

Food sovereignty: Empowering Indigenous peoples in the face of globalisation and climate change

A case-based research study from Oaxaca, Mexico

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Abstract

Worldwide, Indigenous peoples have played a critical role in preserving ecosystems and biodiversity. Historically oppressed by colonial institutions, they are today confronted with detrimental effects of the global food system and increasingly pronounced changes in climate that jeopardise their ability to produce food. In reaction to globalisation, food sovereignty advocates the right of peoples to self-determine their food and agriculture systems. In an Indigenous context, Indigenous food sovereignty also calls for revitalising Indigenous knowledge and practices.

In this research, I investigate how an (Indigenous) food sovereignty approach empowers Indigenous peoples in the face of globalisation and climate change. I conducted semi-structured interviews among 13 local actors in Oaxaca, Mexico. Findings show that sustainable farming and regenerating local food systems enable local actors to reconcile livelihood opportunities with environmental protection, health benefits, social values, and Indigenous cultures revitalisation. Yet, economic limitations and climate change are still compromising their right to food sovereignty.

Keywords: Food sovereignty, local food system, sustainable farming, climate change, traditional ecological knowledge, Mexico.

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Resumen

En todo el mundo, los pueblos indígenas han desempeñado un papel fundamental en la preservación de los ecosistemas y la biodiversidad. Históricamente oprimidos por instituciones coloniales, hoy en día se enfrentan a efectos perjudiciales del sistema alimentario mundial y a cambios climáticos cada vez más pronunciados que ponen en peligro su capacidad de producir alimentos. En reacción a la globalización, la soberanía alimentaria defiende el derecho de los pueblos a definir sus sistemas alimentarios y agrícolas. En un contexto indígena, la soberanía alimentaria indígena también reivindica la revitalización de los conocimientos y prácticas indígenas.

En ese estudio, investigo cómo un enfoque de soberanía alimentaria (indígena) empodera a los pueblos indígenas frente a la globalización y el cambio climático. Realicé entrevistas semiestructuradas con 13 actores locales en Oaxaca, México. Los resultados muestran que la agricultura sostenible y la regeneración de los sistemas alimentarios locales permiten a actores locales conciliar oportunidades de subsistencia con la protección del medio ambiente, beneficios para la salud, valores sociales y la revitalización de culturas indígenas. Sin embargo, limitaciones económicas y el cambio climático siguen comprometiendo su derecho a la soberanía alimentaria.

Palabras clave: Soberanía alimentaria, sistemas alimentarios locales, agricultura sostenible, cambio climático, conocimientos ecológicos tradicionales, México.

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1. Introduction

Since the dawn of time, Indigenous peoples worldwide have played a key role in sustaining ecosystems and much of the world's biodiversity, thereby providing critical ecosystem services that benefit all of humanity (Swiderska et al., 2022; World Wide Fund for Nature et al., 2021). Yet, Indigenous knowledge and ways of life have been undermined for over five centuries by Western ideologies of colonialism, imperialism, and globalisation (Figueroa-Helland et al., 2018). The globalising food system more specifically has generated a series of detrimental effects, such as ecosystems degradation, food insecurity, malnutrition, cultural erosion, and climate change, that are affecting Indigenous peoples across the world (Figueroa-Helland et al., 2018; Pimbert, 2009b). Due to their close relation to the environment and their dependence on natural resources for their subsistence, Indigenous peoples are particularly vulnerable to climate change that jeopardises their ability to produce food and ensure their food security (Ahmed et al., 2022).

In reaction to the global food system, the food sovereignty movement, representing over 200 million small-scale food producers across the world, emerged in 1996 to advocate a paradigm shift away from the industrial and neoliberal ideologies (Pimbert, 2009b) to realise “the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and the right to define their own food and agriculture systems” (La Via Campesina, 2021b). In an Indigenous context, Indigenous food sovereignty also calls for revitalising Indigenous worldviews, practices, and values that have been undermined by the globalisation of the Western knowledge system (Kamal et al., 2015).

