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Livelihoods and Poverty in San Simon Zahuatlan, Oaxaca

Medios de vida y pobreza en San Simón Zahuatlán, Oaxaca

Marlen Martínez-Domínguez https://orcid.org/0000-0001-9840-0149

Centro de Investigaciones y Estudios Superiores en Antropología Social, México,
mmartinez@ciesas.edu.mx

Abstract: Local context and remoteness limit the ability of people in poverty to accumulate well-being and escape this condition. The objective of this work was to analyze how limited access to various forms of capital (human, natural, physical, social and financial) affects the diversification of livelihoods of households in San Simon Zahuatlan, Oaxaca. A mixed methodology was employed: the quantitative analysis used INEGI data, while the qualitative analysis involved interviews with 36 women from the municipality. The findings reveal that limited availability and degradation of land for cultivation, low human capital and a non-agricultural economy are interconnected, creating a link that restricts families' ability to escape poverty. This highlights the need to implement targeted public policies that simultaneously promote access to land, education, employment, and access to basic services.

Keywords: poverty, education, land scarcity, non-agricultural employment, migration.

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Resumen: El contexto local y la lejanía limitan la capacidad de las personas en situación de pobreza para acumular bienestar y salir de dicha condición. El objetivo de este trabajo fue analizar cómo el limitado acceso a los capitales (humano, natural, físico, social y financiero) condicionan la diversificación de medios de vida de los hogares de San Simón Zahuatlán, Oaxaca. Se empleó una metodología mixta: en el análisis cuantitativo se utilizaron datos del INEGI y en el cualitativo se entrevistaron a 36 mujeres del municipio. Los hallazgos muestran que la poca disponibilidad y la degradación de tierras para cultivar, el bajo capital humano y una economía no agropecuaria se entrelazan para formar un vínculo que limita la salida de la pobreza de las familias. Lo anterior plantea la necesidad de implementar políticas públicas focalizadas e impulsar de forma simultánea el acceso a la tierra, a la educación, el empleo y a los servicios básicos.

Palabras clave: pobreza, educación, escasez de tierra, empleo no agropecuario, migración.

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Introduction

Mexico has experienced a reduction in multidimensional poverty, decreasing from 41.9% in 2018 to 36.3% in 2022. In other words, nearly four out of every ten people experienced a deprivation of their social rights and had a monthly per capita income insufficient for the purchase of a basic food basket as well as other goods and services. Among indigenous populations, the most prevalent deprivation is access to nutritious, high-quality food, with three out of every ten individuals affected by this shortfall (Coneval, 2022).

This article examines Sustainable Livelihoods (SL) in San Simon Zahuatlan, a municipality in the Mixteca region of Oaxaca, which exhibits the highest percentage of people living in poverty in Mexico, according to the National Council for the Evaluation of Social Development Policy (2020). Sustainable Livelihoods refer to the assets or resources available to households to mitigate risks in a context of vulnerability (Department for International Development, 1999). Although Oaxaca experienced a reduction in poverty between 2018 and 2022, from 64.3% to 58.4%, there was an increase in deficiencies in access to health services and food, while indicators related to social security, basic services, as well as housing quality and space, improved (Coneval, 2022).

There is an extensive body of literature examining the determinants of poverty in various contexts across Mexico (Mora-Rivera *et al.,* 2024; Ávila-Foucalt & Rodríguez-Robayo, 2018; Garza-Rodríguez, 2016; Winters & Chiodi, 2011). Initially, research focused on factors affecting agricultural productivity, as severe poverty was predominantly viewed as a rural phenomenon. Over time, however, attention has shifted toward factors such as non-agricultural employment, education, and health (Martínez-Domínguez *et al*., 2019; Alkire & Santos, 2014).

The key dimensions of well-being involve the accumulation of endowments in health, education, and assets, which serve as resources to enhance individuals' voice and bargaining power in household decision-making, access to capital, and economic independence. These assets are generally inherited, acquired, or accumulated throughout the life course, and include human capital (formal education), physical capital (machinery and livestock), financial capital (savings), natural capital (farmland), and social capital (networks) (World Bank, 2011). This perspective is grounded in Sen's capabilities approach (1993), which defines human development as the expansion of individual freedoms to

achieve what they have reason to value. In this context, the Sustainable Livelihoods Approach (SLA) examines the link between poverty, livelihood strategies, and vulnerability (Ávila-Foucalt & Rodríguez-Robayo, 2018).

According to Guo and Liu (2021), land is the most important form of wealth for the poor and holds a triple attribute, as a resource, an asset, and capital, by fostering rural development through production, livelihood, and ecological functions. However, limited availability and poor land quality are major contributors to poverty. Within this framework, legal certainty regarding land tenure strengthens asset bases and enhances the resilience of households living in poverty (Department for International Development, DFID, 1999). This study focuses on the interrelation among land, education, and employment. The literature on sustainable livelihoods highlights that these forms of capital, and the interactions between them, play a critical role in shaping potential pathways out of poverty (Fierros-González *et al.,* 2020; Ávila-Foucalt & Rodríguez-Robayo, 2018).

Based on the qualitative analysis, it was identified that sustainable livelihoods in San Simon Zahuatlan depend on households' access to key assets such as land, education, and employment. The information made it possible to examine the relationship between limited human capabilities, including food insecurity, educational lag, poor health, unemployment, and both the scarcity and degradation of farmland, all of which collectively hinder the ability of individuals in the country's poorest municipality to escape poverty.

In this regard, Bird *et al.* (2022) identify the following strategies for escaping poverty: (a) increasing the value of agricultural production through agricultural extension services and rural infrastructure; (b) diversifying livelihoods; and (c) exiting agriculture altogether. Their study found that strategy (b) was more commonly adopted than (a), while only a minority pursued option (c). Along these lines, Dobler-Morales *et al*. (2022) report that access to land and education are key variables that explain the diversification of livelihood strategies.

