Node_List

Node	Dimension	Scale	Definition
Oviposition	Ecological	Plot	Laying of oothecae (egg pod) by female grasshoppers
Hatching	Ecological	Plot	1st Stage in grasshopper lifecycle: grasshoppers emerge from the eggs
Nymphs	Ecological	Plot	2nd Stage in grasshopper lifecycle. There are five consequtive nymph stages but, for simplicity, all five merged in one
Adult_Grasshoppers	Ecological	Plot	3rd Stage in grasshopper lifecycle. Grasshoppers have attained their largest size and can reproduce.
Reproduction	Ecological	Plot	Fertilization of grasshopper females
Grasslands	Ecological	Plot	Land use type where exotic or native grasses dominate
Secondary_Vegetation	Ecological	Plot	Land use type where diverse secondary vegetation grows, mostly herbs and shrubs associated to fallow periods
Milpa	Agronomic	Plot	Agricultural management characterized by a diversified maize-based polyculture, grown mostly for family consumption
Pesticides	Agronomic	Plot	Use of synthetic and commercial pesticides in agriculture
Herbicides	Agronomic	Plot	Use of synthetic and commercial herbicides in agriculture
Feeding_Resources	Ecological	Plot	Presence of edible plants for grasshoppers
Thermoregulation_and_Refuge	Ecological	Plot	Presence of plants and plant-made microenvironments that grasshoppers can use as refuge, for reproduction or to expose to sunlight
Monocultures	Agronomic	Plot	Agricultural management characterized by maize, alfalfa or other crops grown in monoculture, mostly for sale
Soil_Conditions	Ecological	Plot	Realization of biophysical conditions that allow for grasshopper ovoposition, egg survival and hatching (pH, temperature, texture, organic matter content)
Humidity	Ecological	Plot	Realization of soil and air humidity conditions that allow for grasshopper ovoposition, egg survival and hatching
Managed_trees	Agronomic	Plot	Presence of managed and used threes, agave, cacteceae and other perennial elements in and around plots; historically associated with milpa polycultures
Potential_Pest	Agronomic	Plot	Risk of grasshopper affecting maize plants at vulnerable stages or causing enough hervibore damage to become a pest
Pesticide_resistance	Agronomic	Plot	Resistance to commonly used insecticides that grasshoppers can express or evolve
Livestock	Agronomic	Plot	Presence of livestock in grasslands; in order of prevalence in Zaachila: sheep, goats, cattle
Agricultural_productivity	Agronomic	Plot	Qualitative relation between agricultural outputs (amount of maize or bean per area) to inputs (mainly fertilizers and pesticides in Zaachila)
Temperature_Increase	Ecological	Plot	Temperature increase in the grasshopper environments and microenvironments, with respect to its prefered or tolerated ranges
Birds	Ecological	Plot	Presence of insectivore birds that can feed on grasshoppers
Grasshopper_harvest_and_preparatio	Cultural	Village	Set of practices that some people from Zaachila perform to catch, store and prepare grasshoppers for human consumption
Local_markets	Social	Village	Local markets where grasshoppers and local dished are commonly found: Gastronomic, Central and Thursday markets
Grasshopper_consumption	Social	Village	Household habit of eating grasshoppers as a seasonal food
Traditional_food	Cultural	Village	Preparation and consumption of dishes and beverages prepared with local ingredients and recipies, be it at the household or community level
Nutrition	Social	Village	Amount of protein and essential aminoacids consumed by people
Household_income	Economic	Village	Overall income per domestic unit
Drinking_water	Social	Village	Availability of drinking water for households
Local_festivities	Cultural	Village	Realization of periodic celebrations and events that involve several households, a whole neighborhood, irrigation unit, the ejido or the whole community
Barrios_organization	Political	Village	Strength of neighborhood organization for collective action regarding festivities, productive activities and political actions
Tequios	Political	Village	Realization of this traditional figure for collective works; associated to reciprocal help in demanding stages of agricultural activities (e.g. harvest), community works, festivities and other activities; often mediated by assemblies and committees
Cultural_Expressions	Cultural	Village	Music, dance, art, designs, names, signs and symbols, performances, ceremonies, architectural forms, handicrafts and narratives, or other creative manifestations of cultural identity
Disinterest_in_agriculture	Social	Village	Lack of interest that mainly young people express towards agriculture
Diet_sustainability	Social	Village	Degree in which the local diet is a "diet with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affo