In this research, I aim to explore how an (Indigenous) food sovereignty approach empowers Indigenous peoples in Oaxaca, Mexico to face globalisation and climate change. I chose the southern state of Oaxaca as a case study given that the region is home to large Indigenous populations, and part of a country that pursues industrial and neoliberal ideologies, notably through its intensive commercial exchanges with the United States and Canada. Indigenous actors and the local organisations they are forming, are seen as agents of change that work towards the implementation of food sovereignty from a bottom-up approach. To guide my investigation, I elaborated the three following research questions:

- **RQ1:** How has globalisation affected Indigenous peoples, and how regenerating local food systems fosters food sovereignty?

- **RQ2:** What climate and environmental changes Indigenous peoples already perceive, and to which extent can they rely on their traditional knowledge to cope with disturbances?
- **RQ3:** What are the environmental, social, and livelihood benefits promoted along with food sovereignty, as well as the limitations and obstacles that restrict its full potential?

In chapter 2, I present who the Indigenous peoples are and investigate the adverse effects of the global food system, climate change, and the development narrative in the literature. In chapter 3, I introduce food sovereignty and Indigenous food sovereignty as theoretical frameworks, as well as several useful concepts for the purpose of the study. In chapter 4, I outline the research methodology and the context of the case study. In chapter 5, I present and analyse my empirical data. In section 6, I then discuss my findings to answer my research questions. I conclude my research in chapter 7.

2. Literature review

2.1. Indigenous peoples and their traditional ecological knowledge

Indigenous peoples have remained the stewards of large tracts of land across the world since the dawn of time, Figueroa-Helland et al. (2018) explain their intimate relationships with their surrounding environment. Connected with Mother Earth, they have been maintaining “reciprocal relations of mutual dependence” with “non-human persons”, such as animals, plants, water, soil, or mountains (p.179). This connectedness with their natural surroundings implies that humans and ecosystems care for each other. While the environment provides Indigenous peoples with natural resources and food on which they rely for their subsistence, they have been nurturing biodiversity and ecosystem health in return. By observing ecosystem dynamics over hundreds or thousands of years (Figueroa-Helland et al., 2018), Indigenous peoples have acquired a deep understanding of their local environments that enables them to manage it in a sustainable manner (Ahmed et al., 2022).

Knowledge about their local ecosystems that has been transmitted from generation to generation is best known as “traditional ecological knowledge”, defined as “a cumulative body of knowledge, practices, and beliefs evolving by adaptive processes and handed down through generations by cultural transmission, about the relation of living beings (including humans) with one another and with their environment” (Berkes et al., 2000, p. 1252). Such knowledge has been essential to deal with changes in climate and environmental conditions over time (Haider et al., 2021; Lujan Escalante

& Mortimer, 2022), and build resilient social-ecological systems (Loch & Riechers, 2021; Ahmed et al., 2022). Traditional ecological knowledge therefore reflects Indigenous peoples' adaptative capacity to cope with disturbances while meeting communities' needs (Fontana et al., 2022; Lujan Escalante & Mortimer, 2022).

2.2. The adverse effects of the global agri-food system

The global agri-food system is characterised by the expansion of agricultural lands, and the intensification of crop production by means of agrochemicals and machinery (Foley et al., 2011). With a view to optimising food production, large-scale monocultures are favoured, as well as fewer grown species and less variability within species (Pimbert, 2009b). By 2012, monocultures were already occupying around 80 percent of arable land available globally (Figueroa-Helland et al., 2018). This industrial model of agriculture has involved a series of detrimental effects on the environment, as exposed by Pimbert (2009b), and has substantially altered ecosystems around the world. While they have been used to increase food production efficiency, agrochemical inputs have caused soil and water degradation. Large amounts of water are also required to keep up with intensive agriculture, and around 70 percent of all fresh water that is withdrawn is used for irrigating food crops. Consequently, rivers, lakes, and aquifers are being depleted. Additionally, deforestation is occurring in some parts of the world to allow the expansion of the dominant food system. These unsustainable practices associated with industrialised food production are severely affecting biodiversity and the critical ecosystem services that it provides (La Via Campesina, 2010). Lastly, the global agri-food system is one of the most polluting sectors responsible for causing global warming and climate change given the intensive use of fossil fuels for "fertilisers, agrochemicals, production, transport, processing, refrigeration and retailing" (Pimbert, 2009b, p.33). By converting forests and lands into monocultures, degrading soil and water, and ultimately causing biodiversity loss, industrial agricultural production is compromising the capacity of the environment to capture carbon yet indispensable to mitigate climate change (La Via Campesina, 2010).

