Acuña's (2011) methodology, which provides a detailed framework for conducting qualitative analysis using NVivo software.

The interviews will be treated as the primary unit of analysis and organized into folders within the designated case section. For efficient identification, each interview will be assigned a sequential number along with the interviewee's name and surname. This will follow the format: Interview X-Name-Surname.

The folder labeled "Cases" contains the transcribed interviews, which will aid in the analysis of the selected attributes. The selection of attributes and the subsequent entry of information are performed manually. This method is advantageous for the graphical representation of the interviewees' demographic data. Additionally, it facilitates queries between the attributes and the key topics addressed in the interviews.

The use of the "Code" function is essential for organizing the content of the interviews and life histories. Each primary concept should be entered into the designated coding area, with a color assigned to highlight the responses related to

the concept or the question posed. It is important to note that each code may have multiple branches, as they represent interconnected concepts.

The division of responses and their subsequent highlighting through distinct codes based on themes and sub-themes is recommended. This approach is especially beneficial in life histories, where older individuals often weave together ideas or refer to topics of interest during the interview process (Del Castillo Acuña, 2011).

The use of coding facilitates the systematic organization of information, allowing for its representation in various formats, such as word clouds that highlight the most frequent words or graphs that present trends and patterns.

The codes are divided into main codes and subcodes, each assigned a different color for easy identification within the texts (Del Castillo Acuña, 2011). This method allows for the observation of the frequency of each theme and the identification of similarities. Table 3 presents the main codes and subcodes used in this analysis.

Table 3. *Maincodes and subcodes used to analyze the information (Author, 2025).*

Maincode	Subcodes
Relationship with the community's natural resources (productive activities carried out).	• Occupation. • Activities carried out in your childhood related to natural resources. • Changes in livestock, agricultural activities and transformation of raw materials (comparative past and present). • Activities carried out after marriage. • Current activities. • Activities of the parents. • Children's activities. • Husband's or wife's activities. • Issues related to security or criminal activities.
Changes in the dynamics between men and women within the family environment.	• Perceived changes in gender roles. • Influence of gender on decision making. • Gender roles during childhood. • Gender roles in your family today. • Gender roles over time in your family. • Gender violence. • Impact of violence on the family.

Community abandonment and migration.	• Family members who migrated. • Migration to the city. • Reasons for migration. • Where family members migrate.
Future prospects	• Prospects for natural resource management. • Long-term employment opportunities in the community related to agricultural and livestock activities. • Scarcity of natural resources. • New generations working on the land. • Reasons for the abandonment of agricultural and primary activities. • Long-term profitability of agricultural activities. • Loss of territory due to urban expansion. • Lack of rain and drought. • Sale of plots of land.
Ejido-level participation and decision-making.	• Future perspective of the ejido with the changes and the new rurality. • Women's participation in the ejidal commissariat. • Personal participation in decision-making. • Have you been a member of the ejidal commissariat? • Do you agree with the management of the ejido? • Inheritance of land or rights. • Proportion of female ejidatarios
Additional questions for the ejidal commissariat.	• Women's participation in ejido decision-making. • Ejido problems • Prospects for the ejido. • Inheritance of Ejido Rights. • Sale of plots.

Word cloud visualization was implemented to identify lexical patterns and conceptual recurrence across three thematic domains: childhood activities, current occupations, and the professions or jobs of parents, spouses, and offspring.

Additionally, it was essential to identify the most prevalent words related to migration and community abandonment. This analysis aimed to uncover the underlying motivations behind migration. The results of this analysis are presented in word clouds, visually representing the most frequent words or concepts, and highlighting contrasts in responses across different topics.

An interesting approach to examining gender differences and the management of natural resources over time is the analysis of distinctions between the youngest and oldest community members.

To identify the most common ideas and activities, Nvivo's matrix coding option was used to compare each unit of analysis (life stories) and analyze the codes, similarities, and patterns of responses across different age groups (Del Castillo Acuña, 2011).

The classification of subjects into four distinct age groups followed the guidelines set by CONAPO in 2000. The age categories included youth (15 to 24 years), young adults (25 to 44 years), mature adults (45 to 59 years), and seniors (60 years or older).

The matrix helped identify coincidences in codes, words, ideas, and experiences among interviewees, thus simplifying the presentation of the results.

8.4. GIS analysis

To analyze the city's growth, a satellite image analysis was conducted to assess the impact on surrounding communities and ejidos adjacent to the expanding urban area. Satellite images from 1996, 2000, 2008, 2016, and 2024 were compared to identify patterns of land use change.

The images were sourced from Sentinel Hub EO Browser. The data for 1996, 2000, and 2008 were obtained from Landsat 1-5, with a spatial resolution of approximately 80 meters (Universidad Nacional de Colombia, 2023). These images were downloaded in TIFF format (32-bit), offering high resolution, with both true and false color composites used to identify urban areas, water bodies, and croplands.

Images from 2016 were sourced from Landsat 8, with a spatial resolution of 30 meters. These images were also downloaded in TIFF format (32-bit), providing high resolution, with true and false color composites for identifying urban areas and croplands.

Images from 2024 were sourced from Sentinel-2, with a spatial resolution of 20 meters. These images were downloaded in the same TIFF format (32-bit), offering

high resolution with true and false color composites. The images were selected for months with minimal precipitation, using a maximum cloud coverage of 0-10%.

The methodology of Plascencia Tonato (2021) and Chapa et al. (2019) was followed to identify urban growth.

The first step was to define a rectangular polygon encompassing the urban area of the city of Durango. The 2024 satellite image was used as a reference, as it is the most recent and provides the largest extent of coverage.

The polygon was then applied to each of the satellite images for comparison, using data management tools, raster processing, and the "clip" function.

For each year, a clip was created to facilitate the comparison of the city's growth. The cropped images were imported into ArcGIS 10.4 to perform a supervised classification, as no multispectral information was available for the study area (Chapa et al., 2019).

The main objective was to identify the growth of urban sprawl, which led to the decision to use false-color images. According to Cheng et al. (2021), false-color images make it easier to identify areas of vegetation, which appear bright red, while urban areas reflect a white color.

True-color images were also downloaded to compare characteristics and small-scale urban features between the two images, ensuring that pixel selection would be more accurate (Chapa et al., 2019).

A supervised classification was conducted to define the categories of interest. To differentiate between these categories, a point layer was created, and each pixel was classified based on the areas of interest. Four classes were defined, following the methodology of Cachipuendo Amagua (2021) and Chapa et al. (2019).

1. Urban Areas: This class includes roofs, roads, paths, buildings, and any man-made infrastructure.
2. Water: This category encompasses all bodies of water, including streams, reservoirs, and agricultural irrigation canals.

3. Vegetation: This class includes croplands, pastures, green spaces, public gardens, and parks.
4. Other: The fourth class is defined as "Other," which includes bare land, soil, scrubland, and the area of the Cerro de Mercado mine.

The Maximum Likelihood Classification tool was used to classify each pixel in the images, as it is one of the most effective procedures when the data follows a normal distribution (Cachipuendo Amagua, 2021).

After classifying the images into the predefined land use classes, the ArcMap Raster to Polygon tool was applied to convert the raster data into vector polygons, representing each land use category. This allowed for the comparison of the city's growth over time using the satellite images from different years.

To quantify the growth of the urban area, the Calculate Geometry tool in ArcMap 10.4.1 was used to measure the area in hectares of the urban class in each year. We specifically focused on the urban area, as the goal of this analysis is to assess the expansion of the city and its urban footprint between 1996 and 2024.

8.4.1. Annual rate of soil change

To determine the extent and rate of land use change, we applied the annual rate of change formula proposed by the FAO (1996) and used in the study by Cachipuendo Amagua (2021, p. 54), calculated as follows:

$$ARC = \left[\frac{S_2}{S_1}\right]^{\frac{1}{n}} - 1$$

Where:

ARC: Annual Rate of Change; to express it as a percentage, the result must be multiplied by 100.

S_2: Surface area at time 2.

S_1: Surface area at time 1 (initial surface).

n: Number of years between the two periods.

Using this formula, we can determine the percentage of land use change over the past 30 years.

9. Results

The results were categorized based on the main codes used to analyze the information.

9.1. Demographic data.

45 people were interviewed, and the summary of demographic data collected is shown on Table 4.

Table 4. *Summary of demographic data (Author, 2025).*

Characteristics	Category	Number of participants	Percentage (%)
Age	15 to 24 years	4	8.9 %
	25 to 44 years	11	24.4%
	45 to 59 years	11	24.4%
	60 years or more	19	42.2%
Gender	Masculine	18	40%
	Feminine	27	60%
	Non-binary	0	0%
Marital status	Single	13	28.9%
	Married	25	55.6%
	Widowed	6	13.3%
	Divorced	1	2.2%
Education level	Incomplete primary school	9	20%
	Primary school	9	20%
	Secondary school	15	33.3%
	Highschool	2	4.4%

Characteristics	Category	Number of participants	Percentage (%)
	Technical career	3	6.7%
	Bachelor´s degree	7	15.6%
Place of birth	La Ferrería	6	13.3%
	El Nayar	13	28.9%
	Another community	26	57.8%
Ethnicity	Indigenous	2	4.4%
	Mestizo	43	95.6%
Ejidatario	Yes	11	24.4%
	No	34	75.6%
Relationship with ejidatarios	Father	10	22.2%
	Mother	2	4.4%
	Brother	3	6.7%
	Husband	5	11.1%
	Uncle	2	4.4%
	Sister	0	0%
	Aunt	0	0%
	Wife	0	0%

9.2. Relationship with the community's natural resources (productive activities carried out).

To identify the relationship of the interviewees with natural resources, the most frequently used words in general were identified in the word cloud in Figure 5.

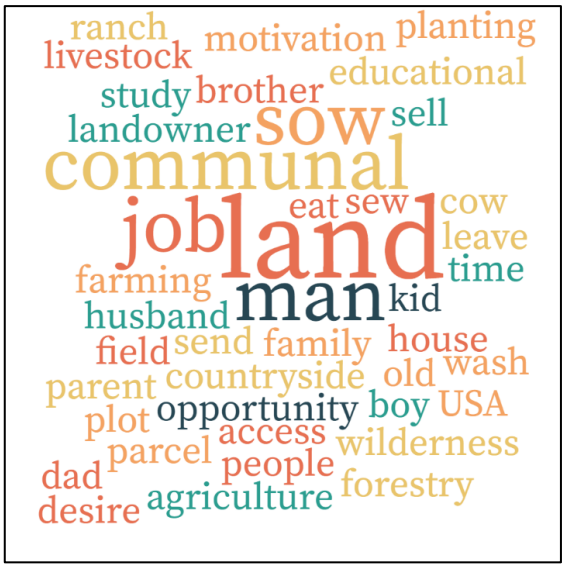

FIGURE 5 WORD CLOUD OF THE MOST FREQUENTLY USED WORDS IN THE INTERVIEWS (AUTHOR, 2025).

Specific points in the respondents' lives were identified where significant differences in their activities were observed. As a result, the following categories were coded: activities performed during childhood, activities performed by their parents, changes in activities after marriage, and, finally, activities performed by their children. Word clouds were generated for each of these categories, and Figure 6 illustrates the most common results for each life stage.

FIGURE 6 ACTIVITIES RELATED TO NATURAL RESOURCES AT DIFFERENT STAGES OF LIFE (AUTHOR, 2025).

9.2.1. Category by age

34% of respondents in the 15-25 and 26-44 age groups reported having better access to basic and even higher education opportunities.

The 15-24 age group mentioned activities related to feeding livestock but did not reference sowing or harvesting. These activities were typically carried out only during holidays or special occasions and were not part of their daily routines, as greater emphasis was placed on education.

"...we divided up the household chores because my mom and dad worked, so we had to do everything together. I am a student pursuing a second university degree" (Edgar Santillán).

"Well, during vacations, I would go with my dad to feed oats to the horses, cows, and pigs. I would ride the horses; sometimes we would sow seeds using the tractor and check the crops, scattering seeds along the way. At home, I would shell corn cobs to feed the animals. We also fertilized the cornfields with cow manure, preparing the soil for planting. Additionally, we would herd the cows or search for them when they got lost. I was also sent to check the apple trees in the orchard to see if any were ripe. Similarly, we would look for the horses when they escaped from the corral to bring them back home. We would go walking in the hills, and sometimes we would fetch water from the spring" (Paola Soto).

A transition can be observed among respondents aged 25 to 44, showing a stronger connection to agricultural and forestry activities. Typically, the children of communal landowners were involved in livestock farming and assisted with sowing during holidays. However, education takes precedence over the help children might provide to their parents. The father is still regarded as the primary person responsible for field work.

In this age group, we find professionals in environmental and forestry engineering who are directly involved in managing forest resources and engaging in mining-related activities. However, their approach is more technical, supported by university education and, in some cases, a master's degree. This provides them with a specialized and professional perspective on natural resource management.

The following excerpts illustrate the points mentioned above:

“I focused on studying... I am an environmental engineer, and I currently work in a mine... Occasionally, I would visit the ranch where my dad grew up. My siblings and I would go there, and they would have me shell corn cobs to feed the cows and pigs or grind corn kernels for the chickens. I also helped my grandmother cook, wash the dishes, and with other household chores.” (Elizabeth Jurado).

“I am pursuing a master’s degree in agricultural and forestry sciences... My thesis focuses on the survival of reforestation efforts, analyzing height and diameter characteristics, as well as proposing alternatives and solutions to national issues, such as low survival rates in reforestation projects and illegal logging.” (Alberto Ponce).

“...even though my dad had his cows and everything, we were never deeply involved... With my grandpa Zoilo (maternal grandfather), he would have us clean up the area, gathering dry branches from the trees, raking the leaves, and cleaning the corrals. He would go to the cornfield, but we stayed around the corral or the house.” (Nohemí Velázquez).