Recreation	Cultural	Village	Access to places or spaces for familiy and community recreation and wellbeing
Overall_urbanization	Land_use	Municipality	Total urbanized areas in the whole municipality, no matter of what type and from what previous type of cover or use
Forest	Land_use	Municipality	Areas covered by primary vegetation, which corresponds mostly to scrub, dry tropical forests, oak forests and oak and pine forest
Water_table_level	Environmental	Municipality	Level below which the pores in the soil and rock and saturated with water; indicator of water availability for irrigation and human consumption
River_degradation	Environmental	Municipality	Pollution, dissecation and overall ecological degradation of the seasonal and permanent streams and rivers found in Zaachila
Authorities_corruption	Political	Municipality	Illegal or dishonest behaviour by people or groups in positions of power, such as the head of the Municipality, the Ejido representatives, local agrarian judges, or public Notaries
Highway_and_Extractivism	Political	Municipality	Prevalece of projects, such as the Libreamiento Sur highway, and activities oriented to exploit natural resources from the region for national or global markets
Ejido_strength	Political	Municipality	Integrity of the ejido assembly and its organization stregth to exert the ejido rights and look after all of the ejidatarios
Municipality	Political	Municipality	Political and administrative authority of Villa de Zaachila
Irrigation_units_organization	Political	Municipality	Strength of irrigation units organization for collective action regarding water management, festivities, productive activities and political actions
Reforestation	Environmental	Municipality	Collective actions for tree planting, monitoring and watering
Community_conflict	Social	Municipality	Disagreement and confrontation between groups on the community, often leading to long term community fragmentation
Water_works	Environmental	Municipality	Works for water capture, infiltration and treatment in the area
Increase_irrigation	Agronomic	Municipality	Increase in the volume of water used to cover water needs for crops

Node_List

Node	Dimension	Scale	Definition
Irregular_water_extraction	Environmental	Municipality	Ilegal or clandestine extraction of underground water, mostly for sale to suburban areas in Zaachila and Oaxaca City
Waste	Environmental	Municipality	Solid waste produced and accumulated in the municipality
Distant_urbanization	Land_use	Municipality	Urbanization initiating in relatively small, isolated areas far from the main village; these areas are often sometimes in fallow or temporary or permanent agricultural disuse
Colonias_urbanization	Land_use	Municipality	Urbanization of areas among or surrounding the areas known as "colonias", mainly to the East of the municipality; often irregular
Villa_urbanization	Land_use	Municipality	Urbanization due to the radial or density growth of the old village
Common_use_land	Land_use	Municipality	Presence and maintenance of land whose allocation and use is decided collectivelly, mainly by the ejido assembly
Social_land_tenure	Political	Municipality	Prevalence of land allocated to ejidos or other figures of collectivelly managed land; in Zaachila it corresponds to the sum of the land allocated to all of the ejidos
Rainfed_agriculture	Land_use	Municipality	Agricultural land depending only on rain water
Irrigation_agriculture	Land_use	Municipality	Agricultural land where irrigation is practiced in the absence of rain
Landbrokers	Political	Municipality	Local or external actors specialized in buying land and selling it at higher prices, often after fractioning it
Irregular_occupation	Political	Municipality	Irregular use, settlement or possession of land by individuals or organized groups, who often fraction and urbanize it
Land_sale	Economic	Municipality	Change of land ownership through a commercial exchange, be it in an irregular or regular
Housing_needs	Social	Municipality	Need for the construction or allocation of houses for young generations in the village
Land_abandonment	Agronomic	Municipality	Temporary or permanent disuse of agricultural lands, without it being part of a planned fallow period
Drough	Environmental	External	Intensity and frequency of droughts affecting local agriculture
Oaxaca_City_expansion	Land_use	External	Urbanization due to the growth of the capital city of Oaxaca, mostly to the North of Zaachila
Health_problems	Social	External	Sanitary and health emergencies effecting at the municipality level (e.g. dengue, covid19)
Turism	Social	External	Frequency and intensity of turism in Zaachila, mostly focused on the gastronomic market

Edge_List

Source	Target	Sign	Scale	Types of evidence	References (see full reference list)