Investment in assets is critical to livelihood strategies and income generation, as "through asset accumulation, households build resilience and sustain their exit from poverty" (Diwakar & Shepherd, 2022: 16). Similarly, formal education enhances household members' ability to obtain employment, develop resilience, and generate alternatives for escaping poverty. Higher educational attainment is associated with greater

poverty reduction (Dobler-Morales *et al*., 2022). However, the weak link between education and the labor market limits the benefits of schooling. Furthermore, the low levels of educational attainment in Indigenous contexts hinder efforts to escape poverty (Mora-Rivera *et al*., 2024). Research on poverty indicates that household-level factors, such as a high dependency ratio, low educational attainment of the household head, lack of non-agricultural employment, and scarcity and degradation of arable land, contribute to the persistence of poverty (Martínez-Domínguez *et al*., 2019; Bird *et al*., 2019).

The document is organized as follows. Section Two presents the conceptual framework that guides the study. The method used to analyze the qualitative data is described in Section Three. The following section contains the findings and discussion. Finally, the conclusions and/or reflections are presented.

Literature Review: The Land–Education–Employment Nexus

Figure 1[1] presents a diagram of the land–education–employment nexus. This study addresses three key relationships: (i) Relationship "A" explores the link between the limited availability and degradation of arable land and educational underachievement; (ii) Relationship "B" examines the connection between low educational attainment and temporary low-skilled migration[2], as well as the near absence of non-agricultural employment, defined as wage and self-employment of household members in the manufacturing, industrial, commercial, and service sectors (Barrett & Reardon, 2000); and (iii) it outlines a vicious cycle of temporary low-skilled migration that places additional pressure on agriculture, thereby exacerbating land degradation and scarcity. These dynamics, in turn, limit households' ability to generate agricultural income and reflect the lack of local conditions for business development.

Studies on rural and Indigenous poverty in Mexico have found that the poorest populations display characteristics that differ from the general poor population (see Table 1). At the *household* level, these include high dependency ratios and low educational attainment of the household head; at the *institutional* level, restrictive political

1 The figures and tables are included in the Appendix at the end of this article.

2 People temporarily migrate to Mexico City, Puebla, Monterrey, and Guadalajara to work in informal jobs.

regulations; in terms of *livelihoods*, a scarcity of non-agricultural employment; and regarding *natural resources*, limited land availability, soil degradation, and environmental risk all contribute to poverty (Mora-Rivera *et al*., 2024; Dobler-Morales *et al*., 2022). This study offers relevant insights into the factors driving Indigenous poverty by exploring how combinations of land, education, and employment dynamics shape this phenomenon.

The Land–Education–Employment Nexus in Oaxaca

Oaxaca is not the only state facing land limitations, employment scarcity, or low human capital. However, the extent to which these challenges are concentrated in certain localities within the state is what makes the interplay of these factors particularly relevant in driving and sustaining poverty. In 2020, of the seven municipalities in Mexico where 90% or more of the population lived in poverty, four were located in Oaxaca (San Simon Zahuatlan, Coicoyan de las Flores, San Francisco Teopan, and San Lucas Camotlan), two in Chiapas (San Juan Cancuc and Chanal), and one in Guerrero (Cochoapa el Grande) (Coneval, 2021). The following section provides a characterization of the population, land ownership, education, and employment in the state.

According to 2020 census data, 51% of the population lives in localities with fewer than 2,500 inhabitants (INEGI, 2020). Data from the 2022 Agricultural Census indicate that Oaxaca has 9.2 million hectares of rural land, of which 1.9 million hectares are used for agricultural production or livestock raising. The average land area per production unit is 2.9 hectares (INEGI, 2022). This, combined with the region's rugged terrain and soil degradation, makes it increasingly difficult to save, accumulate assets, and escape poverty through agriculture, especially in the absence of non-agricultural employment. As a result, given the severe lack of job opportunities, people migrate temporarily to other cities in Mexico (Langlé *et al*., 2018).

In terms of education, low levels of educational attainment prevail in the state, further limiting access to employment opportunities. Schooling is generally of poor quality, with low completion rates. The Indigenous population has the lowest average number of years of schooling, with only five years on average (INEGI, 2020). This situation is due to multiple factors, including limited school coverage,

poor infrastructure conditions, and a lack of materials and human resources (Instituto Nacional para la Evaluación de la Educación, 2018).

In terms of employment, the agricultural sector is the main source of work in Oaxaca. According to data from the National Survey on Occupation and Employment (ENOE), in the third quarter of 2023, the employed population in Oaxaca totaled 1,940,000 people working in maize and/or bean cultivation, as well as supporting other agricultural and commercial activities in establishments (INEGI, 2023).

Data and Methodology

This article is based on a mixed-methods approach that integrates quantitative data and qualitative information from a gender perspective (Kanbur & Schaffer, 2007; Creswell, 1999). The quantitative component draws on secondary data sources, including the National Council for the Evaluation of Social Development Policy (Coneval), the 2020 Population and Housing Census, and the Agricultural Census from the National Institute of Statistics and Geography (INEGI).

The qualitative analysis is based on in-depth interviews with 36 women from seven neighborhoods in San Simon Zahuatlan, Oaxaca, conducted in July 2022.[3] A situated gender-sensitive ethnographic approach was employed, aimed at "gaining first-hand understanding of the diverse experiences of women, the unequal contexts that arise in hierarchical situations between men and women, as well as among women themselves" (Sciortino, 2012: 48). The interviews were conducted using the "snowball sampling method", whereby interviewees referred other women to share their perspectives on education, nutrition, migration, health, socioeconomic conditions, work and caregiving, rest, and leisure. The testimonies collected offered valuable insights into the living conditions of the inhabitants of this Mixtec municipality. The information was analyzed by identifying key categories and relationships, with detailed coding and interpretation using Atlas ti.[4]

3 The information was collected through the project 548 *Women's Civic Participation in the Fight Against Poverty in Rural Municipalities of Mexico 2015-2030: From the Re/Signification of Local Identities to Federal Public Policy*.