Among the interviewees over the age of 30, several mentioned working in forestry to support their families, often having inherited the trade from their fathers. However, since there is no forestry activity on their communal land, they must travel to other regions to work.

This includes securing contracts in the United States and Canada, highlighting that while they are involved in forestry, their work is not tied to their place of origin. Given that 66% of respondents are 45 years of age or older, it is logical that these are the activities most frequently described.

Older respondents provided the most detailed accounts when sharing their experiences about the activities they carried out in the community, emphasizing their strong connection to natural resources. As a result, the most repeated words related to activities performed by their parents and during childhood are directly tied to agricultural work.

The words milpa, land, sowing, and harvest (milpa, tierra, sembrar, and cosecha) highlight that, within the community context, the connection to the land reflects a strong relationship between the interviewees and agricultural work. This connection goes beyond the economic aspect and is deeply tied to identity and culture.

The following excerpt from one of the life stories illustrates the importance of cultivation in preserving biodiversity in the Mexican countryside:

“…my father planted sugarcane, beans, tomatillos, squash, and maize in four colors: white, yellow, red, and blue. My mother grew vegetables in the home garden.” (Rosa Lozano).

The following excerpt highlights the importance of planting specific crops according to the seasons to ensure food security for families:

“But there was a time for planting vegetables and squash. There were specific times for planting one thing or another, depending on the season, so there was always something (referring to food).” (Rosa Lozano).

In relation to the above, the words "beans" and "harvest" (frijoles and cosecha) were also frequently mentioned, as beans, maize, and squash are staple foods traditionally grown and consumed in rural Mexican communities.

9.2.2. Marriage

Another turning point in the shift of activities was marriage. For men who were not communal landowners (ejidatarios), they sought other occupations, such as construction work, hiring themselves out as laborers to landowners, or traveling to the mountains of the Sierra Madre Occidental to work as chainsaw operators in the logging industry.

“I had to study, but sometimes I would go with my father to the mountains. However, when he passed away, we stopped going. Later, I got married, and now I travel abroad for work while my wife takes care of our two daughters.” (Gerardo Hernández).

As for the women, they focused primarily on domestic tasks, such as cooking, bringing their husbands lunch, cleaning, and taking care of the children. They also washed clothes in the river, as they had no running water. In some cases, they raised small livestock, such as pigs or chickens, which could be kept in the yard or backyard. It was uncommon for them to have paid jobs, making them entirely dependent on their husbands for household expenses.

9.2.3. Traditional knowledge

In the following excerpts from the interviews, we can observe women's ability to transform fresh produce into preserves, which allowed food to last longer:

"When I was a child in El Nayar... we would go to the hills to collect aguamiel... we also made honey, and my aunt knew how to make pulque. Nowadays, they hardly do that anywhere anymore." (Beatriz Figueroa).

"Women helped make gorditas, tortillas, and took care of everything in the household, keeping it clean. My father had many cows, and he would milk them along with my mother. She would then make cheese, curd, butter, cream, and everything else. In October, animals were slaughtered, and the meat was dried to have food for the winter. Cheese and butter were made, and a pig was slaughtered to make cured meat, extract lard, and sustain the family. But for the past 20 years or so, people have been buying everything." (Francisco Soto).

"At that time, I was still living in Corral (Corral de Piedra, San Dimas, Durango), and my father had many fruit trees in the yard—mangoes, guavas, apples... On that ranch, since the climate was very humid, sugarcane thrived, so we also made melcocha (a traditional sweet) with the cane and piloncillo. I learned to make cheese, butter, cottage cheese, mango sweets, jams, and preserves. We used to make everything ourselves. I also used to sew; for instance, when my husband tore his pants at the knees, I would cut and sew them into smaller sizes for my children to reuse." (Manuela Mápula).

Older women, particularly those over the age of 60, are characterized by their extensive skills in transforming the resources available to them. These skills included using the metate to grind corn into dough for tortillas, making jams and

honey from fruit, and producing cheese, butter, and cottage cheese. One woman even mentioned working with her aunt to extract aguamiel and make maguey syrup. Unfortunately, much of this knowledge has been lost among younger generations.

9.3. Changes in the dynamics between men and women within the family environment.

Over the last sixty years, family dynamics and traditional roles have shifted significantly due to the inclusion of women in education, the feminist movement, and the recognition of women as ejidatarias (communal landowners) in 1971. When comparing the life of a 60-year-old woman with those of 20- or even 40-year-old women, a stark difference becomes evident.

“Women, meanwhile, stay home, and the work never ends—there is always something to do. Now, younger women are more focused on studying, or if not, they work. Regarding education, people used to say, ‘Why should women study? To get married?’ That is what happened to me. I only studied for one year because my father, who was paying for boarding school, told me, ‘You know what? Do not continue. You will get married eventually, and it is different for men, but for you, what is the point? Education is useless for women; they will not work anyway.’” (Beatriz Figueroa).

This statement highlights the systemic barriers women face in accessing education, rooted in patriarchal ideologies that deem education unnecessary for women. These practices not only limit women’s pathways to economic independence but also perpetuate cycles of dependency and marginalization, excluding them from public and decision-making spheres.

During childhood, girls were typically raised to serve and take care of the household, while most boys either worked on the farms with their fathers or attended school. Education was considered more important for boys, as they were expected to support a family and provide financially.

9.3.1. Gender violence

The following excerpt highlights the social violence and stigma faced by men involved in domestic activities, as such tasks were considered degrading for men by the standards of the time:

“In the past, women were not respected; we have always been discriminated against, and it was even worse for Indigenous women. I have also noticed that women now rarely have children. There were some good husbands, but very few of them helped with household chores. And those who did were mocked and called derogatory names like ‘joto’ (a slur for homosexual men). As little girls, we were taught to cook and clean so that you’ll be prepared for when you get married.” (Margarita Manqueros).

This interview was particularly significant because there are not many Indigenous people living in the community. The participant emphasized how being part of an Indigenous group exacerbates the challenges of discrimination. Even during the interviews, some older participants felt offended by certain questions and occasionally made racist comments about the Indigenous population. These comments often referred to their origin, the fact that many do not speak Spanish, and their association with mountainous regions.

This is a perfect example of how intersectionality operates. Being Indigenous adds an extra layer of difficulty for the interviewee, making it harder for her to secure better jobs while also forcing her to endure stigma and racist comments directed at her and her family. During the interview, she attempted to emphasize her white grandfather’s heritage, as being mestizo is more socially acceptable than being part of a minority group.

“One of my sisters was forced into marriage because she jokingly said yes to her boyfriend, and they married her against her will. He would beat her every day. Another sister was taken away by her boyfriend. I did study, but they did not let me work because they were afraid someone would take me away at the ranch.” (Guillermina Soto).

This extract underscores the oppressive nature of patriarchal traditions that constrained women's autonomy. Practices such as forced marriages and the fear of abduction exemplify a system in which women's agency was disregarded, and their value was reduced to their obedience and relationships with men. Moreover, the systemic violence described—such as the physical abuse endured by her sister—reflects the normalization of gender-based violence within patriarchal structures.

Violence was a recurring theme in the interviews with older women, who also highlighted their inability to seek divorce due to the lack of work opportunities. This issue was even more pronounced in rural communities, where women faced significant challenges. They were often excluded from working in the fields, had to manage childcare on their own, and encountered barriers to traveling to other areas in search of employment.

9.4. Changes in male-female interactions over time

The following extract from the interview illustrates the mindset of older men and their perceptions of how interactions between men and women should be:

"My wife used to help me. We would harvest beans and tlazole (residual plant matter)... She also managed the household and everything that needed to be done. I, on the other hand, worked in the fields. Nowadays, women are very bold… Marriages no longer last because women no longer submit. In the past, there was great respect, even for older siblings… Now everything is a mess. Women go to nightclubs; there is no respect for young ladies anymore. Look at how they dress; how could a man not turn to look at them? … That is why there are so many divorced and abandoned women. In the past, it was all about what the man said. Nowadays, women no longer obey." (Filemón Burciaga).

"In the past, everything was determined by what the man said. Things have become more equitable between genders, partly due to gender equity movements. Women now have more opportunities in the workplace and have received some government support to ensure they have the same chances to work as men." (Francisco Mápula).

The previous excerpts highlight the societal changes and demonstrate how government initiatives have expanded women's opportunities to enter the workforce. This has granted women greater freedom to choose their paths, pursue careers, and participate in a wider range of activities.

The following excerpt is particularly noteworthy because it captures the exchange of ideas between a mother and daughter, illustrating the clash between traditional ways of thinking and modern perspectives on a more equitable society. It also underscores the critical role of education within the home.

"With my eldest son, I would tell my daughter to clean his room, and my daughters scolded me. They said, 'Mom, it is mothers who turn men into machistas.'" (Margarita Manqueros).

Machismo (a cultural belief system that emphasizes male dominance, superiority, and traditional gender roles) is not only perpetuated by men; mothers have also played a role in reinforcing gender roles and attempting to impose them on younger generations. However, younger people now feel increasingly empowered to challenge these norms and express their own perspectives, likely influenced by social media, education, and social movements advocating for a more equitable society.

This statement from a younger participant reflects a clear generational shift in gender dynamics and family interactions. Unlike traditional settings, where household responsibilities were typically divided by gender, this example illustrates a more egalitarian approach necessitated by dual-working parents.

"We divided the household chores because both my mom and dad worked, so we had to do everything together… In the past, it was a more conservative environment, but now we tell things to our parents, we have talked to them about stuff, and they have become more liberal." (Edgar García).

This case further highlights how younger generations are challenging the rigidity of traditional conservatism and actively engaging in dialogue with older generations to negotiate cultural change. This finding complements the broader narrative of shifting

gender roles seen in the experiences of other participants and underscores the role of education and exposure in facilitating these changes.

9.5. Community abandonment and migration.

9.5.1. Migration

When interviewees were asked about their work and families, a consistent theme emerged: the lack of employment and educational opportunities led every respondent to report knowing at least one direct family member who had migrated to larger cities. In most cases, husbands or sons migrated to work and sent money back home.

As a result of the cancellation of government programs, several participants commented on the need to migrate and find work in Durango, the nearest urban center.

“From the ranch, there is only farming work... it is better to go to the city or across the border (to the United States).” (Margarita Manqueros).

“I go to Canada under a work contract to harvest Christmas trees; I go during the November season to cut the trees. This time, I will leave in April for maintenance work on the trees. I work as a chainsaw operator, handling packing and other tasks, all of which I learned from my father. However, when he passed away, I was only four years old. I later observed my older brother sharpening the chainsaw and doing other related tasks.” (Gerardo Hernández).

“Many times, young people want to leave where they are, so they do not engage in primary activities. They aim to pursue a career to move to the city, or in some cases, they go to the United States or get involved in criminal activities.” (Edgar Reyes).

Another factor driving migration is the lack of local economic development. While some respondents work temporarily in the United States or Canada, particularly in seasonal forestry or agricultural jobs, others reported working in nearby cities such as Durango. In some cases, individuals even join criminal groups and switch to growing illicit crops instead of traditional crops like corn or beans.

This trend reflects shifting priorities among younger generations and has led to an increased reliance on remittances from relatives abroad. This, in turn, has significantly altered household income structures and community dependency patterns.

9.5.2. Community abandonment

As the following extract highlights, community members express concern over the declining involvement of young people in primary activities, as many no longer wish to pursue farming. This trend poses a long-term threat to the survival of rural communities:

“The ranches are being abandoned because they no longer produce enough to eat. It is not as bad here yet, but for other people, what do they eat if they do not plant crops? It is complicated.” (Salvador Rodríguez).

During an informal conversation, one interviewee mentioned that his sister-in-law, a kindergarten teacher in La Ferrería, had noticed that over the years, many husbands have migrated, leaving fewer children to enroll in the school. This decline, coupled with smaller family sizes, raises concerns about the possible closure of the school.

This section identifies a key pattern: when parents pass away, there is often no lasting connection to the community. Descendants tend to leave the ranches, seeing little incentive beyond emotional ties. They lack a sense of connection to the land or community where they grew up and instead prioritize professional aspirations.

“In my case, no one lives on the ranch anymore, even though we still have ejido rights. When my father died, there was nothing keeping us there, and we left to look for work,” shared Francisco Mápula.

The persistence of these migration trends highlights the significant challenges rural communities face in maintaining their populations. This is further exacerbating the abandonment of agricultural and natural resource-based practices.

As younger generations prioritize educational and professional advancement, the social and economic structures of these communities are being reshaped, eroding the continuity of traditional practices and knowledge.

9.6. Future relations with natural resources.

Both men's and women's knowledge of agriculture, resource transformation, and traditional crafts has declined across generations. Individuals between the ages of 15 and 44 show a marked decline in their connection to natural resource-based activities, as many in this demographic have migrated to urban areas, such as Durango, or even abroad.

Participants often described their current employment in industries such as factories, retail, call centers, and automotive harness manufacturing plants, signaling a shift away from agriculture and ranching, which were once the community's primary economic base.

"They are prepared for other things. But that is what happens—if there is no one to farm, what are we going to eat?" (Gerardo Barraza).

As one interviewee elaborated:

"Things have changed a lot. I work as a teacher on a small ranch in the ravines, and most people there have stopped planting corn. Now, they focus on poppy cultivation. Younger generations are heading in the same direction because that is what they see in the community." (Edgar Reyes).

This trend signals a potential shift in the community's relationship with natural resources, as traditional agricultural practices give way to activities geared toward urban or industrial economies. For many, these changes suggest an eventual disengagement from agricultural or forestry activities as educational and professional aspirations take precedence.