Oviposition	Hatching	Positive	Plot	Report, Scientific document	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Hatching	Nymphs	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Nymphs	Adult_Grasshoppers	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Nymphs	Potential_Pest	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Adult_Grasshoppers	Reproduction	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Adult_Grasshoppers	Potential_Pest	Positive	Plot	Report, Scientific document	SENASICA – SAGARPA Ficha técnica chapulín, del Val and Moreno Calles (2022)
Reproduction	Oviposition	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Grasslands	Feeding_Resources	Positive	Plot	Scientific document	López Martínez (2015), Aquino Olmedo, S. T. (2015), Pfadt (1994), Castellanos-Vargas, 2001
Grasslands	Thermoregulation_and_Refuge	Positive	Plot	Scientific document	López Martínez (2015), Aquino Olmedo, S. T. (2015), Pfadt (1994), Castellanos-Vargas, 2002
Grasslands	Soil_Conditions	Positive	Plot	Scientific document	López Martínez (2015), Aquino Olmedo, S. T. (2015), Pfadt (1994), Castellanos-Vargas, 2003
Grasslands	Humidity	Positive	Plot	Scientific document	López Martínez (2015), Aquino Olmedo, S. T. (2015), Pfadt (1994), Castellanos-Vargas, 2004
Secondary_Vegetation	Feeding_Resources	Positive	Plot	Scientific document, Interview, Official database	Several interviews, López Martínez (2015), Navarro-Nava (1999), Ramos-Elorduy (2016), iNaturalist Database
Secondary_Vegetation	Thermoregulation_and_Refuge	Positive	Plot	Scientific document, Interview	Several interviews, López Martínez (2015), Navarro-Nava (1999), Ramos-Elorduy (2016)
Secondary_Vegetation	Soil_Conditions	Positive	Plot	Scientific document, Interview	Several interviews, López Martínez (2015), Navarro-Nava (1999), Ramos-Elorduy (2016)
Secondary_Vegetation	Humidity	Positive	Plot	Scientific document, Interview	Several interviews, López Martínez (2015), Navarro-Nava (1999), Ramos-Elorduy (2016)
Secondary_Vegetation	Temperature_Increase	Negative	Plot	Scientific document, Interview	Several interviews, López Martínez (2015), Navarro-Nava (1999), Ramos-Elorduy (2016)
Secondary_Vegetation	Herbicides	Negative	Plot	Interview, Scientific document	Several interviews, González González (2020)
Milpa	Pesticides	Negative	Plot	Interview, Scientific document	Several interviews, González González (2020)
Milpa	Feeding_Resources	Positive	Plot	Interview, Scientific document, Official database	Most interviews, Ramos-Elorduy (2016), iNaturalist Database
Milpa	Thermoregulation_and_Refuge	Positive	Plot	Interview, Scientific document	Mercado1, López Martínez (2015), Ramos-Elorduy (2016)
Milpa	Soil_Conditions	Positive	Plot	Interview, Scientific document	BarrioNiño1, López Martínez (2015), Ramos-Elorduy (2016)
Milpa	Humidity	Positive	Plot	Scientific document	Mares-Guerrero et al (2024), Ramirez and Wright (2025)
Milpa	Monocultures	Negative	Plot	Interview, Workshop	Several interviews, WS_Ejidatarios
Milpa	Managed_trees	Positive	Plot	Scientific document	González González (2020), Beaupré et al (2021)
Milpa	Secondary_Vegetation	Positive	Plot	Scientific document	Gonzalez Gonzalez et al (2020), Moreno-Calles et al (2013), Plot visits 2015-2025
Pesticides	Hatching	Negative	Plot	Interview, Scientific document	Several interviews, Cerritos and Cano-Santana (2008)
Pesticides	Reproduction	Negative	Plot	Scientific document, Interview	BarrioNiño1, Cerritos and Cano-Santana (2008)
Pesticides	Adult_Grasshoppers	Negative	Plot	Interview, Workshop, Report	Most interviews / WS_Ejidatarios / SENASICA – SAGARPA Ficha técnica chapulín
Pesticides	Nymphs	Negative	Plot	Report, Workshop, Interview	SENASICA – SAGARPA Ficha técnica chapulín / Most interviews / WS_Ejidatarios
Pesticides	Pesticide_resistance	Positive	Plot	Scientific document	Hansen (1988), Ekström and Ekbom (2011), Cerritos and Cano-Santana (2008)
Pesticide_resistance	Potential_Pest	Positive	Plot	Scientific document	Hansen (1988), Ekström and Ekbom (2011), Cerritos and Cano-Santana (2008)
Herbicides	Reproduction	Negative	Plot	Official database, Interview, Scientific document	Roalo1, BarrioNiño2, SIAP 2007, SIAP 2022, Macarini et al (2025)
Herbicides	Soil_Conditions	Negative	Plot	Official database, Interview, Scientific document	Roalo1, BarrioNiño2, SIAP 2007, SIAP 2023, Macarini et al (2025)
Herbicides	Feeding_Resources	Negative	Plot	Official database, Interview	Roalo1, BarrioNiño2, SIAP 2007, SIAP 2024
Herbicides	Thermoregulation_and_Refuge	Negative	Plot	Official database, Interview	Roalo1, BarrioNiño2, SIAP 2007, SIAP 2025
Herbicides	Secondary_Vegetation	Negative	Plot	Official database, Interview	Roalo1, BarrioNiño2, SIAP 2007, SIAP 2022