4 Acknowledgment to Alma Mildred Castellanos Cruz for her contribution to the systematization of the data.

Gender perspective is "a cultural construct of sexual differences that refers to the distinctions and inequalities between femininity and masculinity, and to the relationships between them" (Batthyány, 2008:193). The sexual division of labor is a central category within gender studies, assigning women to the private sphere and men to the public sphere (Batthyány, 2022). In this regard:

> A gender perspective entails: i) acknowledging the power dynamics between genders, which generally privilege men as a social group and disadvantage women; ii) recognizing that these relations are socially and historically constructed and form an integral part of individual identities; and iii) understanding that they permeate the entire social fabric and intersect with other social structures, such as class, ethnicity, and age (Gamba, 2007: n.p.).

The characteristics of the 36 women interviewed are as follows: their average age is 30 years; 50% have completed secondary education, 33% have completed primary education, and 14% have not attended school. All of them engage in domestic and caregiving work. In addition, 80% of the women, beyond their unpaid labor, participate in sewing soccer balls, an activity that helps supplement household income, and work in agricultural production for family sustenance.

Results

Key Characteristics of Indigenous Poverty in San Simon Zahuatlan, Oaxaca, Mexico

Based on statistics from Coneval and INEGI, a sociodemographic overview of San Simon Zahuatlan is presented. As shown in Table 2, the municipality is generally characterized by low levels of educational attainment, high illiteracy rates, and limited employment opportunities.

In terms of poverty indicators, 99.6% of the population lives in poverty, and the municipality has been classified as having a very high marginalization index (see Table 3). According to Coneval, in 2010 the municipality ranked sixth in the country, in 2015 it moved to tenth place, and by 2020 it ranked first nationwide (Coneval, 2020). Likewise, the marginalization index remained very high throughout the 2010–2020 period.

Between 2010 and 2020, poverty in the municipality showed a gradual increase. These figures suggest that escaping poverty is particularly difficult in areas facing multiple structural challenges stemming from the interrelation between land, education, and employment (see Table 3).

According to Coneval's multidimensional poverty measurement, between 2010 and 2020, the most severe deprivations in the municipality[5] were related to access to social security and health services (see Figure 2).

Land, Education, and Employment as Factors in Poverty Reduction

The following section analyzes the factors of education, employment, and land in relation to poverty, drawing on both quantitative and qualitative data derived from secondary sources and in-depth interviews with women from the municipality.

Land as a Means of Sustainable Livelihood

Quantitative data point to the limited availability and degradation of arable land, which constitutes the first element of the land –education–employment nexus. According to the 2022 agricultural census, the municipality had a total of 4,609 hectares, of which only 563 were suitable for agricultural use, while 4,046 hectares had no agricultural or forestry use. In the same year, there were 272 agricultural producers, meaning that the average landholding per farmer was 2.06 hectares (INEGI, 2022).

Of the 563 hectares used for agricultural production, 194 were devoted to annual crops, 32 to perennial crops grown outdoors, and 337 hectares were uncultivated. Regarding labor, 236 men and 36 women worked as primary producers in the 272 production units, with significant support from family members, 237 men and 257 women, highlighting the high level of female involvement in agricultural activities. In terms of technology use, 93% of production units relied on animal traction with plows, while only 2% used pesticide spraying equipment. Notably, of the 272 production units, only one used a rented tractor for agricultural work (INEGI, 2022).

5 In Mexico, municipal-level poverty has been estimated every five years since 2010 by Coneval.

Regarding livestock farming, 16 households in the municipality were engaged in animal breeding, of which 7 raised cattle, 6 raised pigs, 7 raised goats, 4 raised turkeys, 1 raised horse, and 3 raised donkeys, but none of them vaccinated or dewormed the animals. Of the total number of cattle (565 heads), 204 were cows, 211 were working cattle, 5 were for fattening, 40 were breeding bulls, and 105 were calves. In terms of the production system, 20% of the 565 cattle were raised through free grazing, while 80% were raised with controlled grazing. As for access to credit, of the 272 units, 7 applied for and were granted credit for livestock production. Of the total units (272), 47.06% received support from one of the federal government programs: 32.03% from the Production for Well-being program, 56.25% from the Fertilizer for Well-being program, and 39.84% from the Sowing Life program (INEGI, 2022).

Among the challenges faced by agricultural production units, 77.5% of the 272 units were affected by climatic factors, with drought being the most prevalent (98.6%), followed by strong winds (24.5%) and hail (9.6%). In addition, 52.61% of the agricultural production units were damaged by biological factors, such as pests (79%), diseases (1.8%), and other biological agents (36.9%). Agricultural producers reported that the development of agricultural activities was negatively impacted by the high cost of inputs and services (87%), soil fertility loss (70%), transportation difficulties (62%), storage challenges (41%), the advanced age or illness of the producer (5%), and labor shortages (5%) (INEGI, 2022).

As for the sociodemographic characteristics of the municipality's producers, of the 272 agricultural producers, 88% are men and the remainder are women. In terms of age distribution, 13% are between 18 and 29 years old; 32% between 30 and 44; 46% between 45 and 64; 8% between 65 and 80; and 0.74% are over 80 years old. As for educational attainment, 46% of producers have completed primary education, 18% secondary education, and 1% upper secondary education. In terms of ethnic origin, 99.6% self-identify as Indigenous and are Mixtec speakers. Additionally, 21% of producers engage in an activity other than agriculture. With respect to time devoted to agricultural production, 46% work more than six months per year in agriculture, 21% between three and six months, and 32% up to three months. As for government support, 6.5% of producers aged 65 and older receive a benefit through the *Pensión*

para el Bienestar de las Personas Adultas Mayores program (INEGI, 2022). These data reveal that the typical profile of a producer is that of an Indigenous man, between 45 and 65 years of age, with only a primary school education.