"I have seen it with people our age or a little older who have passed away. Their children sell everything because they do not know how to care for it. Cows require work—you must feed them, so they sell them, and the land too. Now that there is no land, we have nowhere to plant, and without planting, there is nothing to feed the animals." (Beatriz Figueroa).

Despite increased access to education, many perceive fieldwork or livestock-related jobs as low-status or unprofitable professions, as emphasized in the following statement:

“Many, after studying, no longer want to work in the fields. They see it as beneath them or as something dirty.” (Margarita Manqueros).

9.6.1. Anthropogenic Environmental Impacts

Another factor to consider is the environmental impact of human activities. For example, urban sprawl has negatively affected agricultural areas. Several ejidatarios explained that they felt pressured to sell their land because new residents began stealing crops and damaging plots.

“Most stopped planting because people who moved nearby would steal the harvest... Now it does not rain anymore, and we only have rainfed plots... I think the ejido will disappear.” (Filemón Burciaga).

In this statement, changes in rainfall patterns are also mentioned, a topic that will be further explored in the section on resource scarcity.

9.7. Resource scarcity

9.7.1. Water scarcity

In conversations with older community members, the perceived changes in the flow of the Tunal River over the years—attributed to past infrastructure projects—were frequently mentioned, as highlighted in the following excerpt:

“Now the river is no longer a river. When they built Guadalupe Victoria Dam in 1960, the river stopped flowing. They stopped it there at the dam, and there is also a dam in La Ferrería. Now we must request irrigation water. Because of this, our river dried up, but it used to be beautiful. Today’s children do not know anything about that.” (Manuel Lerma).

Lack of rainfall was also highlighted as a major challenge to achieving viable harvests on rainfed plots, underscoring the fact that farming is no longer profitable

for producers. Another interviewee noted that limited access to water for irrigation restricts the ability to sustain crops, as farmers must apply for water allocations.

According to participants whose age allowed for life history analysis, there have been noticeable changes in precipitation patterns based on their own experiences.

“The drought situation is tough. I have six hectares, and they only gave me water for one. They have cut back; they are not giving us water anymore... there is no water in the dam. That water is being used for a purification plant, I think it is called El Tunal 2.” (Salvador Rodríguez).

The treatment plant is mentioned in SIGEIA (2024) as one of the largest long-term projects to provide drinking water to the city of Durango. However, it is critical that the government assess the negative impacts on neighboring communities and provide alternatives along with mitigation measures.

9.7.2. Lack of land

This sentiment is echoed in the words of Manuel Sánchez, who states:

“The land is failing; there is no water, and it does not rain like before. Besides, all the land has become housing developments, and even if I do not want to sell, I must because the city has absorbed the lands that were used for farming. Nature itself no longer lets us plant... there are meetings, but nothing is done in the ejido anymore. I have fenced off my land and want to sell it as lots for construction.” (Manuel Sánchez).

“This used to be all farmlands; everything was planted, but they sold it, and people started moving in. Before, the land was cheap; it cost us 5,000 pesos.” (Gloria Barraza).

The previous excerpts show that ejidatarios often prefer to sell their ejido lands as residential lots, reflecting the low prices of land acquisition in the past.

One interviewee, a trained forestry engineer and member of a forest ejido in San Dimas, Durango, shared a critical perspective based on his professional experience, highlighting an overlooked issue in land redistribution:

“In theory, if there are 100 ejidatarios in the ejido, there should always be 100 because when the ejido was created, it was designed to meet the needs of those 100 people. As the population grows, it becomes difficult because not everyone will have access to land or grazing areas.” (Francisco Mápula).

This excerpt is particularly valuable in illustrating the difficulty of achieving equitable access to natural resources. It reflects the "tragedy of the commons," where shared use of resources leads to overexploitation.

However, another problem arises in this scenario: when the ejidatarios received full property rights through the 1992 agrarian reform, many began to sell their plots, creating a domino effect. This resulted in a mix of housing developments and agricultural land, which eventually forced most ejidatarios to sell as they faced diminishing returns and theft of their crops by new residents.

“My son tells me I spend more than I earn with my cattle. For example, since it did not rain this year, I have been spending everything on cattle feed for the animals. There is still a little water left for them, but three wells have dried up, leaving only one for them to drink from.” (Beatriz Figueroa).

9.8. Ejido-level participation and decision-making.

Participation in decision-making within the ejido is an essential aspect of community governance and resource management. The interviews reveal that participation rates vary by gender, age, and tenure status within the ejido.

Male ejidatarios, especially older members, are more likely to be involved in decision-making processes and to have held roles within the ejidal commissariat. Women, however, have historically been excluded from these positions, although this dynamic is slowly changing as younger generations demand greater inclusivity.

The following excerpt highlights the dissatisfaction of some ejidatarios who believe that the statutes of the Agrarian Law are not being upheld:

“Yes, right now we have more women than men. Before, women could not have ejidal rights, only men. But then men started dying, and the successors became the wives. However, when they have sons, they send their sons instead of representing

themselves. That is a problem; they send only representatives, but they are not the ejidatarios. Before, if someone leased their plot and more than two years passed, they would lose the plot. Now many things are done without respecting the agrarian law." (Filemón Burciaga).

In interviews, it was often mentioned that many ejidatarias (female landowners) are widows who have inherited the land. However, they do not actively participate in ejidal assemblies, preferring instead to send their sons as representatives, since the sons will eventually inherit the ejidal title.

"…Before, it was almost all men, but as they started passing away... Back then, it was not like it is now. Women were pushed aside and not considered at all. As a daughter, you did not expect to inherit from your parents; it was always the sons, the men, who had the right to keep everything. Back then, there was no justice—if the brothers fought, the men would win. And if a woman got married, she had no right to inherit anything. If you left home, you had no rights—you left, so your husband was supposed to take care of you." (Beatriz Figueroa).

"…In the case of the ejido, now the governing boards are made up of both genders. At the beginning, it was all men because the ejido was originally created for male heads of households. But then widows started becoming successors, and they took over the ejidal rights. So now, there are many women who are daughters and successors. Today, we are practically talking about half and half." (Francisco Mápula).

For some interviewees, holding ejido rights (such as ejidatario status) is an important source of influence, allowing them to participate in the assembly where collective decisions are made regarding the ejido's common lands and resources. However, several interviewees noted the need for greater participation by women, emphasizing that many women still lack the opportunity or encouragement to actively participate in the management of ejido resources.

As the demographics of the ejido evolve, there is potential for changes in governance structures that allow for broader representation and promote a more inclusive approach to resource management. However, continued support and

education are needed to further break down traditional barriers and promote equitable participation across gender lines.

9.9. Additional questions for the ejidal commissariat.

“Now many have forgotten their obligations as ejidatarios; they only want the benefits.” (Filemón Burciaga).

“There are problems and corruption within the ejido and in government agencies. Some people sell the land without assembly approval, even if they have no way to prove it... Many regret selling, especially those who are old like me, because they have nothing left. Back then, no one guided us, and even the agencies favored the buyers. That is the story of how all the land was sold—we were blind and did not value what we had.” (Filemón Burciaga).

Mr. Filemón admits they did not value their lands when deciding to sell them for residential developments.

“In the past, there were more programs that supported the countryside, like PROCAMPO, and programs where they would give us chickens or small animals, but none of that exists anymore... The ejido is a good way to request support, but without the ejido, no one would listen to us.” (Manuel Sánchez).

The excerpt above illustrates how ejidatarios have become accustomed to receiving government aid instead of focusing on creating a strong market or job opportunities.

“Well, there is hardly anything to deal with in the ejido anymore; all the land has been sold. The neighborhoods have taken over, and the little we plant gets stolen. People used to respect it more, but not anymore. Now they steal everything. I sold my land here and bought land in Dolores. I go there every day on my motorcycle.” (Salvador Rodríguez).

10. Discussion

10.1. Relationship with the community's natural resources and category by age

The utilization of natural resources has historically formed the foundation of the Mexican economy. However, as evidenced by the findings from the interviews, this paradigm is undergoing a significant transition.

This shift can be attributed to several factors. First, there has been an increase in educational attainment, which has facilitated the exchange of ideas and information, a phenomenon driven by globalization. Second, resource scarcity has played a pivotal role in this transition. During the ejido era, land distribution was determined by the number of individuals allocated plots, and as the population expanded, it became impractical to allocate additional land to new families.

As illustrated in Table 5, the data reveals significant disparities among the different age groups.

Table 5. *Important changes that occur in each generation (Author, 2025).*

15 to 24 years old	25 to 44 years old	45 to 59 years old	60 years or more
Traditional Knowledge			
There has been no mention of this topic.	The topic was not referenced except for aspects related to cooking, forest harvesting, and planting by farmers.	Many individuals in this sector utilize traditional knowledge to generate economic resources, such as cooking, working in the timber industry, planting, making jam, sewing, and embroidery.	There is extensive knowledge of how to produce goods from raw materials, as everything was traditionally made at home—from tortillas to preserves, jams, and bread. Skills such as sewing, embroidery, animal husbandry, agriculture, and wood collection in the forest were also common. Traditional methods of treating illnesses, including the use of medicinal plants, "sobar para el empacho y limpias para el mal de ojo" (massage for stomach pain and energetic purification for the evil eye), were also highlighted.

15 to 24 years old	25 to 44 years old	45 to 59 years old	60 years or more
			Additionally, the use of different types of maize for planting was mentioned, along with extensive knowledge of the seasons for planting various crops to ensure food security for the family.
Education			
High levels of education (high school and bachelor's degree).	High levels of education, including high school, bachelor's degrees, technical training, and master's degrees.	Mostly basic education (primary and secondary).	Most of the interviewees did not complete their primary education. A proportion of them attended secondary school in adulthood.
Gender roles			
Flexible gender roles, both genders participate in education, domestic work, and formal jobs.	Flexible gender roles, both genders participate in education, domestic work, and formal jobs.	The division of labor is determined by gender, with males traditionally responsible for providing for the household and females expected to undertake domestic duties. However, if women aspire to financial independence, they often engage in occupations such as cooking, cleaning, and caregiving. Societal prejudice against certain roles and behaviors assigned to men and women persists, reflecting deep-rooted sexism.	Traditional gender roles are rigid, with men seen as providers and women as submissive figures responsible for domestic work and childcare. The man is considered the authority and has the final say, while the woman becomes part of the husband's family.
Access to land			
Women are entitled to own and inherit ejido land and rights. However, members of the current generation show little interest in this possibility, primarily due to the high costs involved. Additionally, they consider the maintenance of croplands to be	Women can own and inherit ejido land and rights. However, this generation tends to sell parcels to the real estate market. Only a few individuals are interested in agriculture as a livelihood.	Women can own and inherit ejido land and rights. They actively participate in the management and care of their land. Meanwhile, men primarily oversee planting and harvesting activities.	Women do not inherit and cannot own land. Most leave the administration and care of plots or ejido rights inherited on the death of their husbands to their sons.

15 to 24 years old	25 to 44 years old	45 to 59 years old	60 years or more
an overly burdensome task.			
		Work or activities	
They are either still students, work as employees, or hold jobs related to their bachelor's degrees.	They work in fields related to their bachelor's degrees, in the service sector, or as employees in Durango City. They engage in natural resource-related work only if their parents rent or own parcels, or if their bachelor's degree is related to forestry, agriculture, or veterinary medicine.	They work in the service sector or as employees in the city. Individuals who own land or hold rental agreements for it engage in primary activities. In this sector, some women still dedicate themselves entirely to being traditional housewives.	A proportion of individuals continue to engage in cattle husbandry as a pastime, given the inability to generate substantial profit from this activity. This group includes pensioners and women dedicated to household chores.
		Decision making	
They feel free to make decisions and are more open to pursuing diverse paths in life. The influence of social media is a significant factor in this regard.	The decision-making process is characterized by an economic rationale, with considerations given to both financial viability and personal circumstances. In some cases, the process is also influenced by the perspective of the spouse.	Women tend to depend on their husbands and often consult them before making important decisions. While men may consult with their wives, as well as their sons and daughters, they are primarily responsible for making decisions within the household.	The man makes decisions, and the woman is expected to obey him. In the event of the husband's death, the majority of widows depend on their eldest son or daughter.
		Migration	
They want to migrate to larger cities due to the lack of opportunities.	They migrate to larger urban centers in pursuit of employment opportunities that align with their academic qualifications. Some undertake temporary migration to the United States, subsequently returning to their communities. This	This generation tends to migrate to larger cities, Canada, or the United States, either through contracts or illegally. However, it is mostly men who leave the community and send remittances to their families. They are typically employed in agricultural or forestry jobs.	The decision of men to migrate to cities was influenced by their lack of land ownership, which compelled them to seek employment as construction workers and, in some cases, bring their families with them. Some men participated in the *Programa Bracero*, a program that recruited Mexican laborers to work in the United States' agricultural sector from

15 to 24 years old	25 to 44 years old	45 to 59 years old	60 years or more
	phenomenon is not exclusive to men; women also seek to leave their communities in pursuit of more lucrative opportunities.		1942 to 1964 (Durand, 2007).

A notable observation is the loss of connection with natural resources among individuals aged 25 to 44, except for those who hold a bachelor's degree in a relevant field or possess ejido rights.

Furthermore, the findings indicate that the youngest generation, comprising individuals between 15 and 24 years old, exhibits a significant lack of engagement in agriculture or livestock activities. This suggests a complete disconnection between younger generations and primary economic activities.

It is also evident that the nature of work roles has shifted for women, who were previously dedicated to housework. Starting with the 45–59-year-old generation, there has been an increase in women entering the labor market, initially in service and care work. Among younger generations, women are increasingly becoming professionals, which expands their job opportunities.

Previous studies have identified similarities with the experiences described by women in rural communities. For example, Mora Guerrero (2017), in her study of rural communities, notes that girls are generally raised to perform domestic work, while boys are directed toward paid employment.