Feeding_Resources	Nymphs	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Feeding_Resources	Adult_Grasshoppers	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Feeding_Resources	Reproduction	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Thermoregulation_and_Refuge	Oviposition	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Thermoregulation_and_Refuge	Hatching	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Thermoregulation_and_Refuge	Nymphs	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Thermoregulation_and_Refuge	Adult_Grasshoppers	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Thermoregulation_and_Refuge	Reproduction	Positive	Plot	Scientific document, Report, Interview	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín, Several interviews on "encuachado"
Monocultures	Milpa	Negative	Plot	Interview, Workshop	WS_Ejidatarios, Several interviews
Monocultures	Feeding_Resources	Positive	Plot	Interview, Scientific document	López Martínez (2015), Several interviews
Monocultures	Thermoregulation_and_Refuge	Positive	Plot	Interview, Scientific document	López Martínez (2015), Several interviews
Monocultures	Pesticides	Positive	Plot	Interview, Workshop	Several interviews, WS_Ejidatarios
Monocultures	Herbicides	Positive	Plot	Interview, Scientific document	González González (2020), Roalo1
Soil_Conditions	Oviposition	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Soil_Conditions	Hatching	Positive	Plot	Scientific document, Report	Serrano and Ramos (1990), Cano-Santana (1997), SENASICA – SAGARPA Ficha técnica chapulín
Humidity	Oviposition	Positive	Plot	Scientific document	Aquino Olmedo (2015)
Humidity	Hatching	Positive	Plot	Scientific document	Aquino Olmedo (2015)
Managed_trees	Pesticides	Negative	Plot	Scientific document, Participant observation	Gonzalez Gonzalez et al (2020), Plot visits 2015-2025
Managed_trees	Herbicides	Negative	Plot	Scientific document, Participant observation	Gonzalez Gonzalez et al (2020), Plot visits 2015-2025
Managed_trees	Feeding_Resources	Positive	Plot	Scientific document, Official database	Cerritos and Cano-Santana (2008), iNaturalist Database
Managed_trees	Thermoregulation_and_Refuge	Positive	Plot	Scientific document	Cerritos and Cano-Santana (2008)
Managed_trees	Soil_Conditions	Positive	Plot	Scientific document	Cerritos and Cano-Santana (2008)
Managed_trees	Humidity	Positive	Plot	Scientific document	Cerritos and Cano-Santana (2008)
Potential_Pest	Milpa	Negative	Plot	Report	SENASICA – SAGARPA Ficha técnica chapulín
Potential_Pest	Grasslands	Negative	Plot	Report	SENASICA – SAGARPA Ficha técnica chapulín
Potential_Pest	Secondary_Vegetation	Negative	Plot	Report	SENASICA – SAGARPA Ficha técnica chapulín
Potential_Pest	Managed_trees	Negative	Plot	Report	SENASICA – SAGARPA Ficha técnica chapulín
Temperature_Increase	Humidity	Negative	Plot	Scientific document	Cerritos and Cano-Santana (2008)
Soil_Conditions	Agricultural_productivity	Positive	Plot	Scientific document	Beaupré et al (2021)
Potential_Pest	Agricultural_productivity	Negative	Plot	Report	SENASICA SENASICA – SAGARPA Ficha técnica chapulín
Birds	Nymphs	Negative	Plot	Interview, Scientific document	BarrioNiño1, Aquino-Olmedo (2015)
Birds	Adult_Grasshoppers	Negative	Plot	Interview, Scientific document	BarrioNiño1, Aquino-Olmedo (2015)
Nymphs	Birds	Positive	Plot	Interview, Scientific document	BarrioNiño1, Aquino-Olmedo (2015)
Adult_Grasshoppers	Birds	Positive	Plot	Interview, Scientific document	BarrioNiño1, Aquino-Olmedo (2015)
Birds	Potential_Pest	Negative	Plot	Scientific document	Aquino-Olmedo, 2015
Grasshopper_harvest_and_preparation	Community_conflict	Negative	Village	Scientific document	Cohen et al. (2024)
Grasshopper_harvest_and_preparation	Recreation	Positive	Village	Interview, Scientific document	Several interviews; Cohen et al. (2024)
Grasshopper_harvest_and_preparation	Grasshopper_domestic_consumption	Positive	Village	Scientific document, Interview	Several interviews, Ramos-Elorduy (2016), Sosa Marcos (2015)
Grasshopper_harvest_and_preparation	Local_markets	Positive	Village	Scientific document, Interview	Several interviews, Ramos-Elorduy (2016), Sosa Marcos (2015)
Grasshopper_harvest_and_preparation	Adult_Grasshoppers	Negative	Village	Scientific document, Interview	Several interviews, Ramos-Elorduy (2016), Sosa Marcos (2015)
Grasshopper_harvest_and_preparation	Nymphs	Negative	Village	Scientific document, Interview	Several interviews, Ramos-Elorduy (2016), Sosa Marcos (2015)
Grasshopper_harvest_and_preparation	Cultural_Expressions	Positive	Village	Scientific document, Interview	Several interviews, Ramos-Elorduy (2016), Sosa Marcos (2015)
Grasshopper_harvest_and_preparation	Household_income	Positive	Village	Scientific document, Interview	Several interviews, Ramos-Elorduy (2016), Sosa Marcos (2015); Cohen et al. (2024)