The results of the qualitative data reveal that limited land availability and severe soil degradation for cultivation are major issues in San Simon Zahuatlan. Land tenure and fragmentation, soil degradation, climate phenomena such as drought, and the presence of pests were identified as key limitations to agricultural growth and poverty reduction. Land plots are small, making agricultural production insufficient to ensure year-round food security. This situation leads to food insecurity, including child malnutrition, and prevents the generation of surplus for commercialization, hindering savings, investment, and capital accumulation. In addition, households are exposed to market price volatility and increases in agricultural product prices may further aggravate poverty (Leroy *et al*., 2023; Dobler-Morales *et al*., 2022; Velasco & Cantellano, 2021; Langlé *et al*., 2018).

Land rental does not occur in the municipality; however, land is lent within families, where members cultivate it to support the extended family.

> Interviewer: Do you have land?
>
> Interviewee: No, we only have a small plot, but it belongs to my grandfather.
>
> Interviewer: What do you plant and harvest?
>
> Interviewee: Corn, beans, squash, the basics. We're not planting right now because the rain is late. What if we plant and nothing grows? Fertilizer is expensive. If it grows, great. If not, well, we'll see what God says, maybe next year. It's very dry now. Before, everything would be green by June. Now it's already the end of July, and it's still the same. It hasn't rained yet so we can start working. *(*31-year-old woman from the Cristo Rey neighborhood)

Some of the key characteristics of agricultural production in the municipality include small landholdings per farmer; plots located on mountain slopes, which are exposed to wind and erosion, leading to nutrient loss; reliance on rainfed agriculture; use of chemical fertilizers; and the use of animal traction or digging sticks (*coa*) for farming tasks. These conditions underscore the need to seek alternatives for the development of sustainable agriculture in the region. In this regard, Orozco-Ramírez *et al*. (2020) propose revisiting a pre-Hispanic

technique native to the Mixteca Alta region known as *maíz cajete*, a cultivation method that involves planting on sloped terrain where soil nutrients are captured, and rainwater is retained in depressions locally known as *jollas*. Crops are planted deep in the soil to take advantage of residual moisture before the rainy season. Among the advantages of this technique are its drought resistance and higher yields.

Education as Capital for Diversifying Survival Strategies

The second element of the land-education-employment link focuses on education, characterized by low levels of schooling within the population, primarily obtained through local basic education institutions. The various challenges faced by the local education sector are analyzed, examining how these issues impact poverty. This includes an exploration of the educational offerings, the cost of education, and the investment in the education of children.

With respect to educational infrastructure, the municipality has four preschools, six primary schools, two secondary schools, and one *telebachillerato* (a type of distance-learning high school in rural areas of Mexico) (INEGI, 2024); however, some of the facilities are insufficient, and others are in poor condition. It is worth noting that the telebachillerato serves a small number of students because most adolescents at that level do not continue their studies due to lack of financial resources.

Dropping out of school is the result of a lack of financial resources and other constraints experienced by households, as well as the limited number of basic and upper secondary education centers. This reflects the impact of poverty on education and, conversely, how low educational attainment undermines the ability to escape poverty. Qualitative data show that school completion rates are very low, particularly among women. Among younger generations, completing primary school and attempting to attend *telesecundaria* (a distance-learning lower secondary education model offered in rural Mexico) has become somewhat more common for their children; however, very few continue studying beyond lower secondary education.

Qualitative data show that several factors contribute to school dropout in the municipality: (1) poverty, as children from lower-income families are more likely to leave school; (2) temporary circular migration, since children often travel with their parents to cities such as

Mexico City, Puebla, and Guadalajara, which interrupts their learning; (3) grade repetition, largely due to frequent absences caused by repeated migration; (4) the gap in educational infrastructure between the municipal seat and the surrounding neighborhoods, particularly in the more remote areas where there are no schools at any level; (5) long distances to secondary and upper secondary schools, as students sometimes have to walk for up to an hour along dirt roads; (6) low quality of education, linked to the curriculum and poor learning outcomes; (7) inadequate school facilities, such as the lack of properly functioning restrooms; (8) the absence of a local labor market, which makes it difficult for families to keep their children in school; (9) the involvement of children in agricultural labor; and (10) the lack of bilingual instruction, as teachers do not speak Mixtec and the teaching–learning process occurs in Spanish, even though Mixtec is commonly spoken at home.

> Interviewer: Why did you stop studying?
>
> Interviewee: Because there was no more school here. There was just the telesecundaria, and then I dropped out. I would have liked to continue studying, but the only options were in Huajuapan or Amatitlan, and I couldn't go. The thing is, here it's a village with no jobs, we don't have money, so I couldn't continue my studies (25-year-old woman from the Buena Vista neighborhood).
>
> Interviewee: Yes, here we speak Mixtec, and sometimes the children don't understand Spanish. They go to the teachers, and they speak Spanish, but the children can't understand much because they aren't used to speaking Spanish. In the family, we mostly speak Mixtec. That's the difficulty; they don't understand much. And now, with the pandemic (Covid-19), he didn't go to school very much. It wasn't long, just one or two hours, three times a week. He learned, but just a little, not as much as before. Before, they would go every day, from 9 AM to 12 PM, or even until 1 PM. Now, it's not like that. They go for a little while and then return. He comes home with his homework, and sometimes I help him, but sometimes I can't because I have other tasks to do, like washing clothes and cooking. And right now, it hasn't rained, so we've been working a little bit, but there's no time for anything else (25-year-old woman from the Buena Vista neighborhood).