As a result, their social connections and support networks are limited primarily to their nuclear family and, occasionally, their extended family. When women actively participate in paid work or form work groups, it often creates tension within the family, as they no longer have the same amount of time previously dedicated to household responsibilities (Mora Guerrero, 2017).

The generational differences in experiences align with Mohanty's (1989) critique of homogenization. She argues that individual experiences vary significantly based on

the diversity of women's identities, cultures, and lived realities. Thus, it is inaccurate to portray these diverse experiences as part of a singular, undifferentiated category.

Sundberg (2015) highlights similar patterns of exclusion in scientific and knowledge-production practices, where women and other marginalized groups are systematically disadvantaged. Conventional frameworks often dismiss their experiences and knowledge as inferior, perpetuating broader inequities in access to resources, power, and influence.

10.1.1. Marriage

For older generations, marriage was considered obligatory due to religious and cultural expectations to start a family and have many children. However, in recent years, the concept of marriage has undergone significant changes.

It is also important to note that, in past generations, once a woman married, she became the responsibility of her husband. As a result, women rarely inherited land or property, which were typically reserved for the eldest son. This patrilineal system, common in rural communities, required women to relocate to their husbands' homes, effectively stripping them of inheritance rights. This exclusion not only limited women's access to resources but also barred them from participating in decision-making processes (Arzate & Vizcarra, 2007).

The young women interviewed no longer feel the same pressure to marry, as they can choose to work or study until they decide to settle down. For older generations, however, the fact that women are marrying later or choosing to have fewer children is seen as a disadvantage, and they perceive modernity as eroding traditional values.

As mentioned in the findings, groups and joint activities often fail due to the need to return to domestic responsibilities. While younger generations are more likely to share domestic work compared to older generations, balancing work and home life remains a challenge.

García and Lescano (2021) emphasize that a significant part of the existing gender gap in opportunities stems from unpaid domestic activities and the time devoted to them, as well as other factors such as access to employment and financing.

In recent years, there has also been an increase in divorce rates, leading many women to return to their parental homes. These women often become providers for their households, supporting both their children and parents.

This new role redefines gender and generational relationships within ejidal families and represents a form of empowerment for rural women. The absence of a male spouse places women in the public sphere, enabling them to participate more frequently in ejidal assemblies and community affairs (Del Rey, 2005).

10.1.2. Traditional knowledge

A discernible discrepancy in the extent of traditional knowledge is evident between older and younger generations, as highlighted by the findings from the interviews. This phenomenon is concerning, as noted by Lazos-Chavero and Jiménez-Moreno (2021), given its implications for the loss of agro-ecological expertise amid an aging population in rural areas. The absence of generational replacement in these regions further exacerbates the issue.

Older individuals frequently mentioned their work in the milpas, but this practice has significantly declined over the years and across generations. Farmers are increasingly opting for monoculture, particularly fodder species, to feed their livestock.

The milpa, a traditional Mesoamerican farming system involving the intercropping of maize, beans, and squash, has deep roots in Mexican culture. It plays a critical role in preserving the biodiversity of cultivable species in Mexico, serving as a pillar for food sovereignty and security in rural communities, alongside its historical and cultural significance (Fonteyne et al., 2023).

Traditional knowledge related to the use of species for medicinal purposes has been gradually lost. Younger generations now prefer to purchase everything from medicines to food rather than producing it themselves.

This shift has led to a loss of biodiversity, which also signifies a decline in community culture. The relationship between people and their environment has

weakened, along with traditional practices tied to cultural and survival heritage (Lepofsky, 2009).

10.1.3. Gender violence

Violence was frequently mentioned in the interviews, with women primarily experiencing violence within the home, while men more often faced conflicts with neighbors or other men.

Without a support network, women are particularly vulnerable to violence. Figure 9 illustrates the percentage of women and the types of violence they have experienced in the state of Durango. These findings align with the experiences shared in the interviews, which predominantly highlighted economic violence and discrimination. According to Figure 9, 29.10% of women reported experiencing economic violence, but the most common form of violence is psychological.

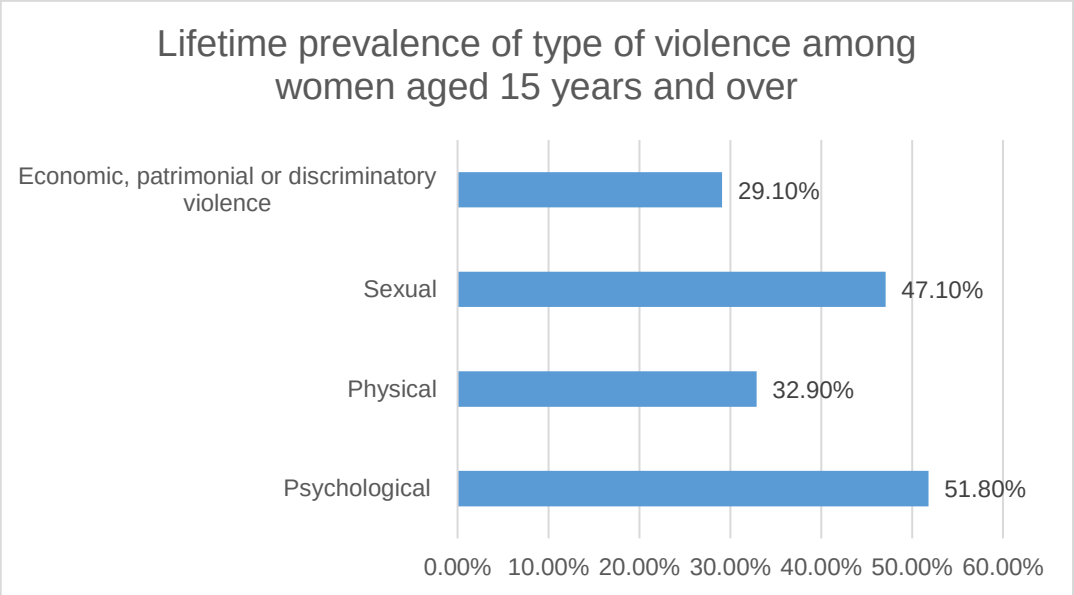

FIGURE 7 LIFETIME PREVALENCE OF TYPE OF VIOLENCE AMONG WOMEN

SOURCE: MODIFIED FROM PROGRAMA ESTATAL DE DESARROLLO 23-28 (2023)

It emphasizes that gender, alongside race, class, and other dimensions, shapes access to and control over natural resources and ecological knowledge (Sundberg, 2015).

These elements illustrate how violence against women has been perpetuated, aligning with what Arzate and Vizcarra (2007) term the “reduction of human fulfillment.” This concept refers to the loss of human potential as women are objectified, rendered disposable, denied reflective consciousness, and ultimately made invisible.

As shown in Figure 10, domestic violence is the second most common crime reported to authorities in the municipality of Durango. However, it is important to note that many women do not report instances of violence to the authorities.

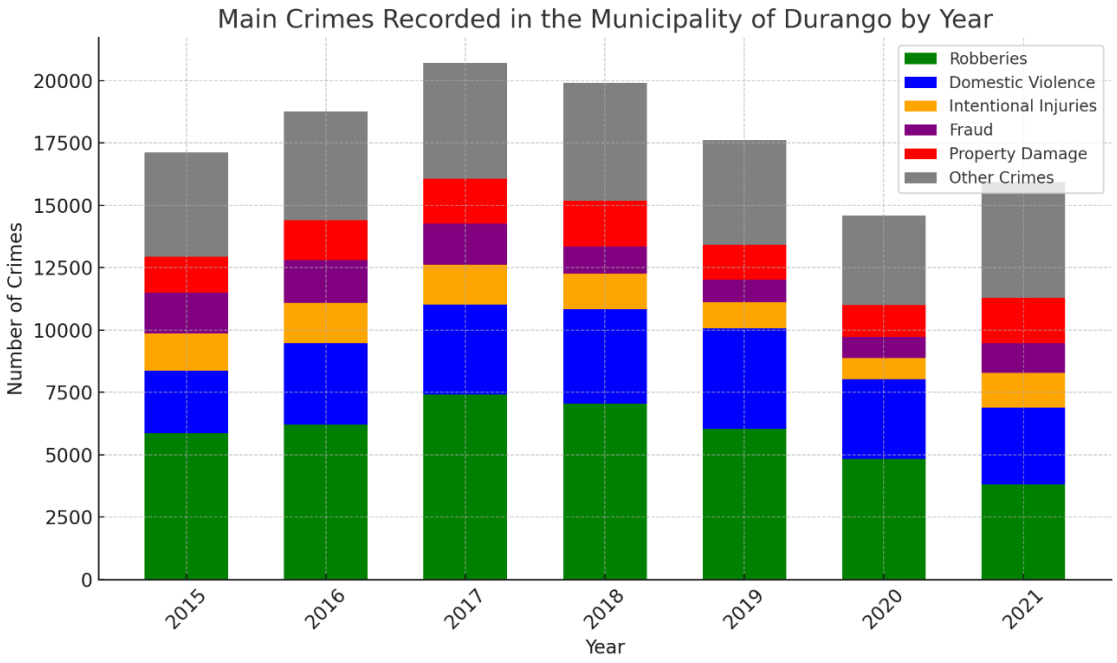

FIGURE 8 MAIN CRIMES IN THE MUNICIPALITY OF DURANGO (SESNSP, 2021).

10.2. Changes in male-female interaction over time

According to older participants, a dramatic generational shift in gender roles has occurred. They described a transition from a state of subjugation, where their decision-making depended on their husbands’ approval, to a contemporary era marked by the empowerment of women.

The gender asymmetries that historically affected women from childhood, due to the imposition of traditional roles and dependence on others (Flores Martínez et al., 2022), have diminished as women's access to higher education has improved their opportunities for economic independence.

This transformation is exemplified by women attaining independent professional careers and educational levels that enable them to compete equitably with their male counterparts.

Another significant issue involves the shifting roles and contributions of women within the domestic sphere. Conlon et al. (2014) observed that, in older generations—particularly those aged 60 and above—there was a system of interdependence and reciprocity among women of different ages. This system involved grandmothers assisting with child-rearing, while younger wives were expected to care for elderly in-laws.

However, with women's entry into the labor force, such relationships have been renegotiated. Instead of providing direct care for the home and relatives, women in better economic positions now often choose to offer financial support or pay for eldercare and childcare services.

Another notable change is that women, once valued primarily for their reproductive capacity, are now appreciated for a broader range of qualities and contributions (Flores Martínez et al., 2022).

10.3. Community abandonment and migration.

The phenomenon of migration was a recurring theme in the interviews. For instance, most of the individuals interviewed were not born in the communities of El Nayar and La Ferrería and had chosen to migrate for various reasons.

According to the State Development Program 2023–2028 (2023), rural-urban migration has resulted in 72.4% of the population being concentrated in 50 cities, while the remaining 27.6% reside in 5,840 rural localities. Salgado and Vizcarra (2007) emphasize that, in rural communities, migration is often the most critical survival strategy for households facing economic hardship.

This phenomenon was previously addressed by Moore (1991) in his concept of proletarianization, which refers to the creation of a working class that sells its labor and becomes disconnected from the means of production—in this case, land—as small-scale production is no longer profitable for various reasons.

On a national level, migration is shaped by four key contextual factors: the unequal distribution of wealth, limited access to state-provided social services, the depletion of fertile land, and the scarcity of well-paying jobs in rural areas. These issues are closely tied to the lack of policies aimed at enhancing productivity in the agricultural sector (Salgado & Vizcarra, 2007).

As illustrated in Figure 11, remittance income in the municipality of Durango increased by 69% from 2017 to 2021, highlighting the significance of monetary transfers from migrants residing abroad. This finding aligns with participants' reported preferences for living in other countries while financially supporting their families in Mexico.

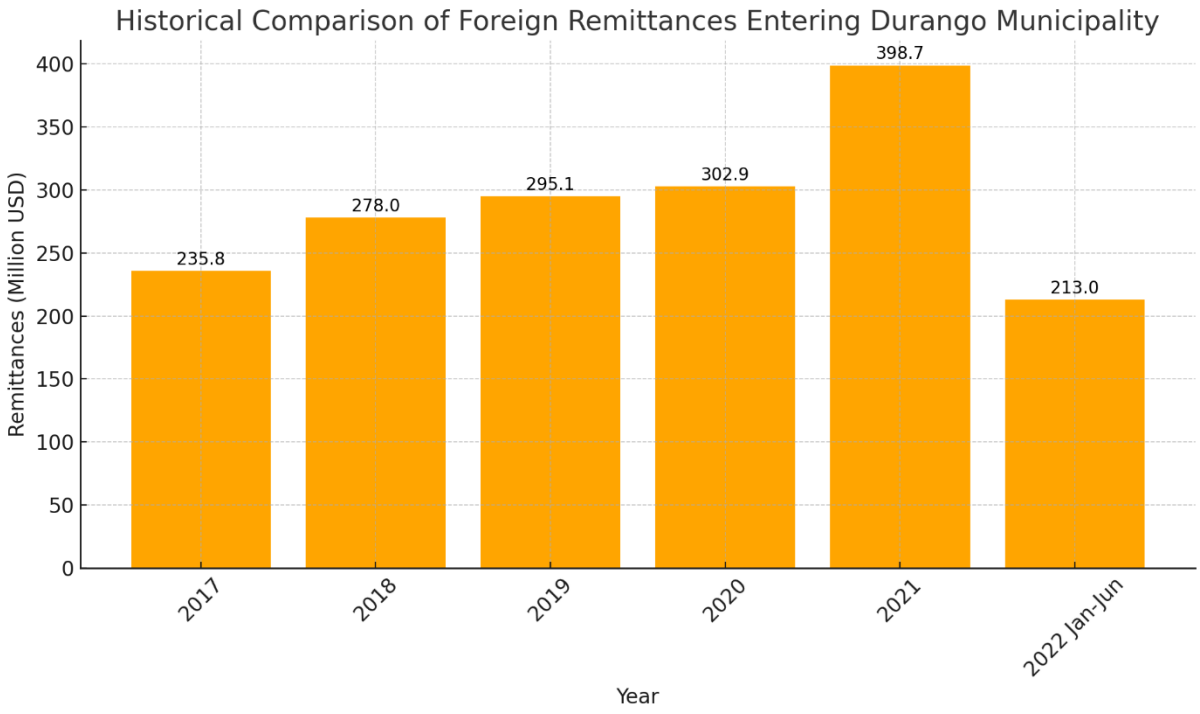

FIGURE 9 HISTORICAL COMPARISON OF FOREIGN REMITTANCES ENTERING DURANGO MUNICIPALITY (BANXICO, 2022; CITED IN STATE DEVELOPMENT PROGRAM 23-28,2023).