Adult_Grasshoppers	Grasshopper_harvest_and_preparation	Positive	Village	Scientific document, Interview	Several interviews, Ramos-Elorduy (2016), Sosa Marcos (2015)
Nymphs	Grasshopper_harvest_and_preparation	Positive	Village	Scientific document, Interview	Several interviews, Ramos-Elorduy (2016), Sosa Marcos (2015)
Local_markets	Household_income	Positive	Village	Scientific document, Interview, Participant observation	Several interviews, Ramos-Elorduy (2016), Visits to Zaachila markets 2025
Local_markets	Traditional_food	Positive	Village	Scientific document, Interview, Participant observation	Several interviews, Ramos-Elorduy (2016), Visits to Zaachila markets 2025
Local_markets	Cultural_Expressions	Positive	Village	Scientific document, Interview, Participant observation	Several interviews, Ramos-Elorduy (2016), Visits to Zaachila markets 2025
Grasshopper_domestic_consumption	Nutrition	Positive	Village	Scientific document, Interview	Wegier et al (2018), Ramos Elorduy et al (1997), Mercado1
Nutrition	Health_problems	Negative	Village	Scientific document, Interview	Wegier et al (2018), Ramos Elorduy et al (1997), Mercado2
Grasshopper_domestic_consumption	Cultural_Expressions	Positive	Village	Interview, Participant observation	Several interviews, Observation of murals and names in the region (teams, businesses, etc.)
Traditional_food	Grasshopper_harvest_and_preparation	Positive	Village	Interview, Participant observation	Several interviews, Visits to local markets
Traditional_food	Diet_sustainability	Positive	Village	Interview, Scientific document	Several interviews, Singh and Singh (2017), Jacome (2022), Benrey et al (2024), Almaguer-González, et al., 2020
Nutrition	Several interviews, Singh and Singh (2017	Positive	Village	Report	Burlingame and Dernini FAO (2012)
Household_income	Diet_sustainability	Positive	Village	Report	Burlingame and Dernini FAO (2012)

Edge_List

Source	Target	Sign	Scale	Types of evidence	References (see full reference list)
Drinking_water	Diet_sustainability	Positive	Village	Report	Burlingame and Dernini FAO (2012)
Milpa	Traditional_food	Positive	Village	Scientific document, Interview	Mora van Cauwelaert (2017), Beaupré et al (2021), Almaguer- González, et al (2020), SanJose1
Traditional_food	Milpa	Positive	Village	Scientific document	Mora van Cauwelaert (2017)
Traditional_food	Local_markets	Positive	Village	Scientific document, Participant observation	Guzman (2016), Molina Luna and Campos Ángeles (2016), Mora van Cauwelaert (2017), Visits to local markets 2015- 2025
Traditional_food	Local_festivities	Positive	Village	Scientific document, Participant observation	Guzman (2016), Molina Luna and Campos Ángeles (2016), Mora van Cauwelaert (2017), Attendance to local festivities 2015 – 2025 (e.g. Cena de los concheros, Día de muertos, Lunes del cerro, family celebrations, La samaritana, among others)
Local_festivities	Cultural_Expressions	Positive	Village	Scientific document, Participant observation	Calderón García (2012), Mora van Cauwelaert (2017)
Local_festivities	Barrios_organization	Positive	Village	Scientific document, Participant observation	Mora van Cauwelaert (2017), Attendance to local festivities 2015 – 2025 (e.g. Cena de los concheros, Día de muertos, Lunes del cerro, family celebrations, La samaritana, among others)
Local_festivities	Local_markets	Positive	Village	Scientific document, Participant observation	Guzman (2016), Molina Luna and Campos Ángeles (2016), Mora van Cauwelaert (2017), Attendance to local festivities 2015 – 2025 (e.g. Cena de los concheros, Día de muertos, Lunes del cerro, family celebrations, La samaritana, among others)
Barrios_organization	Local_festivities	Positive	Village	Scientific document, Participant observation	Mora van Cauwelaert (2017), Attendance to local festivities 2015 – 2025 (e.g. Cena de los concheros, Día de muertos, Lunes del cerro, family celebrations, La samaritana, among others)
Barrios_organization	Tequios	Positive	Village	Scientific document, Participant observation	Mora van Cauwelaert (2017), Attendance to local festivities 2015 – 2025 (e.g. Cena de los concheros, Día de muertos, Lunes del cerro, family celebrations, La samaritana, among others)
Tequios	Local_festivities	Positive	Village	Scientific document, Participant observation	Mora van Cauwelaert (2017), Attendance to local festivities 2015 – 2025 (e.g. Cena de los concheros, Día de muertos, Lunes del cerro, family celebrations, La samaritana, among others)
Tequios	Agricultural_productivity	Positive	Village	Participant observation	Visits to plots during preparation or harvest days 2015 – 2025