The qualitative evidence confirmed that migration is directly linked to the lack of educational progression, reinforcing the connection between land scarcity, education, and migration.

> Interviewee: ...Right now, my daughters are no longer going to school. We left because we told them we were going to Mexico. We left, and I took a while to come back here, and the principal said that if we were gone for too long, about two months, the children wouldn't be accepted back in school. That's what happened to me; I came back too late, and they didn't accept my daughters. They're staying home now, and they won't go to school until next month, after the holidays, according to what the principal said (26-year-old woman from the Cristo Rey neighborhood).

The costs of basic education (preschool, primary, and secondary) entail expenses that lead to school dropout. Sending children to school is too expensive for most families, due to enrollment fees and the purchase of materials, as stated in the following interview.

> Interviewee: There are many children who don't go to school because they don't have their materials, like pencils, crayons, or notebooks (26-year-old woman from the Cristo Rey neighborhood).

These expenses increase with the purchase of uniforms and school supplies. Additionally, parents participate in maintaining school facilities, such as cleaning classrooms and the playground. Moreover, in most of the municipality's localities, there are no school cafeterias. The *Cocina Comedor Nutricional Comunitario* program, implemented by the Government of the State of Oaxaca, provides meals to children, adolescents, and older adults (Government of Oaxaca, 2022). In this regard, one interviewee mentioned:

> Interviewee: There are cafeterias, but only in certain areas, not in all neighborhoods, just in some. Yes, it's something we're going to address with the people from the *Secretaría del Bienestar* and DIF to see what's going on. Because also in Tecolote, that's what they said, that cafeteria has nothing, just some sheets of metal, and it stopped functioning. This is related to the new administration of the president who cut the full-time schools, and the children stopped receiving meals, but this is having consequences because the children need to be well-fed (36-year-old woman from the El Sabino neighborhood).

Based on qualitative data, it was observed that for parents, it is difficult to prioritize their children's education, particularly keeping them in school, because it is challenging for families to afford the materials and supplies required by teachers.

> Interviewee: ...Due to lack of money, here in the village, there really are no places to work and earn money, and it's because of the lack of money that I didn't continue my studies (28-year-old woman from the Cristo Rey neighborhood).

The low levels of education in household leadership, combined with educational expenses, temporary and permanent migration, and other factors, contribute to school dropout, impacting the current and future abilities of household members to engage in different livelihoods. People without higher secondary education are unlikely to secure well-paid employment outside the community. In this regard, Acosta and Pérez-Santillán (2023) state that completing higher secondary education is the minimum requirement to avoid poverty in urban areas, a situation that traps residents in subsistence means, primarily in agriculture, a finding confirmed by other studies on education and poverty (Mora-Rivera *et al*., 2024; Dobler-Morales *et al*., 2022). Diversifying livelihoods is crucial for poverty reduction, particularly in the context of limited land availability and soil degradation for farming, resulting in low agricultural productivity. Moreover, access to better-paid non-agricultural jobs outside the community depends on education and the capabilities of individuals, but in general, people barely complete basic education.

Livelihoods: Non-Agricultural Rural Economy and Limited Economic Activity

The third and final component of the land-education-employment link is livelihoods. However, in a slow non-agricultural rural economy, this limits opportunities for poverty reduction (Leroy *et al*., 2023; Diwakar and Shepherd, 2022; Ávila-Foucalt and Rodríguez-Robayo, 2018).

Qualitative data shows that most household members work in family agricultural activities, particularly in the cultivation of corn, beans, and squash. The municipality has no industries that employ people, so residents migrate temporarily (back and forth) to Mexico City, Puebla, Monterrey, and Guadalajara, and then return to the communities to continue working in agricultural tasks. Migrants typically find informal work as vendors of sweets and snacks, car washers, and some even beg for money.

In most of the neighborhoods in the municipality, women are also engaged in sewing soccer balls. The interviewees described it as occasional work, poorly paid (they receive 14 to 20 pesos per ball, and the time required to sew one ranges from four to five hours). They view this work as an activity that supplements their family income for

purchasing food. The limited availability of land, but above all, soil degradation and erosion, low levels of education, and lack of employment have made this type of informal work a strategy for generating income.

The above suggests that most people in the municipality with low levels of education face a significant challenge in escaping subsistence farming and poorly paid seasonal work, generating limited hope of escaping poverty. The qualitative analysis revealed the absence of formal employment in the study area, leading to a strong reliance on family subsistence agriculture, focused on the production of the milpa system (corn, beans, and squash for self-consumption), indicating very low diversification of livelihoods within households. This situation proves insufficient to meet food needs, forcing residents to purchase corn and beans at the market to supplement their annual consumption.

Families in better economic conditions own grocery stores, liquor stores, and other small businesses. There is almost no diversification of livelihoods towards non-agricultural activities in the municipality, due to the absence of industries that employ residents, as well as the scarcity of capital: human (low education levels), natural (small land area and high soil degradation), physical (very few livestock and no agricultural machinery), financial (lack of financial institutions and income from other sources of employment), and social (family migration networks are uncommon, as each family migrates individually to the cities). This limited availability of capital further complicates the situation for the residents of this municipality.

Livelihoods in San Simón Zahuatlan are extremely vulnerable to crises and pandemics, making it important to understand this risk environment in order to identify the obstacles to diversifying household livelihoods. The analysis focuses on the shocks related to land, education, and employment. One of the environmental shocks in the area is exposure to a variety of natural disasters, particularly drought, which impacts the families' food security.