One notable aspect of labor mobility is the increasing role of women, who previously migrated alongside their husbands as companions. However, starting in the 1990s, women began migrating independently, often because men, upon migrating to distant locations, disengaged from their families. As a result, women migrate and become the primary economic providers (Del Rey, 2005).

Migratory movements have led to a phenomenon of return migration, which brings about societal changes. For example, many women who chose to migrate and later returned to their communities of origin brought with them different perspectives on gender inequality, leading their households to adopt more egalitarian dynamics. In contrast, other women who migrated and returned based on their partners' decisions do not work, as they "do what their husband says," reflecting deeply ingrained machismo (Franco Aguilar, 2017).

In the previous paragraph, we can identify what Franco Aguilar (2017) defines as pendular migration (coming and going). As the name suggests, this involves short stays of several months with specific objectives, such as studying or saving money, which is often invested in the community of origin to build family assets.

Many of these migrants belong to a second generation born on American soil. Having obtained residency, they are able to secure legal contracts and employment opportunities in the United States, allowing them to send remittances to their families in Mexico.

A salient issue that merits consideration is the aging demographic of the rural population, which hinders the replenishment of the workforce. This phenomenon is exacerbated by the fact that, in many cases, only one son inherits the ejidal land. Consequently, the remaining siblings are compelled to migrate in pursuit of more lucrative employment opportunities, as the distribution of ejidal land is not permitted (Gallardo Zúñiga, 2003).

Several interviewees cited different reasons for their decision to migrate and leave their respective communities. Some mentioned problems with cartels, including kidnappings or extortion. While some requested that this part of the interview not be recorded, it is a reality that affects rural communities. One participant shared the

personal experience of losing their home and property to pay a ransom following the abduction of their spouse.

Since the so-called “war against drug trafficking,” which began during the administration of Felipe Calderón Hinojosa (2006–2012), there has been a phenomenon of forced displacement. This has occurred in Durango, with the bloodiest period of the war being from 2008 to 2010, when violent events occurred throughout the state.

These events particularly affected women, who lost their husbands, sons, fathers, and brothers—individuals who were often their primary financial providers. Many families were displaced, staying in temporary shelters in the city of Durango, and in some cases, they decided to leave their communities of origin entirely (Fuerte Celis et al., 2020).

The affected population has largely been neglected. Only in Chiapas are there programs to assist displaced persons, but for the rest of the country, the issue has not been legislated or officially acknowledged (Ávila Lara, 2014).

10.4. Future relations with natural resources.

The contemporary generation demonstrates a strong commitment to pursuing advanced levels of education, often accompanied by the search for specialized employment opportunities that allow them to apply their knowledge.

As shown in Figure 12, only 4.5% of the female population is engaged in activities related to the agricultural sector, while most women work in commerce and manufacturing.

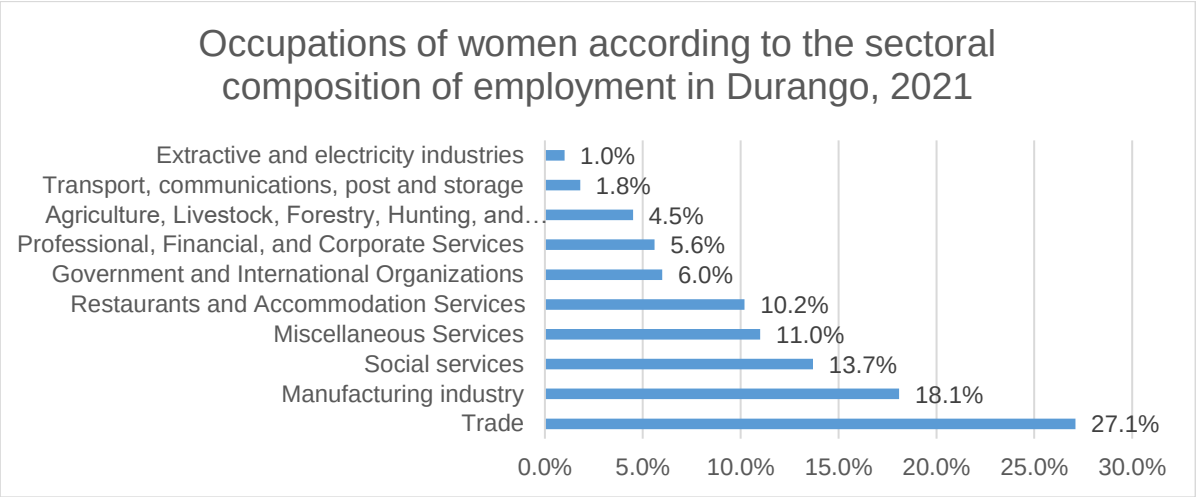

FIGURE 10 OCCUPATIONS OF WOMEN IN DURANGO, 2021. (SOURCE: MODIFIED FROM PROGRAMA ESTATAL DE DESARROLLO 23-28, 2023).

The phenomenon of women's disengagement from natural resource management is not isolated; it is accompanied by a parallel trend among men, who also seek employment opportunities in urban areas, often as employees. This shift reflects a broader societal perception of agriculture as a strenuous and less desirable occupation.

However, for those who remain in rural areas, particularly older generations, their connection to natural resources continues to reflect identity and cultural heritage, despite increasing economic and social pressures. The Mexican countryside is aging, a trend largely driven by migratory flows (Gallardo Zúñiga, 2003).

10.5. Resource scarcity

10.5.1. Soil and land use

In the interviews, the impact of urban growth, changes in rainfall patterns, and lack of access to water were widely cited as key factors contributing to the abandonment of agricultural activities.

The agrarian land redistribution program was officially concluded in 1992, as the country's evolving conditions no longer supported its continuation. Factors such as rural population growth, which increased demand for resources, placed immense

pressure on the fixed amount of available land, leaving no new parcels to distribute (Gallardo Zúñiga, 2003).

The sale of croplands is directly linked to the 1992 reform of Article 27 of the Mexican Constitution, which allowed ejidatarios to gain full ownership of their parcels. This reform enabled them to transition from being mere usufructuaries to full proprietors, granting them the ability to associate with one another, the state, or third parties to allocate the use of their lands (Gallardo Zúñiga, 2003).

The impact of this phenomenon was evident in the communities of La Ferrería and El Nayar, as highlighted by interviewees' emphasis on the loss of agricultural land due to the sale of plots. To verify these claims, an analysis was conducted on the urban sprawl of Durango City and its impact on both ejidos.

As shown in Figure 13, urban expansion became particularly significant starting in 2008. This growth is linked to various projects, such as the construction of the peripheral ring road surrounding Durango City, which directly affected 43 kilometers (262.2 hectares) of land previously used for farmland, scrubland, pastureland, and walnut orchards (Secretaría de Comunicaciones y Transportes, 2007).

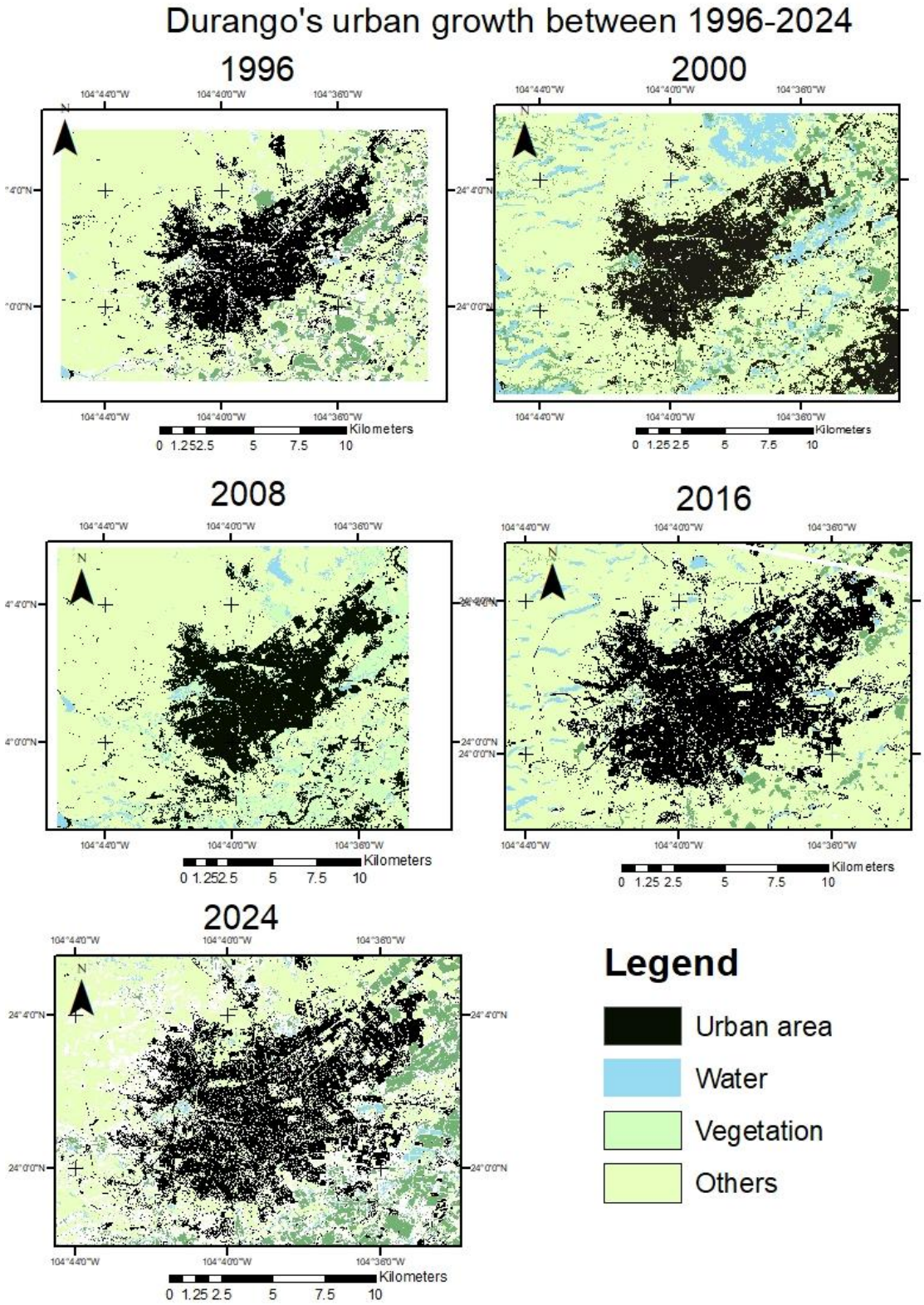

FIGURE 11 URBAN GROWTH OF DURANGO CITY (1996–2024) (ELABORATED BY THE AUTHOR, 2025).

Satellite images were used to identify the urban expansion of Durango City, following the methodologies of Cachipuendo Amagua (2021) and Chapa et al. (2019). This approach allowed us to estimate the number of hectares by which the city has expanded, as well as the ejidos that have been impacted.

To calculate the annual rate of change, we used the formula proposed by the FAO in 1996, as applied by Cachipuendo Amagua (2021). This formula enables us to express the increase in urban sprawl as a percentage.

The primary focus is on the ejidos of La Ferrería and El Nayar. However, by using the vector layer of ejidos, it was interesting to observe how this phenomenon has affected the ejidos surrounding Durango City.

The results of the urban sprawl expansion are presented in Table 6:

Table 6. *Increase of urban area of Durango city (elaborated by the author, 2025).*

Year	1996 (ha)	Increase of urban area (ha)	Annual rate of change (%)
1996	6,440.6930	-	-
2000	6,858.1280	417.435	1.58
2008	7,161.0931	720.4001	0.88
2016	7,341.1059	900.4129	0.65
2024	7,663.9769	1,223.2839	0.62

The results of the annual rate of change analysis indicate that in the year 2000, the growth rate reached 1.58%, marking the highest recorded change. This peak could be associated with the full ownership of ejidal lands and the sale process initiated by ejidatarios during the 1990s.

By 2008, the rate of change had decreased to 0.88%, and in the most recent periods, it fluctuated between 0.65% in 2016 and 0.62% in 2024, suggesting a stabilization of urban growth.

As illustrated in Figure 14, the expansion of Durango City over the last 28 years is highlighted in red. Using the shapefile of agricultural centers (ejidos) available in IDEGEO, based on INEGI (2015) data for the municipality of Durango, we identified 20 ejidos directly affected by the city's growth. This includes the study areas of El Nayar and La Ferrería, aligning with residents' reports of territorial loss due to ejidatarios selling their land.

This urban expansion has significant implications, including the loss of agricultural land, increased pressure on natural resources, and the transformation of rural communities. The findings underscore the need for sustainable urban planning to balance growth with the preservation of ejidal lands and local livelihoods.