Tequios	Ejido_strength	Positive	Municipality	Workshop, Scientific document, Participant observation	WS_Ejidatarios, Romero Luna et al (2019), Participation in the organization of fairs and events 2015 – 2025
Tequios	Barrios_organization	Positive	Municipality	Workshop, Scientific document, Participant observation	WS_Ejidatarios, Romero Luna et al (2019), Participation in the organization of fairs and events 2015 – 2025
Tequios	Irrigation_units_organization	Positive	Municipality	Workshop, Scientific document, Participant observation	WS_Ejidatarios, Romero Luna et al (2019), Participation in the organization of fairs and events 2015 – 2025
Local_festivities	Recreation	Positive	Village	Other, Participant observation	Melchor, C. V. (1996), Attendance to local festivities 2015 – 2025 (e.g. Cena de los concheros, Día de muertos, Lunes del cerro, family celebrations, La samaritana, among others)
Managed_trees	Recreation	Positive	Village	Participant observation	Visits to plots 2015 – 2025
Livestock	Household_income	Positive	Village	Report	SIAP 2022
Agricultural_productivity	Household_income	Positive	Village	Scientific document	Mora van Cauwelaert (2017)
Drinking_water	Household_income	Positive	Village	Participant observation	Multiple visits to households 2015 – 2025
Authorities_corruption	Irregular_occupation	Positive	Municipality	Workshop	WS_Ejidatarios, Villalobos Portilla (2024)
Authorities_corruption	Highway_and_Extractivism	Positive	Municipality	Workshop, Report	WS_Ejidatarios, Alonso et al (2021)
Authorities_corruption	Landbrokers	Positive	Municipality	Workshop	WS_Ejidatarios
Highway_and_Extractivism	Community_conflict	Positive	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderon Garcia (2012)
Highway_and_Extractivism	Overall_urbanization	Positive	Municipality	Workshop, Report	WS_Ejidatarios, Alonso et al (2021)
Ejido_strength	Highway_and_Extractivism	Negative	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderon Garcia (2012)
Ejido_strength	Common_use_land	Positive	Municipality	Workshop, Official database	WS_Ejidatarios, RAN
Barrios_organization	Highway_and_Extractivism	Negative	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderon Garcia (2012)
Municipality	Local_markets	Positive	Municipality	Report, Participant observation	Planes Municipales de Desarrollo, Visit to the markets "regiduría" of the municipal offices
Municipality	Local_festivities	Positive	Municipality	Participant observation	Co-organization of Agroecological encounters and fairs, Attendance to local festivities 2015 – 2025 (e.g. Día de muertos, Lunes del cerro, family celebrations, among others)
Municipality	Monocultures	Positive	Municipality	Interview, Workshop	Several interviews, WS_Ejidatarios
Municipality	Milpa	Negative	Municipality	Interview, Workshop	Several interviews, WS_Ejidatarios
Municipality	Water_works	Positive	Municipality	Interview, Workshop	MunicipalityOfficer, WS_Ejidatarios
Ejido_strength	Authorities_corruption	Negative	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderón García (2012)
Ejido_strength	Irrigation_units_organization	Positive	Municipality	Workshop	WS_Ejidatarios
Ejido_strength	Tequios	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, EjidoOfficer
Irrigation_units_organization	Ejido_strength	Positive	Municipality	Workshop, Participant observation	WS_Ejidatarios, Visits to collective actitivies organized by irrigation units and the ejido 2015 – 2025
Irrigation_units_organization	Barrios_organization	Positive	Municipality	Participant observation	Visits to tequios at the Río Reyes irrigation unit 2015 – 2025
Irrigation_units_organization	Tequios	Positive	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderón García (2012)
Irrigation_units_organization	Authorities_corruption	Negative	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderón García (2012)
Ejido_strength	Barrios_organization	Positive	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderón García (2012)
Barrios_organization	Irrigation_units_organization	Positive	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderón García (2012)
Barrios_organization	Authorities_corruption	Negative	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderón García (2012)
Barrios_organization	Community_conflict	Negative	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderón García (2012)
Reforestation_works	Forest	Positive	Municipality	Workshop	WS_Ejidatarios
Forest	Recreation	Positive	Municipality	Workshop	WS_Ejidatarios, WSYouth
River_degradation	Recreation	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, WSYouth, MunicipalityOfficer
Community_conflict	Irrigation_units_organization	Negative	Municipality	Scientific document, Workshop	WS_Ejidatarios, Calderón García (2012)