In this regard, the works of Arceo-Gómez *et al*. (2020) and Rodríguez-Oreggia *et al*. (2012) analyzed the impacts of natural disasters on human development and poverty in Mexico; their findings reflect that floods and droughts have the most significant negative effects on both indicators. Similarly, De Silva and Kawasaki (2018) show that households relying on natural resources for their livelihoods are more exposed to the risk of climate events, making

them more vulnerable to economic losses caused by droughts and floods. To counteract the impacts of natural disasters, Arouri *et al*. (2015) propose actions such as promoting access to microcredits, remittances, and government subsidies.

The studies by Leroy *et al*. (2023) emphasize that climate events (increased temperatures, reduced rainfall, and changes in rainfall patterns) are factors that affect farmers in the high Mixteca region of Oaxaca. These environmental shocks cause families to become poorer. The study by Pérez-Uribe and Palacios (2024) found that droughts increase poverty levels, particularly due to the low yield of crops. Households use survival strategies such as eating twice a day, buying fewer foods (their diet is based on tortillas and beans), and temporarily migrating back and forth to cities to sell sweets and snacks, or to beg for alms.

Qualitative information indicates that the natural environment is one of the main factors affecting the harvest, through drought, wind, nutrient-poor soils, crop diseases, and pests, as well as economic shocks that impact the families' food supply.

> Interviewee: The adult population generally eats twice a day... when there's not enough, they eat tortillas with salt. I buy vegetables when there's money, but right now I can't buy any, so we don't eat fruit or anything like that, not even vegetables (woman, 26 years old, from Buena Vista neighborhood).

> Interviewee: ... some children eat three times a day; they eat early in the morning, then at noon they have more tortillas, and in the afternoon, they eat again (woman, 23 years old, from San Miguel neighborhood).

The above aligns with the work of Velasco and Cantellano (2021), who state that the main foods are corn and beans, and in the rainy season, wild plants; this results in households being exposed to food insecurity due to climatic factors that affect the production of these crops and the collection of edible plants.

In terms of environmental impacts, the qualitative data suggest that the lack of rainfall is a widespread problem in the study area, affecting the harvest of squash, corn, and beans. Farmers cultivate on steep slopes, which makes them highly vulnerable to the effects of climate phenomena and landslides. The interviewees mentioned that droughts, pests, and crop diseases increase poverty.

> Interviewee: ... right now, since the rain was delayed, we took longer to plant, we just finished planting (woman, 23 years old, from Cañada el Tecolote neighborhood).

> Interviewee: ... the planting season is in June and July, when it rains, we plant, but right now, since there's no rain, people have to go out and look for work because we have to buy corn to cook (woman, 28 years old, from Buena Vista neighborhood).

The scarcity of livelihoods is a widespread factor contributing to poverty in the municipality, particularly due to the low educational levels of heads of household, the absence of a productive sector that generates employment, and a nascent handicraft activity. The latter consists in the production of palm hats with limited market reach. Those who make the hats buy the palm from vendors in nearby towns.

The stitching of soccer balls is an activity that increases the workload of women, who, in addition to helping with agricultural and forestry production, also carry out domestic and care work, which takes a toll on their health.

> Interviewee: ... I stitch soccer balls. I get paid 18 pesos and it takes me three hours to finish one. That's not enough. Sometimes I prick myself with the needle and my hands get swollen. Sometimes my back hurts because I spend six hours sitting. I wake up very early, make tortillas, feed my siblings and parents, my father has diabetes, and my mother suffers from high blood pressure (woman, 26 years old, from Cañada el Tecolote neighborhood).

> Interviewee: ...No, in this case I don't have any support at all. I just rely on the little I earn from stitching soccer balls, and that's it. But support from IMSS or Prospera? No, I don't have access to that (woman, 20 years old, from Tres Cruces neighborhood).

Other livelihoods include social programs such as *Sembrando Vida* and *Beca para el Bienestar Benito Juárez de Educación Básica* (Benito Juárez Scholarship for Basic Education). However, most of the women interviewed said the following:

> Interviewees: ...my child receives the Benito Juárez scholarship. I've only received it four times; after that, I haven't received anything (25-year-old woman from the Buena Vista neighborhood).

> ...we're enrolled in the *Sembrando Vida* program. We go to the field to plant trees; we spend a long time there and get back home very late. Then we have to cook and clean the house. The work in the program is very demanding because the trees must not die, and if they do, they must be replaced (29-year-old woman from the 5 de Mayo neighborhood).

> ...the *Sembrando Vida* program involves a great deal of work, and it's both support and not support, because part of the funds must be reinvested. We are required to

> have 2,800 live plants on a 2.5-hectare plot. The issue here is the drought, plants die and must be repurchased, along with chemicals and seeds. Those of us in the program are reforesting and planting species like pitaya and nanche, even though fruit trees don't grow well here due to lack of water (22-year-old woman from the San Miguel neighborhood).

In this regard, the work of Hernández-Aguilar *et al*. (2023) highlights the lack of studies that assess the contribution of social programs such as *Pensión para Adultos Mayores* (Pension for Older Adults), *Becas Jóvenes Construyendo el Futuro* (Youth Building the Future Scholarships), and *Pensión para Personas con Discapacidad* (Disability Pension) to the well-being of individuals in rural communities in the Mixteca region of Oaxaca. Hernández-Aguilar *et al*. (2023) note that these social programs are essential for rural families due to the lack of opportunities; however, distrust and the absence of proper documentation are significant barriers to accessing them.

The Land–Education–Employment Nexus

Limited land availability and soil degradation, low levels of schooling, and very few non-agricultural livelihood opportunities exacerbate poverty in the municipality. Qualitative data show that in contexts of extreme scarcity and land degradation for cultivation, vulnerability increases, and the diversification of the rural economy is hindered. Likewise, the low educational attainment of residents prevents them from engaging with better-paying labor markets outside the municipality. This is compounded by low levels of private investment in isolated rural areas. Although people migrate temporarily, the conditions under which they do so are highly constrained, and thus circular or temporary migration does not constitute a viable pathway out of poverty. These results are consistent with the findings of Leroy *et al*. (2023), Dobler-Morales *et al*. (2022), Velasco and Cantellano (2021), and Bird *et al*. (2019).