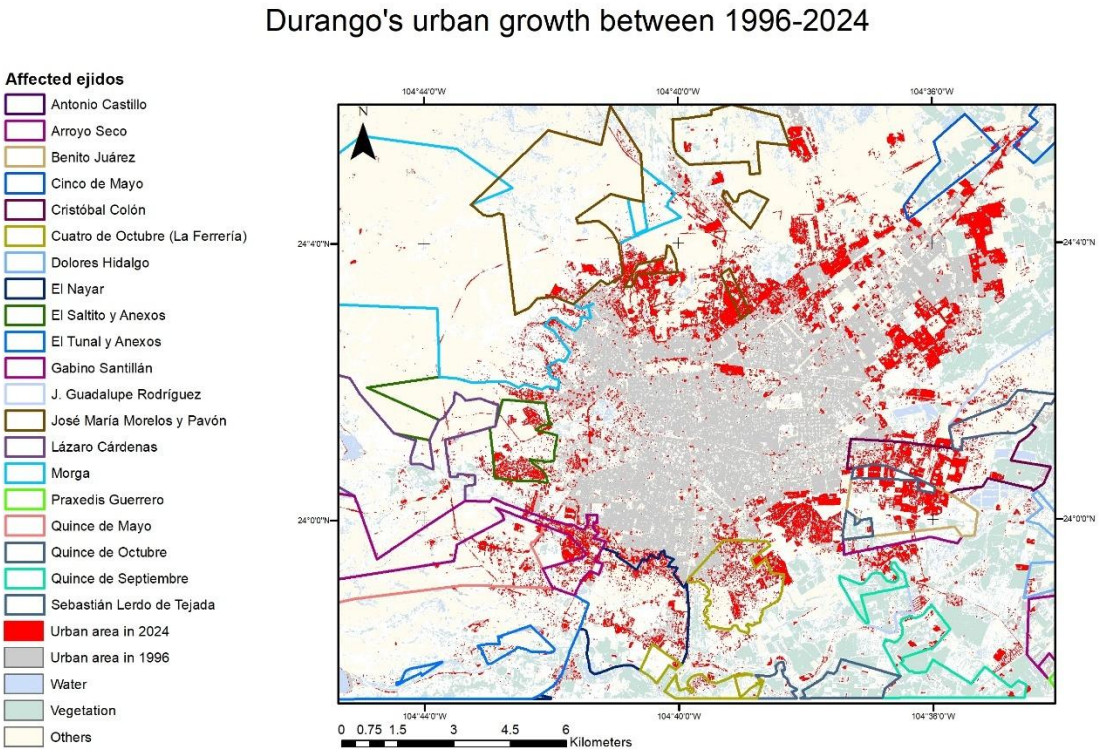

FIGURE 12 EJIDOS AFFECTED BY THE URBAN GROWTH OF DURANGO CITY (1996–2024) (ELABORATED BY THE AUTHOR, 2025).

The spatial analysis corroborates the loss of arable land in the ejidos of La Ferrería and El Nayar, demonstrating that urban sprawl has expanded by 1,223.2839 hectares since 1996.

In the interviews, participants mentioned that the lack of fallow land and areas for cattle grazing has led farmers to prioritize planting fodder on their plots. This aligns with municipal-level production data.

According to the Municipal Program (2021), the agricultural sector at the municipal level is characterized by the production of 22 different products, with green alfalfa and fodder oats being the most produced. However, these are not the most profitable crops.

As shown in Table 7, the most produced agricultural products in the state of Durango are listed. Notably, the most profitable products—corn and walnuts—do not appear in the table, as they rank eighth in production volume. However, they generate 193 million pesos annually.

Table 7. *Agricultural production in Durango (elaborated by author, source: SAGARPA, 2021).*

Crop	Production (tons)	Production value (Million Pesos)
Green alfalfa	264,282	$150.64
Green forage oat	203,691	$116.99
Green forage corn	136,948	$65.39
Corn grain	126,553	$771.97
Green forage sorghum	18,919	$9.52

10.5.2. Water scarcity

Ulloa (2008) highlights that climate change significantly impacts crops and crop diversity, threatening the food sovereignty of rural and Indigenous communities and altering the relationship between humans and nature.

The rural economy relies heavily on agriculture, making communities highly dependent on crops and the climatic conditions that affect them. Land management is a crucial factor in determining exploitation methods. However, globalization and neoliberal policies have diminished communities' ability to address current environmental challenges (Campos et al., 2013).

Furthermore, rainfed production is the primary agricultural activity for most subsistence farmers in the country (Munguía-Aldama et al., 2015). According to Altieri and Nicholls (2009), approximately 55% of smallholder households worldwide live below the poverty line, making them particularly vulnerable.

Climate change is expected to significantly affect regions where maize is cultivated. This crop holds immense social, cultural, and nutritional importance for traditional farming communities in Mexico and is considered a staple food. Therefore, this analysis focuses on the impact of climate change on maize cultivation in this region (Munguía-Aldama et al., 2015).

For instance, Ruíz and Meza (2012), citing Saldaña and Sandberg, report that between 1980 and 2005, the agricultural sector suffered significant economic losses due to weather-related disasters, accounting for 80% of all losses caused by natural disasters.

Adverse weather conditions could reduce maize production by up to 15% by 2055, jeopardizing the subsistence and food security of large areas in the region (Conde-Alvarez & Saldaña, 2007). This risk is exacerbated by the limited adaptive capacity of small-scale farmers (Hellin et al., 2014).

According to Ruíz-Corral et al. (2011), temperatures during the May–October period are projected to increase by 2°C by 2051, leading to the loss of agricultural areas suitable for rainfed maize cultivation. Additionally, precipitation during these months is expected to decrease by approximately 4%, resulting in a less favorable water balance. The outlook is concerning.

Another critical factor is the construction of the Presa Tunal II dam, which will directly affect ejidos and occupy 583,690 hectares. The Environmental Impact Assessment

was submitted in 2019, but as of now, the government has not initiated construction activities (Trujillo, 2019).

10.6. Ejido-level participation and decision-making.

The status of an ejidatario not only grants the right to work the land but also confers significant social standing within the ejido. However, this role comes with specific obligations, and failure to fulfill them may result in the loss of ejidatario status (Del Rey, 2005; Gallardo Zúñiga, 2003).

According to Del Rey (2005), ejidal succession varies depending on the age of the ejidatario. Those under 40 years old tend to designate the eldest son as the successor, as he is perceived as the most capable of assuming the role if needed. In contrast, ejidatarios over 60 years old often designate the youngest son, as older children have typically established their own lives, while younger ones often still reside at home. A third group of ejidatarios designate their wives as successors, ensuring their survival by granting them control over the land. This allows women to work the fields or leverage the land to access other resources. It also secures the support of their children, who must maintain contact with their mother to be considered future successors.

According to D'Aubeterre et al. (2003), women's visibility in spaces previously reserved for men has increased due to male migration. This has also led to greater participation in communal committees or assemblies that manage communal lands.

Additionally, in the case of ejidos, the death of the founders has resulted in more women inheriting ejidal rights, as they are often the direct successors of their husbands, as mentioned in one of the interviews.

Vázquez García (2001) documents that, following a husband's death, many women are entitled to inherit ejido rights. However, the plots of land and associated agricultural labor often remain under the control of a male relative. The mechanisms of land transfer in these communities remain questionable, as they appear to function primarily as a conduit for inheritance from the husband to the eldest son.

For substantial change to occur, it is argued that the impetus must emerge from within the community itself (Vázquez García, 2001).

10.7. Additional questions for the ejidal commissariat.

The 1992 reform of Article 27 of the Mexican Constitution transformed land management by promoting land certification and creating patrimonial value. This reform prioritized the land's patrimonial value over its productive use (Del Rey, 2005), leading many ejidatarios to fully utilize their lands by selling them as residential lots.

Previously, plots were considered family assets, but they have now become commodities that can be rented or sold (Vázquez García, 2001). As observed in the communities, most individuals eventually decided to sell their plots.

The cost of progress, often associated with the loss or limited gains from land sales, is difficult to fully comprehend in its social, political, ecological, and cultural dimensions. Regional development is frequently misunderstood as being solely driven by economic growth (Tagle López, 2004).

Arzate and Vizcarra (2007) argue that the state has focused on aid programs, such as the now-defunct Progresa-Oportunidades, rather than developing comprehensive social welfare policies that emphasize social solidarity and respect for human rights.

Many ejidatarios had become accustomed to receiving government programs. Consequently, when some of these programs were discontinued, they chose to sell their land, as they no longer wished to continue farming and opted for immediate monetary gain. However, some ejidatarios now regret this decision, as they lost their land and the money did not last.

11. Conclusions

From a methodological standpoint, this research faced significant challenges in data collection, primarily due to the distrust of the rural population, which hindered access to testimonies and experiences.

Qualitative analysis is inherently challenging for researchers due to the difficulty of standardizing responses. However, life stories, particularly those shared by elders, are a vital source of knowledge that should be preserved and documented.

The most important findings of this research are outlined in the following points:

11.1. Gender roles changes

Over the past five decades, the lifestyles and intergenerational relationships within these communities have undergone significant changes, influenced by globalization, new technologies, and the exchange of ideas. This exchange has gradually reshaped gender roles, enabling individuals to occupy spaces that were previously considered exclusive to either men or women.

It is crucial to emphasize that gender dynamics extend beyond the experiences of women. Recognizing the importance of incorporating male perspectives into the discourse on gender is essential, as men also possess unique forms of traditional knowledge, wisdom, and experiences that differ from those of their female counterparts.

Incorporating both perspectives enriches the analysis of historical events by providing two distinct vantage points. These perspectives are shaped by gender-based differences and the rigid roles historically and culturally established within these communities.

The experiences of the younger generation contrast sharply with those of the elderly. The main differences lie in the activities they engage in, as gender roles have become more flexible. Educational attainment has increased, particularly among women, who can now choose when to marry or have children and no longer depend strictly on men.

Currently, it is considered that both parents can actively participate in child-rearing and pursue careers. However, limitations still exist for women, who often take on a greater share of child-rearing responsibilities and, in cases of divorce, are usually the ones who retain custody of the children.

Access to university education has also enabled women to integrate in the workforce. They can now actively participate in the labor market and engage in informed decision-making.

At the ejidal level, there is a replacement due to the death of ejidatarios. However, women often designate their male children as representatives, meaning they do not yet fully participate in decision-making processes.

11.2. Land use change, loss of croplands and new urban settlements

A key aspect of this research focuses on the consequences of the 1992 agrarian reform on the Mexican countryside. Despite its initially benevolent intentions, the reform ultimately led to the loss of agricultural land and the livelihoods of rural households.

The geographic information system (GIS) was used to confirm the loss of land use, demonstrating the emergence of the "new rurality," characterized by the blurring of boundaries between urban and rural areas. This phenomenon has already affected 20 ejidos in the city of Durango, visible as an expanding urban sprawl who change the land use of 1,223.2839 hectares since the year 1996 according to the spatial analysis.

In La Ferrería and El Nayar, agricultural activity has been impacted by the sale of plots, and currently, areas dedicated to agriculture are very scarce. Only few people own livestock. Regarding backyard gardens and small orchards, their use has practically ceased, as many households have chosen to expand the size of their homes instead.

11.3. New rurality.

In both communities, the growing urbanization of rural areas is observed. Modern housing construction styles have been replicated, the urban sprawl has expanded into ejido lands, and many individuals choose to commute to the city of Durango for work or study, returning to their communities in the evenings.

Most young people aspire to study or seek employment outside their communities, except for those who pursue agricultural or forestry careers. However, there is no longer a desire to dedicate oneself entirely to agriculture or livestock farming.

It is essential to redefine and improve rural work to make it profitable, dignified, and appealing to new generations. This is because agriculture is the foundation of food security and represents the cultural connection we have with our land and our roots.

In addition to the above, there is the challenge of changing rainfall patterns and water scarcity, as mentioned in the interviews, which further affects the development of agricultural activities.

Finally, the impact of social networks on young people is notable, as the information they receive through the internet influences their personal aspirations, trends, career choices, and even how they interact socially.

11.4. Loss of traditional knowledge

Unfortunately, this research has confirmed the loss of oral traditions, rural culture in Durango, and traditional knowledge and livelihoods. These losses have been exacerbated by the so-called "new rurality," which is increasingly urbanizing the way of life in these communities.

A clear disconnect with natural resources was identified among the generation aged 18 to 24. This is because they lack a direct relationship with natural resources and primarily seek to pursue activities related to university studies.

The few individuals who still wish to work in natural resource-related activities are those with the technical or professional background necessary to make informed decisions. They leverage technological advancements and global knowledge that can be applied to their own communities.

In the long term, this could lead to a redefinition of fieldwork, which is essential to ensure the continued viability of the Mexican countryside.

Those who engage in natural resource-related work do so from a technical or professional perspective, enabling them to make informed decisions. They consider technological advances and integrate global knowledge applicable to the communities of La Ferrería and El Nayar. This shift could ultimately redefine fieldwork, ensuring the sustainability of rural life in Mexico

11.5. Final recommendations

In conclusion, this research reaffirms the need to adopt strategies that preserve traditional knowledge and promote a more equitable and sustainable rural transition.

It is essential to strengthen policies that ensure equal access to land and encourage community participation by both women and men.

It is also necessary to revalue rural work by incorporating technical and technological knowledge, enabling new generations to find a balance between tradition and modernity.

This ensures that future decisions are made by taking into consideration the wisdom of our ancestors. Additionally, by documenting the experiences of the elderly, a testimony of their knowledge remains, as what is not spoken or written is as if it never existed.