Community_conflict	Ejido_strength	Negative	Municipality	Scientific document, Workshop	WS_Ejidatarios, Calderón García (2012)
Tequios	Reforestation_works	Positive	Municipality	Workshop	WS_Ejidatarios
Tequios	Water_works	Positive	Municipality	Workshop, Other	WS_Ejidatarios, Documentary "XNIZAA Sembradores de agua"
Water_works	River_degradation	Negative	Municipality	Workshop, Other	WS_Ejidatarios, Documentary "XNIZAA Sembradores de agua"
Forest	River_degradation	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Authorities_corruption	Community_conflict	Positive	Municipality	Workshop, Scientific document	WS_Ejidatarios, Calderón García (2012)
Increase_irrigation	Irregular_water_extraction	Positive	Municipality	Workshop, Participant observation	WS_Ejidatarios, Authors decided not to specify the context of participant observation in this case
Increase_irrigation	Water_table_level	Negative	Municipality	Workshop, Interview, Scientific document	WS_Ejidatarios, MunicipalityOfficer
Irregular_water_extraction	Water_table_level	Negative	Municipality	Other	WS_Ejidatarios
Overall_urbanization	Water_table_level	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Overall_urbanization	Soil_Conditions	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Water_table_level	Drinking_water	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Waste	River_degradation	Positive	Municipality	Workshop	WS_Youth
Waste	Soil_Conditions	Negative	Municipality	Interview	SanLucasTlanichico1
Overall_urbanization	Waste	Positive	Municipality	Workshop, Other	WS_Youth, Newspapers' notes on waste crisis in Oaxaca city and Zaachila (2020–2023)
Distant_spots_urbanization	Overall_urbanization	Positive	Municipality	Workshop, Scientific document	WS_Ejidatarios, Pérez Hernández et al (2021)
Colonias_urbanization	Overall_urbanization	Positive	Municipality	Workshop, Scientific document	WS_Ejidatarios, Bautista (2008), Martínez Castañeda et al (2023)
Villa_urbanization	Overall_urbanization	Positive	Municipality	Workshop	WS_Ejidatarios
Common_use_land	Grasslands	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, EjidoOfficer
Common_use_land	Secondary_Vegetation	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, EjidoOfficer
Common_use_land	Forest	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, EjidoOfficer
Common_use_land	Tequios	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, EjidoOfficer
Common_use_land	Livestock	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, EjidoOfficer
Social_land_tenure	Common_use_land	Positive	Municipality	Official database, Interview	RAN, EjidoOfficer
Distant_spots_urbanization	Rainfed_agriculture	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Distant_spots_urbanization	Common_use_land	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Distant_spots_urbanization	Social_land_tenure	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Rainfed_agriculture	Milpa	Positive	Municipality	Workshop, Interview, Scientific document	WS_Ejidatarios, Several interviews, Castro Campero (2021)
Irrigation_agriculture	Monocultures	Positive	Municipality	Workshop, Interview, Scientific document	WS_Ejidatarios, Several interviews, Castro Campero (2021)
Villa_urbanization	Rainfed_agriculture	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Villa_urbanization	Social_land_tenure	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Villa_urbanization	Irrigation_agriculture	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Colonias_urbanization	Rainfed_agriculture	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Colonias_urbanization	Irrigation_agriculture	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Colonias_urbanization	Social_land_tenure	Negative	Municipality	Workshop, Interview, Scientific document	WS_Ejidatarios, MunicipalityOfficer, Bautista (2008), Martínez Castañeda et al (2023)
Colonias_urbanization	Forest	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, MunicipalityOfficer
Landbrokers	Authorities_corruption	Positive	Municipality	Workshop	WS_Ejidatarios
Landbrokers	Irregular_occupation	Positive	Municipality	Workshop	WS_Ejidatarios
Landbrokers	Land_sale	Positive	Municipality	Workshop, Other	WS_Ejidatarios, Public advertisements on the village and on social networks
Irregular_occupation	Colonias_urbanization	Positive	Municipality	Workshop, Interview, Scientific document	WS_Ejidatarios, Several interviews, Martínez Castañeda et al (2023); Villalobos Portilla (2024)
Irregular_occupation	Community_conflict	Positive	Municipality	Workshop, Scientific document	
Irregular_occupation	Distant_spots_urbanization	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Land_sale	Colonias_urbanization	Positive	Municipality	Workshop, Interview, Scientific document	WS_Ejidatarios, Several interviews, Martínez Castañeda et al (2023)