The education sector in the region faces structural barriers such as the lack of school infrastructure, human and material resources, as well as economic, social, cultural, and road infrastructure conditions, all of which contribute to low school attendance. Few children from poor families complete secondary education, and even fewer finish high school. The impact of this is compounded

by structural forces within the labor market, where school dropout results in an adolescent population that neither studies nor earns a wage, further hindering poverty reduction and increasing vulnerability to impoverishment.

Despite the weak connection between the three factors discussed (land, education, and employment), families in the municipality develop survival strategies, such as relying on household members to contribute to subsistence farming of maize, beans, and squash; sharing food within extended families; gathering wild plants during the rainy season; adults eating twice a day and children three times; and migrating temporarily to cities to take up informal employment.

Conclusion

Poverty reduction in San Simón Zahuatlan is severely constrained by the land–education–employment nexus. Limited land availability, degradation, and erosion hinder agricultural yields, the primary livelihood activity in the region. The low level of productive diversification fails to provide employment opportunities for the local population, prompting people to migrate temporarily to other cities in the country. Additionally, low levels of education limit employment prospects, and the cost of education at all levels remains beyond the reach of most households, creating a poverty trap that is increasingly difficult to escape.

Reversing this situation requires territorial development and external demand sources for the rural economy, making the non-agricultural economy a potential alternative for reducing poverty. In this regard, the priority is to improve connectivity and access to these communities to encourage mobility. Second, it is essential to address the fundamental challenges faced by residents, such as the lack of water infrastructure to ensure access to potable water; invest in social programs focused on education, health, and nutrition; and strengthen the agricultural sector through soil improvement programs, traditional maize cultivation systems (*cajete maíz*), fertilizers, and high-yield seed varieties to ensure production levels meet household consumption needs. Additionally, encouraging group-based entrepreneurship initiatives could serve as a catalyst for labor-intensive employment in higher-value activities, where the creation of a product or service benefits the collective or

organization involved. In conclusion, comprehensive public policies are needed to strengthen human, physical, natural, financial, and social capital, ultimately improving the living conditions of populations facing the most severe structural disadvantages.

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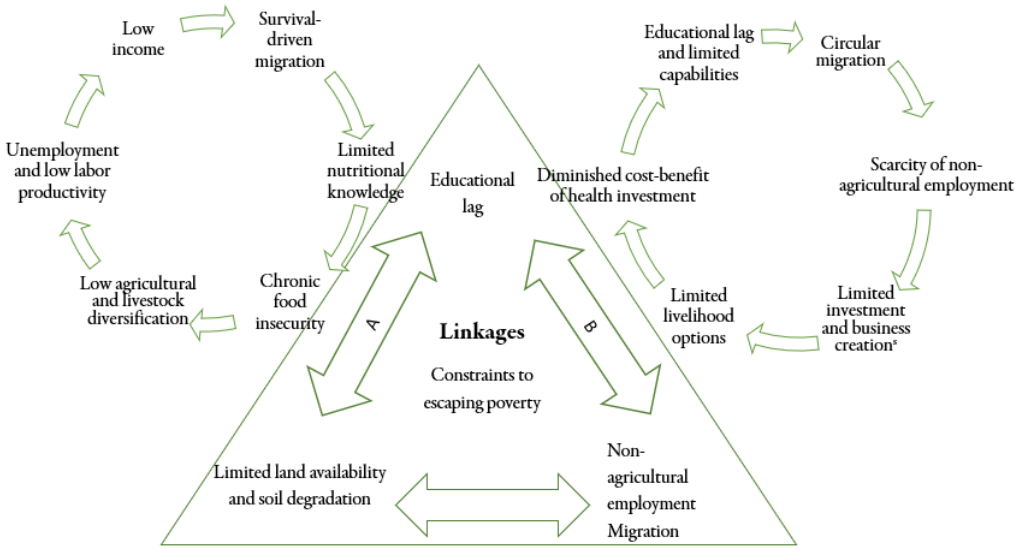
Appendix

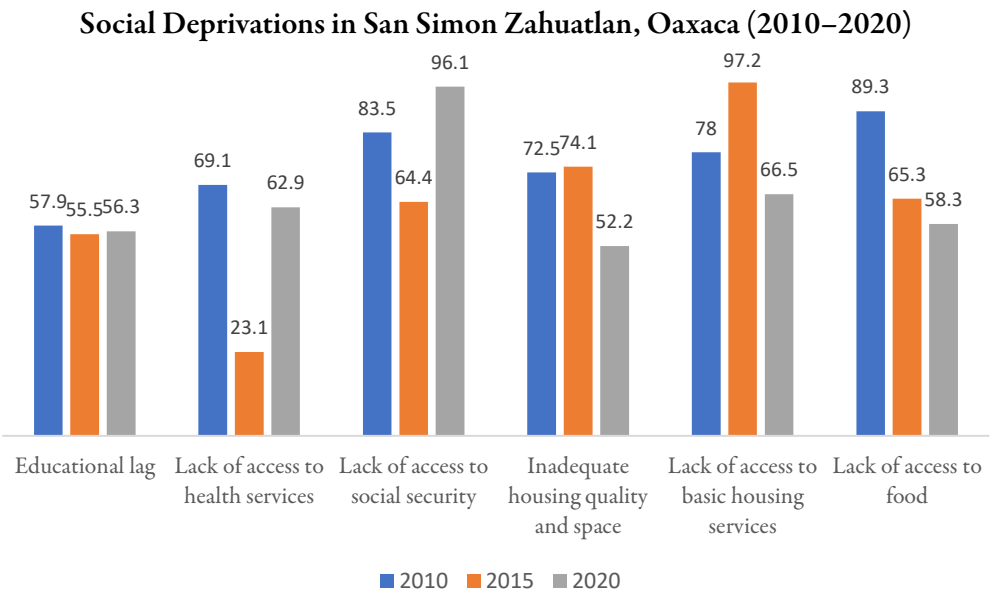
Figure 1

Linkages Among Constraints to Escaping Poverty in San Simon Zahuatlan, Oaxaca



Source: Based on Bird *et al.* (2022).