12. References

Altieri, M. A., & Nicholls, C. (2009). Cambio climático y agricultura campesina: Impactos y respuestas adaptativas. *LEISA: Revista De Agroecología, 24*(4), 5-8. https://www.leisa-al.org/old/index.php/volumen-24-numero-4

Ambrosio–Albalá, M. (2017). Ciclo adaptativo y cambio rural: el enfoque territorial en la gestión de la resiliencia rural. *Revista de Fomento Social*. https://www.researchgate.net/publication/323265519_Ciclo_adaptativo_y_cambio_rural_el_enfoque_territorial_en_la_gestion_de_la_resiliencia_rural_Adaptive_cycle_and_rural_change_making_the_case_for_the_territorial_approach_to_manage_rural_resilience#fullTextFileContent

Arzate Salgado, J., & Vizcarra Bordi, I. (2007). De la migración masculina transnacional: violencia estructural y género en comunidades campesinas del Estado de México. *Migración y Desarrollo, Red Internacional de Migración y Desarrollo*. https://www.redalyc.org/pdf/660/66000905.pdf

Ávila Lara, M. M. (2014). El desplazamiento interno forzado en México visto desde la perspectiva de género. *El Cotidiano* (183), 27-28. https://www.redalyc.org/pdf/325/32529943004.pdf

Beauvoir, S. de. (1949/2011). *The second sex* (C. Borde & S. Malovany-Chevallier, Trans.). Vintage Books. (Original work published 1949). https://archive.org/details/the-second-sex

Bocco, G., Velázquez, A., & Torres, A. (2000). Ciencia, comunidades indígenas y manejo de recursos naturales. Un caso de investigación participativa en México. *Interciencia*, *25*(2), 64–70. https://doi.org/ISSN:0378-1844.

Cachipuendo Amagua, V. E. (2021). Determinación de zonas óptimas para expansión urbana en la parroquia de Machachi del cantón Mejía mediante la aplicación de técnicas de información geoespacial como apoyo a la planificación territorial [Universidad de las Fuerzas Armadas]. https://redi.cedia.edu.ec/author/650022887929361e7bceade0/documents?p=1

Campos Sánchez, M., Herrador, D., Manuel Valdés, C., & Mccall, M. K. (2013). Estrategias de adaptación al cambio climático en dos comunidades rurales De México y el Salvador. *Boletín de la Asociación de Geógrafos Españoles, 61*. https://doi.org/10.21138/bage.1547

Chapa, F., Hariharan, S., & Hack, J. (2019). A New Approach to High-Resolution Urban Land Use Classification Using Open Access Software and True Color Satellite Images. Sustainability, 11(19), 5266. https://doi.org/10.3390/su11195266

Candelas Ramírez, R. (2019). La relevancia de los ejidos y las comunidades rurales en la estructura social de México. Centro de Estudios Sociales y de Opinión Pública (CESOP). Documento de trabajo núm. 319. https://www.ccmss.org.mx/wp-content/uploads/Relevancia-Ejidos-CESOP.pdf

Castellano Fuentes, C. L., & de Miguel Negredo, A. (2010). Estereotipos viejistas en ancianos: actualización de la estructura factorial y propiedades psicométricas de dos cuestionarios pioneros. *International Journal of Psychology and Psychological Therapy*. https://www.ijpsy.com/volumen10/num2/261/estereotipos-viejistas-en-ancianos-actualizaci-ES.pdf

Castillo Bastidas, C. P., Montaño Fuertes, J. A., & Salazar, S. L. (Eds.). (2010). La utilización de los recursos naturales: ¿Cuestión de género*?* (Vol. 54). *Revista Unimar*. http://asis.umariana.edu.co/publicaciones_unimar/index

Challenger, A., & Dirzo, R. (2009). Factores de cambio y estado de la biodiversidad. *Capital Natural de México, Vol. II*. https://www.academia.edu/40190484/Challenger_y_Dirzo_2009_Factores_de_cambio_y_estado_de_la_biodiv

Comisión Nacional de Áreas Naturales Protegidas. (2014). Programa de Manejo Reserva de la Biósfera Sierra del Abra Tanchipa. SEMARNAT. https://www.gob.mx/conanp/documentos/areas naturalesprotegidas-278226

Comisión Nacional del Agua (CONAGUA). (2024). Actualización de la disponibilidad media anual de agua en el acuífero Valle del Guadiana (1003), estado de Durango. CONAGUA, México. https://sigagis.conagua.gob.mx/gas1/Edos_Acuiferos_18/durango/DR_1003.pdf

Comisión Nacional Forestal (CONAFOR). (2022). Reglas de operación 2023 del Programa de Desarrollo Forestal Sustentable para el bienestar. Diario Oficial de la Federación. https://www.conafor.gob.mx/apoyos//docs/adjuntos/c973f53fba23d9b486bd63939008b358.pdf

Comité de Planeación para el Desarrollo del Estado de Durango. (2023). *Plan Estatal de Desarrollo 2023-2028*. Gobierno del Estado de Durango. https://www.durango.gob.mx/ped.pdf

Conde, C., & Saldaña-Zorrilla, S. (2007). Cambio climático en América Latina y el Caribe: Impactos, vulnerabilidad y adaptación. *Revista Ambiente y Desarrollo, 23*(2), 23-30. https://keneamazon.net/Documents/Publications/Virtual-Library/Economia-Desarrollo/39.pdf

Consejo Nacional de Evaluación de la Política de Desarrollo Social. (2020). Indicador de pobreza por localidad 2020. CONEVAL. https://www.coneval.org.mx/Paginas/principal.aspx

Consejo Nacional de Población (CONAPO). (2000). Índices de desarrollo social en las etapas del curso de vida, 2000. Consejo Nacional de Población (CONAPO). http://www.conapo.gob.mx/work/models/CONAPO/Resource/1342/1/images/03Indicedesarrollo.pdf

Craig, G. (2010). Community capacity building: critiquing the concept in different policy contexts. In R. Kiely & A. Sumner (Eds.), *Rethinking international development series* (pp. 41–66). Palgrave Macmillan. https://www.researchgate.net/publication/321300794_Community_capacity-building_Something_old_something_new#fullTextFileContent

Cuervo-Robayo, A. P., Ureta, C., Gómez-Albores, M. A., Meneses-Mosquera, A. K., Téllez-Valdés, O., & Martínez-Meyer, E. (2020). One hundred years of climate change in Mexico. PloS One, 15(7), e0209808. https://doi.org/10.1371/journal.pone.0209808

Deere, C. D. (2006). ¿La feminización de la agricultura? Asalariadas, campesinas y reestructuración económica en la América Latina rural. *Revista ALASRU, nueva*

época, Análisis Latinoamericano del Medio Rural, 4, 77-136. https://doi.org/10.5154/r.rga.2012.48-49.06

De Ferranti, D., Perry, G. E., Foster, W., Lederman, D., & Valdés, A. (2005). Beyond the City: The Rural Contribution to Development. World Bank. https://openknowledge.worldbank.org/server/api/core/bitstreams/e68890a7-f90a-53eb-bb4a-f480e2aed431/content

Del Castillo Acuña, P. (2011). El impacto de la crisis alimentaria en las mujeres rurales de bajos recursos: Una propuesta de análisis cualitativo (2008-2009) [Tesis de licenciatura, Universidad Nacional Autónoma de México]. http://132.248.9.195/ptb2011/marzo/0667229/0667229_A1.pdf

Del Rey Poveda, A. (2005). El nuevo marco de relaciones intergeneracionales en las familias ejidales: migración y herencia en el sur de Veracruz. Universidad de Salamanca. https://www.researchgate.net/publication/285850667_El_nuevo_marco_de_relaciones_intergeneracionales_en_las_familias_ejidales_migracion_y_herencia_en_el_sur_de_Veracruz#fullTextFileContent

Durand, J. (2007). El programa bracero (1942-1964). Un balance crítico. *Migración y Desarrollo, (9)*, 27-43.

Escuela Agraria de Oaxaca, Tequio Jurídico, A.C., & Comisión Nacional para el Desarrollo de los Pueblos Indígenas. (2012). *Manual del Comisariado* (2ª ed.). Comisión Nacional Forestal. https://www.gob.mx/cms/uploads/attachment/file/85206/Manual_de_Comisariado.pdf

Fabricius, C., Koch, E., Magome, H., & Turner, S. (2004). Rights, resources and rural development (Earthscan). Earthscan. https://doi.org/ISBN:1-84407-009-3

FAO. (2015). Base referencial mundial del recurso suelo 2014. FAO, Rome. https://openknowledge.fao.org/server/api/core/bitstreams/dea292cb-370d-46c7-a44d-59a617953c3b/content

Fernández Moya, E. (2012). La gestión de los comunes en México: hacia un modelo de análisis de los ejidos. *Perifèria, Revista de Recerca i Formació en Antropologia*, (16). Universidad Autónoma de Barcelona. https://ddd.uab.cat/pub/periferia/periferia_a2012m6v17n1/periferia_a2012m6v17n1a7.pdf

Figueroa Díaz, M. E. (2009). Representaciones sociales de género en transformación. La experiencia de los miembros de un proyecto productivo rural en Oaxa*ca* [Tesis de doctorado, Universidad Nacional Autónoma de México]. https://repositorio.unam.mx/contenidos/representaciones-sociales-de-genero-en-transformacion-la-experiencia-de-los-miembros-de-un-proyecto-productivo-rura-81562?c=pQ8wXB&d=false&q=Representaciones%20sociales%20de%20g%C3%A9nero%20en%20transformaci%C3%B3n.%20La%20experiencia%20de%20los%20miembros%20de%20un%20proyecto%20productivo%20rural%20en%20Oaxaca&i=1&v=0&t=search_0&as=0

Fonteyne, S., Castillo Caamal, J. B., Lopez-Ridaura, S., Van Loon, J., Espidio Balbuena, J., Osorio Alcalá, L., Martínez Hernández, F., Odjo, S., & Verhulst, N. (2023). Review of agronomic research on the milpa, the traditional polyculture system of Mesoamerica. *Frontiers in Agronomy*. https://doi.org/10.1016/j.biocontrol.2024.105637

Forest Stewardship Council. (2015). Estándar Internacional FSC. Principios y criterios para el manejo forestal sustentable. https://fsc.org/sites/default/files/2020-02/Principios%20y%20criterios%20para%20el%20manejo%20forestal%20responsable.pdf

Franco Aguilar, J. (2017). Experiencia migratoria, retorno e inserción: mujeres en zonas rurales de Jalisco. Universidad Nacional Autónoma de México, Doctorado en Antropología. https://repositorio.unam.mx/contenidos/experiencia-migratoria-retorno-e-insercion-mujeres-en-zonas-rurales-de-jalisco-71753

Fuerte Celis, M. P., Pérez Luján, E., & Ángeles García, A. (2020). Las olvidadas. Mujeres desplazadas en Durango, las otras víctimas de la “guerra contra las drogas”. *Sociológica, 35*(99), 131-165. https://www.scielo.org.mx/pdf/soc/v35n99/2007-8358-soc-35-99-131.pdf

Gallardo Zúñiga, R. (2003). Reforma constitucional de 1992: El surgimiento del nuevo Derecho agrario mexicano. Universidad Nacional Autónoma de México. https://www.pa.gob.mx/publica/rev_22/Rub%E9n%20Gallardo.pdf

Gallegos C., J. I. (1963). El fundador de Durango. *Historia Mexicana, 13*(2), 163-184. https://www.jstor.org/stable/i25135204

García, E. (2004). Modificaciones al sistema de clasificación climática de Köppen para adaptarlo a las condiciones de la República Mexicana. México, D.F.: Instituto de Geografía, Universidad Nacional Autónoma de México. https://publicaciones.geografia.unam.mx/index.php/ig/catalog/view/83/82/251

García Roces, I., & Soler Montiel, M. (2010). Mujeres, agroecología y soberanía alimentaria en la comunidad de Moreno Maia del estado de Acre, Brasil. *Investigaciones feministas*, *1*, 43–65. https://idus.us.es/items/831e8fa7-3d52-4345-977b-48018c6b94d2

Gobierno del Estado de Durango. (2013). Ordenamiento Ecológico del Territorio del Municipio de Durango. Gobierno del Estado de Durango. https://api-transparencia.durangocapital.gob.mx/?action=preview&uid=11ae7bbc40d97d9fdf8f375606198ebb&key=2fe548d5ae881ccfbe2be3f5429d7852

Gobierno del Municipio de Durango. (2023). Plan Municipal de Desarrollo 2023-2025. Durango, México. https://implandgo.gob.mx/IMPLAN/Plan%20Municipal%20de%20Desarrollo/Plan%20Municipal%20de%20Desdarrollo%202023-2025.pdf

Gómez Bonilla, A. (2011). El desarrollo rural en México y Colombia. Problemas comunes y respuestas emergentes de los actores. (pp. 187–199). Editorial Pontificia Universidad Javeriana. https://www.academia.edu/1460837/El_desarrollo_rural_en_M%C3%A9xico_y_Colombia_Problemas_comunes_y_respuestas_emergentes_de_los_actores

Gómez Tagle López, E. (2004). Ambientalismo, sustentabilidad urbana y desarrollo regional. *Revista Mexicana de Ciencias Políticas y Sociales, Universidad Nacional Autónoma de México*. https://www.redalyc.org/pdf/421/42119205.pdf

González Elizondo, M. S., González Elizondo, M., & Márquez Linares, M. A. (2006). *Vegetación y ecorregiones de Durango*. Instituto Politécnico Nacional, CIIDIR Durango. https://www.researchgate.net/publication/322244135_Vegetacion_y_Ecorregiones_de_Durango

GRIC UPRM, Graduate Research and Innovation Center, Universidad de Puerto Rico. (2023, June 6). Introducción al uso de NVivo para el análisis de datos cualitativos [Video]. YouTube. (168) Introducción al uso de NVivo para el análisis de datos cualitativos (6 de junio de 2023) - YouTube