Source	Target	Sign	Scale	Types of evidence	References (see full reference list)
Land_sale	Villa_urbanization	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Land_sale	Household_income	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Land_sale	Distant_spots_urbanization	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Social_land_tenure	Ejido_strength	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Social_land_tenure	Tequios	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Ejido_strength	Social_land_tenure	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Housing_needs	Villa_urbanization	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Housing_needs	Colonias_urbanization	Positive	Municipality	Workshop, Interview, Scientific document	WS_Ejidatarios, Several interviews, Villalobos Portilla (2024)
Land_abandonment	Irregular_occupation	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, Several interviews
Cultural_Expressions	Land_sale	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, WS_Youth, Several interviews
Disinterest_in_agriculture	Land_sale	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, WS_Youth, Several interviews
Disinterest_in_agriculture	Land_abandonment	Positive	Municipality	Workshop, Interview	WS_Ejidatarios, WS_Youth, Several interviews
Agricultural_productivity	Land_abandonment	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, WS_Youth, Several interviews
Household_income	Land_sale	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, WS_Youth, Several interviews
Household_income	Disinterest_in_agriculture	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, WS_Youth, Several interviews
Cultural_Expressions	Disinterest_in_agriculture	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, WS_Youth, Several interviews
Agricultural_productivity	Disinterest_in_agriculture	Negative	Municipality	Workshop, Interview	WS_Ejidatarios, WS_Youth, Several interviews
Overall_urbanization	Temperature_Increase	Positive	Municipality	Interview	Several interviews
Overall_urbanization	Feeding_Resources	Negative	Municipality	Interview	Several interviews
Overall_urbanization	Thermoregulation_and_Refuge	Negative	Municipality	Interview	Several interviews
Overall_urbanization	Humidity	Negative	Municipality	Interview	Several interviews
Overall_urbanization	Soil_Conditions	Negative	Municipality	Interview	Several interviews
Forest	Thermoregulation_and_Refuge	Positive	Municipality	Scientific document, Interview	Lopez Martinez (2015), Several interviews
Forest	Temperature_Increase	Negative	Municipality	Other	Inferred interaction
Forest	Soil_Conditions	Positive	Municipality	Scientific document, Interview	Lopez Martinez (2015), Several interviews
Water_table_level	Agricultural_productivity	Positive	Municipality	Scientific document, Interview	Mora Van Cauwelaert (2017), Several interviews
Water_table_level	Humidity	Positive	Municipality	Interview, Workshop	Several interviews, WS_Ejidatarios
River_degradation	Overpopulation	Negative	Municipality	Interview	Several interviews
Health_problems	Household_income	Negative	Municipality	Interview, Participant observation	Several interviews, Personal communications with zaachilean families 2015 - 2025
Health_problems	Land_sale	Positive	Municipality	Interview, Participant observation	Several interviews, Personal communications with zaachilean families 2015 - 2025
Pesticides	Health_problems	Positive	Municipality	Interview, Other, Scientific document	Several interviews, Newspapers' notes on intoxication cases in Oaxaca, Hernández and Aguilar (2023)
Drough	Hatching	Negative	External	Interview, Scientific document	Several interviews, Aquino Olmedo (2015)
Drough	Pesticides	Positive	External	Interview, Participant observation	Several interviews, Personal communication regarding the use of pesticides
Drough	Increase_irrigation	Positive	External	Interview	Several interviews
Drough	Rainfed_agriculture	Negative	External	Interview, Scientific document	Beaupré et al (2021), Woodmansee (2022) Several interviews
Oaxaca_City_expansion	Disinterest_in_agriculture	Positive	External	Interview, Workshop	Several interviews, WS_Youth
Oaxaca_City_expansion	Landbrokers	Positive	External	Workshop, Other	WS_Ejidatarios, Public advertisements on informal immobilry channels on social networks
Oaxaca_City_expansion	Overall_urbanization	Positive	External	Scientific document	Bautista (2008), Madrid Vázquez (2012), Martínez Castañeda et al (2023)
Turism	Household_income	Positive	External	Interview	Several interviews
Turism	Local_markets	Positive	External	Interview, Other	Several interviews, Public advertisements in Oaxaca City

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