Figure 2



Source: Own elaboration based on data from Coneval (2020).

Table 1

Factors Explaining Poverty in Rural and Indigenous Contexts in Mexico

Poverty Factors	Maintains Poverty (=) Increases Poverty (+) Reduces Poverty (-)
Household	
High dependency ratio (children and older adults)	=
Female-headed household	=
Households with disabled and/or elderly members	=
Head of household with low educational attainment	=
Unemployment	=
Increase in household size and dependency ratio	+
Household members with a disability	+
Head of household with low educational attainment	+
Access to health security	-
Access to upper secondary education	-
Head of household with at least secondary education	-
Productive and Financial Assets	
Debt	+
Crop loss, high school tuition costs, high medical and funeral expenses	+
Informal saving and lending groups (tandas)	-
Savings	-
Acces to microcredit	-
Institutional Policy	
Cost of access to basic education and health services	=
Regulations and policies that hinder the non-agricultural economy	=
Targeting errors: exclusión from access to health services, free school meals, etc	=
Elimination of social security schemes	+
High school fees and sale of productive assets	+
Male abandonment of wife and children	+
Social security fee exemptions for the poorest	-

Poverty Factors	Maintains Poverty (=) Increases Poverty (+) Reduces Poverty (-)
Programs that promote agricultural production	-
Improved water supply and sanitation	-
Free school meals for the poorest children	-
Legal support for gender equity in land ownership and inheritance	-
Local governments enforcing child support	-
Livelihoods	-
Temporary work	=
Low labor market participation	+
Becoming a temporary agricultural worker	+
Job loss in non-agricultural businesses	+
Accumulation of productive assets such as land and livestock	-
Improvement in agricultural productivity	-
Livelihood diversification (agricultural and non-agricultural employment)	-
Non-agricultural employment or self-employment	-
Informal non-agricultural work with higher pay that allows saving and investment	-
Livestock loans	-
Receipt of remittances	-
Natural Resources	
Land scarcity, and soil fragmentation and degradation	=
Climate shocks	= +
Land scarcity, and soil fragmentation and degradation	+
Land rental	-
Land accumulation through agricultural surpluses	-

Source: Own elaboration based on Mora-Rivera *et al.* (2024) and Bird *et al.* (2022).

Table 2

Population Distribution by Sociodemographic Characteristics in San Simon Zahuatlan, 2020

Indicators	San Simon Zahuatlan
Total population	4,940
Average number of live-born children	3.15
Percentage of population with a disability[6]	256 (5%)
Population aged 3 and over who speak an Indigenous language	4,368 (88%)
Illiterate population[7]	1,138 (23%)
Average years of schooling [8] total	4.1
Employed population aged 12 and older [9]	604 (12%)
Population affiliated with a health service	1,819 (37%)

Source: Own elaboration based on data from INEGI (2020).

6 Persons who have great difficulty or are unable to perform at least one activity of daily living, such as seeing, hearing, walking, remembering or concentrating, bathing, dressing or eating, speaking or communicating.

7 Persons aged 15 and over who cannot read or write a simple message.

8 Result of dividing the total number of completed school grades by the number of persons aged 15 and over.

9 Persons aged 12 and over who carried out any economic activity during the reference week.

Table 3

Socioeconomic Indicators of San Simon Zahuatlan, Oaxaca

Indicators	San Simon Zahuatlan
Total population	
2010	3,759
2015	3,636
2020	4,940
Poverty rate	
2010	99% (3,722 persons)
2015	99.4% (3,613 persons)
2020	99.6% (4,925 persons)
Marginalization index	
2010	Very high
2015	Very high
2020	Very high

Source: Own elaboration based on data from Coneval (2020) and Conapo (2010, 2015, and 2020).

Marlen Martínez Domínguez holds a PhD in Strategies for Regional Agricultural Development. She is a Researcher for Mexico with the Secretariat of Science, Humanities, Technology, and Innovation (Secihti), assigned to the Center for Research and Advanced Studies in Social Anthropology (CIESAS) – Pacific South Unit, Mexico. Her research areas include poverty, rural development, and the appropriation of Information and Communication Technologies (ICTs). Recent publications include Morales *et al*. (2022), "Rural Indigenous Women and Poverty: The Impact of Disadvantages in Access to Resources" in *Culturales*, vol. 10, Mexico: UABC. Doi: https://doi.org/10.22234/recu.20221001.e649; Martínez-Domínguez, Marlen and Gómez Navarro, Dulce (2024), "The Digital Divide in Indigenous Areas as a Factor of Social Exclusion" in *Inmediaciones de la Comunicación*, vol. 19, no. 1, Uruguay: Universidad ORT Uruguay. Doi: https://doi.org/10.18861/ic.2024.19.1.3557;Martínez-Domínguez, Marlen *et al*. (2019), "Non-Agricultural Diversification, Poverty, and Gender in Rural Mexico" in *Agrociencia*, vol. 53, no. 6, Mexico: Colegio de Postgraduados. Doi: https://www.agrociencia-colpos.org/index.php/agrociencia/article/view/1854.