Gruber, J. (2010). Key principles of community-based natural resource management: a synthesis and interpretation of identified effective approaches for managing the commons. *Environmental management*, *45*(1), 52–66. https://doi.org/10.1007/s00267-008-9235-y

Hernández Chavarria, J., González Lazalde, I., & Galván Ismael, M. Q. (2022). La productividad en los distritos agrícolas de Durango, México. *Revista de Investigación Académica sin Frontera*. https://www.researchgate.net/publication/357746864_La_Productividad_en_los_Distritos_Agricolas_de_Durango_Mexico

Instituto Nacional de Estadística y Geografía. (2010). Red hidrográfica, escala 1:50,000, edición 2.0. INEGI. https://www.inegi.org.mx/temas/hidrologia/#descargas

Instituto Nacional de Estadística y Geografía. (2013). Datos vectoriales nacionales de uso del suelo y vegetación, escala 1:250,000, serie V. INEGI. https://www.inegi.org.mx/temas/usosuelo/#descargas

Instituto Nacional de Estadística y Geografía. (2018). División política municipal, escala 1:250,000. INEGI. http://geoportal.conabio.gob.mx/metadatos/doc/html/muni_2018gw.html

Instituto Nacional de las Mujeres. (24 de febrero 2021). Igualdad, inclusión y medio ambiente. Instituto Nacional de las Mujeres.

https://www.gob.mx/inmujeres/articulos/igualdad-inclusion-y-medio-ambiente?idiom=es

James, R., Gibbs, B., Whitford, L., Leisher, C., Konia, R., & Butt, N. (2021). Conservation and natural resource management: where are all the women? *Oryx: The Journal of the Fauna Preservation Society*, *55*(6), 860–867. https://doi.org/10.1017/s0030605320001349

Jiménez Chaves, V. E. (2020). Triangulación metodológica cualitativa y cuantitativa. *Revista sobre estudios e investigaciones del saber académico*. https://doi.org/10.70833/rseisa14item276

Kay, C. (2009). Estudios rurales en América Latina en el periodo de globalización neoliberal: ¿una nueva ruralidad? *Revista Mexicana de Sociología*. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0188-25032009000400001&lng=es&tlng=es.

Kelly, C., Ferrara, A., Wilson, G. A., Ripullone, F., Nolè, A., Harmer, N. Y Salvati, L. (2015) "Community resilience and land degradation in forest and shrubland socio–ecological systems: Evidence from Gorgoglione, Basilicata, Italy": Land Use Policy, 46(Julio), 11–20. https://www.sciencedirect.com/science/article/abs/pii/S0264837715000307

Lazos-Chavero, E., & Jiménez-Moreno, M. (2022). Vulnerabilidades rurales a partir del envejecimiento entre nahuas del sur de Veracruz. Trace, 81, 132-161. https://doi.org/10.22134/trace.81.2022.803

Llambí, L., (2012). Procesos de transformación de los territorios rurales latinoamericanos: los retos de la interdisciplinariedad. Eutopía: Revista de Desarrollo Económico Territorial, (3), 117-134. https://www.redalyc.org/pdf/6757/675771379006.pdf

López Carlassare, A. L., & Palma García, M. O. (2020). Resiliencia comunitaria en zonas rurales. Aliada para la sostenibilidad. *WPS Review International on Sustainable Housing and Urban Renewal (RI-SHUR)*. https://doi.org/10.24310/wps.vi11-12.15908

López Jiménez, L. N., & Chan Quijano, J. G. (2016). Marco conceptual del manejo de recursos naturales. *Revista Latinoamericana de Recursos Naturales*, *1*, 27–35. https://www.researchgate.net/publication/311515293_Marco_conceptual_del_manejo_de_recursos_naturales

López Romo, H. (1998). La metodología de la encuesta. En A. Wesley Longman (Ed.), *Técnicas de investigación en sociedad, cultura y comunicación* (pp. 33–74). Red de Bibliotecas Universitarias. https://biblioteca.marco.edu.mx/files/metodologia_encuestas.pdf

Mackay, M., & Petersen, K. (2015). Rural Community Resilience. Research Stocktake and Annotated Bibliography. Research Report Prepared for AgResearch. Faculty of Environment, Society and Design, Lincoln University. https://www.agresearch.co.nz/assets/Uploads/Rural-community-resilience-research-stocktake-and-annotated-bibliography.pdf

Matijasevic, M. T., & Ruíz Silva, A. (2013). La construcción social de lo rural. *Revista Latinoamericana de Metodología de la Investigación Social, 5*, 24-41. https://www.academia.edu/4367534/La_construcci%C3%B3n_social_de_lo_rural_Social_construction_of_the_notion_of_rural

Maya, D. L., & Ramos, P. A. (2011). El rol del género en el manglar: heterogeneidad tecnológica e instituciones locales. Cuadernos De Desarrollo Rural, 3(56). https://revistas.javeriana.edu.co/index.php/desarrolloRural/article/view/1236

Mohanty, C. T. (1989). Under Western Eyes: Feminist Scholarship and Colonial Discourses. *Boundary 2, Duke University Press*. https://link.springer.com/article/10.1057/fr.1988.42

Munguía Aldama, J., Sánchez Plata, F., Vizcarra Bordi, I., & Rivas Guevara, M. (2015). Estrategias para la producción de maíz frente a los impactos del cambio climático. *Revista de Ciencias Sociales* (RCS), XXI(4), 538-547. http://hdl.handle.net/20.500.11799/38740

Murray-Tortarolo, G. N. (2021). Seven decades of climate change across Mexico. *Atmósfera, 34*(2), 217–226. https://doi.org/10.20937/atm.52803

Oriol, N. (2004). Metodología cuantitativa y cualitativa en la investigación sobre la formación inicial del profesorado de educación musical para primaria. Aplicación a la formación instrumental. *Revista electrónica complutense de investigación en educación musical 1*(3), 63. https://revistas.ucm.es/index.php/RECI/article/view/RECI0404110003A

Ley General del Equilibrio Ecológico y la Protección al Ambiente. Artículo 44°, (28 de enero 1988) (testimony of Publicado en el Diario Oficial de la Federación). https://www.diputados.gob.mx/LeyesBiblio/pdf/LGEEPA.pdf

Prados Megías, M. E., Márquez García, M. J., & Padua Arcos, D. (2017). Life stories as a biographic-narrative method. How to listen to silenced voices. *Procedia - Social and Behavioral Sciences*. https://doi.org/10.1016/j.sbspro.2017.02.136

Pucha-Cofrep, F. (2023, abril 11). Análisis multitemporal del cambio del uso del suelo. Youtube. https://www.youtube.com/watch?v=tEwIz9LjCTs&list=WL&index=1&t=1s

Punzo Díaz, J. L., Vicente L., J., & Murguía Hernández, A. I. (2017). Presencia Aztatlán en sitios Chalchihuites del valle del Guadiana, Durango. Arqueología. https://www.academia.edu/34721254/Presencia_Aztatl%C3%A1n_en_sitios_chalchihuites_del_valle_del_Guadiana_Durango

Quintana Peña, A. (2006). Metodología de investigación científica cualitativa. En A. Quintana Peña & W. Montgomery (Eds.), *Psicología tópicos de actualidad* (pp. 65–76). UNMSM. https://www.ubiobio.cl/miweb/webfile/media/267/3634305-Metodologia-de-Investigacion-Cualitativa-A-Quintana.pdf

Rangel Farfán, I. (2015). Metadatos ejidos IDEGEO. Instituto Nacional de Estadística Geografía e Informática (INEGI). https://idefor.cnf.gob.mx/layers/geonode%3Aejidos_por_tipologia_wgs84

Rentería Garita, C., & Delgado-Serrano, M. M. (2014). La formación de capital social en los ejidos mexicanos. Decisiones sobre las tierras tras el artículo 27 de la reforma constitucional. *Revista Internacional de Sociología, 72*(1), 9-33. https://doi.org/10.3989/ris.2011.09.01

Reyes Hernández, H., Montoya Toledo, J. N., Fortanelli Martínez, J., Aguilar Robledo, M., & García Pérez, J. (2013). Metodologías participativas aplicadas al análisis de la deforestación del bosque de niebla en San Luis Potosí, México. *Bois et forets, 318*(4), 27–39. http://www.scopus.com/inward/record.url?eid=2-s2.0-84899073845&partnerID=MN8TOARS

Rivas Flores, J. I., & Herrera Pastor, D. (2010). *V*oz y educación: La narrativa como enfoque de interpretación de la realidad. *Ediciones Octaedro*. https://www.academia.edu/11931551/Voz_y_educaci%C3%B3n_Un_enfoque_narrativo_de_interpretaci%C3%B3n_de_la_realidad

Rubio, B. (2002). La exclusión de los campesinos y las nuevas corrientes teóricas de interpretación. *Nueva Sociedad, 182*, 21-33. https://biblat.unam.mx/hevila/Nuevasociedad/2002/no182/3.pdf

Ruiz Corral, J. A., Medina García, G., Ramírez Díaz, J. L., Flores López, H. E., Ramírez Ojeda, G., Manríquez Olmos, J. D., Zarazúa Villaseñor, P., González Eguiarte, D. R., Díaz Padilla, G., & Mora Orozco, C. de la. (2011). Cambio climático y sus implicaciones en cinco zonas productoras de maíz en México. *Revista Mexicana de Ciencias Agrícolas, 2*(2), 309-323. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-09342011000800011&lng=es&tlng=es

Ruiz Meza, L. (2010). Climate change, poverty and migration processes in Chiapas, Mexico. *International Journal of Labour Research, 2*(2), 187-210. https://www.researchgate.net/publication/319043295_Climate_change_poverty_and_migration_processes_in_Chiapas_Mexico

Ruiz Meza, L. (2012). Cambio climático y migraciones laborales en la frontera sur de México*. Luna Azul, 35*, 301-320. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S1909-24742012000200014&lng=es&tlng=es.

Ruiz Ruiz, J. (2009). Análisis sociológico del discurso: métodos y lógicas. *Forum: qualitative social research. Sozialforschung* , *10*(2). https://doi.org/ISSN1438-5627

Ruiz-Rivera, N., & Salgado-Hernández, M. del C. (2021). Capacidad comunitaria para el manejo de los recursos naturales en el espacio rural: una revisión de sus componentes causales. *Sociedad y Ambiente*, *24*, 1–31. DOI: 10.31840/sya.vi24.2274

Salgado-de Snyder, V. N., & Wong, R. (2007). Género y pobreza: determinantes de la salud en la vejez. Salud Pública de México. https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0036-36342007001000011

Sánchez Díaz, G. (2009). Los orígenes de la industria siderúrgica mexicana: Continuidades y cambios tecnológicos en el siglo XIX. *Revista TZINTZUN*. https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0188-28722009000200001

Sánchez, J. (2019). Recursos naturales, medio ambiente y sostenibilidad (Libros de la CEPAL). Comisión Económica para América Latina y el Caribe (CEPAL). https://doi.org/ISBN:978-92-1-047946-2

Santa Cruz Terán, F. F., Obando Peralta, E. C., Reyes Pastor, G. E., & Rodríguez-Balcázar, S. (2022). Investigación cualitativa: una mirada a su validación desde la perspectiva de los métodos de triangulación. *Revista de Filosofía*. https://doi.org/10.5281/zenodo.6663103

Secretaría de Medio Ambiente y Recursos Naturales. (2022). Acuerdo por el que se establecen las Reglas de Operación del Programa de Conservación para el Desarrollo Sostenible (PROCODES), para el ejercicio fiscal 2023. https://www.gob.mx/conanp/acciones-y-programas/programa-de-conservacion-para-el-desarrollo-sostenible-procodes-2023

Siso Martín, J. (2007). La información a los pacientes como presupuesto de su autonomía: una visión particular de nuestros mayores. Disponible en http://www.ceoma.org/modules.php?name=News&file=print&sid=705.

Soares Moraes, D. (2006). Mujeres, agua, leña y desarrollo: estudio de caso sobre género y recursos naturales en los Altos de Chiapas. *Gestión y cultura del agua. Tomo II* (pp. 293–312). Instituto Mexicano de Tecnologías del Agua (IMTA) y

Colegio de Postgraduados en Ciencias Agrícolas (COLPOS). https://biblioteca.ecosur.mx/cgi-bin/koha/opac-detail.pl?biblionumber=000060046

Springer, M. L., & Newton, K. (2020). Gen Y (Millennial) and Gen Z Cultural Cohort Demographics: Social, Political and Economic Perspectives and Implications. *American Society for Engineering Education*. DOI: 10.18260/1-2--34700

Sundberg, J. (2015). Feminist Political Ecology. *The International Encyclopedia of Geography, Wiley-Blackwell & Association of American Geographers*. DOI: 10.1002/9781118786352.wbieg0804

Universidad Juárez del Estado de Durango. (s/f). Repositorio institucional. Universidad Juárez del Estado de Durango. Consulted May 8, 2024, from: http://repositorio.ujed.mx/jspui/handle/123456789/155

UNIVERSIDAD NACIONAL DE COLOMBIA. (August 23, 2023). Satélite Landsat. Esri. https://storymaps.arcgis.com/stories/ea0d0859cc9c412bb283e208fc04a3bf

Vaca Pardo, L. N., & Reyes-Hernández, H. (2021). Conocimiento tradicional y preservación de la agrobiodiversidad. Los casos de La Trinidad, en México y Kokonuco, en Colombia. *Tropical and subtropical agroecosystems*, *24*(45), 1–14. DOI: 10.56369/tsaes.3416

Vázquez García, V. (2001). Género y tenencia de la tierra en el ejido mexicano: ¿La costumbre o la ley del Estado? *Estudios Agrarios (18).* https://americalatinagenera.org/wpcontent/uploads/2014/07/doc_394_EJIDO_MEXICANO-1.pdf