The global agri-food system is thereby affecting small-scale food producers and local populations throughout the world. Although global food production has been significantly increasing in the last decades (Foley et al., 2011), up to 828 million people in the world were still suffering from hunger and malnutrition in 2021 (Food and Agriculture Organisation, n.d.). Figueroa-Helland et al. (2018) point out that most of them are living in countries that rather export their food production than feed their own populations. Current food and agriculture policies fuelling the globalising agri-food system involve for small farmers to be integrated into regional and global food markets, as well as to

compete with agri-food corporations that benefit from subsidies and produce cheaper food (Pimbert, 2009b). In developing countries, market liberalisation therefore severely affects small farmers that depend on farming for their incomes and livelihoods since imported food is often cheaper than domestically produced food (Pimbert, 2009b).

Furthermore, the global agri-food system may result in three different scenarios impacting small-scale producers and local populations. Firstly, unable to compete with cheaper imports, farming, pastoral, and fishing families are migrating to urban areas in order to seek other income sources (Pimbert, 2009b). Secondly, to further expand the agri-food system, powerful corporations and foreign investors grab lands from local populations mainly in the Global South (Figueroa-Helland et al., 2018). Entire communities may be displaced from their lands and forced to migrate (Pimbert, 2009b). Thirdly, Robbins (2012) argues that due to state development interventions and/or their integration into regional and global markets, local populations convert their production systems into industrialised food production. Unfair trade conditions may entail that small-scale food producers do not have other choice than overexploiting natural resources from their environment, thereby causing environmental degradation. Environmental injustices stem from the global agri-food system as small-scale producers bear the environmental costs of producing certain types of export-oriented crops. In the three scenarios, most rural people migrate to cities or abroad and most of them end up working in precarious conditions and/or living in urban slums, thereby creating new facets of poverty and inequality (Pimbert, 2009b).

2.3. The detrimental impacts of climate change on Indigenous peoples

While small farmers and rural communities in developing countries have contributed the least to global greenhouse emissions and climate change, they are among the first to suffer the consequences (La Via Campesina, 2010). Shifts in climate entail rising temperatures, changes in precipitation patterns, shorter rainy seasons, as well as an intensification and recurrence of extreme weather events such as dry spells and heavy rains (Dasgupta et al., 2014). Additionally, changing weather patterns come along unknown pests, devastating effects on farmlands, crops failures, and threats to biodiversity (La Via Campesina, 2010).

Given their high dependence on their natural environment and agriculture for their subsistence and livelihoods, Indigenous peoples are particularly vulnerable to the adverse impacts of climate change that jeopardise their food production and food security (International Labour Office, 2017; Ahmed et al., 2022; Pimbert, 2009b). While traditional ecological knowledge has been evolving over time to respond to disturbances in social-ecological systems (Lujan Escalante & Mortimer, 2022), rapid

environmental changes associated with climate change compromise Indigenous peoples' capacity to adapt (Ahmed et al., 2022; Valdivia et al., 2010). Local knowledge is becoming less relevant to adjust to unpredictable climate conditions (La Via Campesina, 2010). Furthermore, facing climate-related damage and loss of livelihoods, Indigenous peoples may be forced to migrate away from their traditional lands in search of work, thereby losing part of their cultural identity (International Labour Office, 2017).

2.4. The development narrative

Development interventions, either for the integration of developing countries into the global food market, agricultural modernisation, or climate change adaptation, emanate from certain Western development ideologies. Escobar (2012), one of the leading members of the post-development theory, discusses the construction of the dominant development narrative. The Occident associated ways of life in the Global South with backwardness, poverty, and under-development. This worldview shaped the development narrative justifying the need for poorer countries to develop and modernise. A new realm of knowledge regarding the development of the Global South has then been elaborated and comprises theories and practices that have ever since nourished the development narrative. By fostering its model of development all over the world and for decades in the name of progress, the Occident universalises the Western living standards and knowledge system.

The question of who produces knowledge raises serious concerns. Fazey et al. (2020) put forward that knowledge produced within the Western knowledge system serves the interest of a handful of economic and political elites. Such knowledge, promoted within their institutions and globally, is dominated by capitalistic ideologies that disregard the adverse impacts they engender on the environment and local populations throughout the world. Pimbert (2009d) further explains that the way a problem and its solutions are framed, the worldwide need to modernise agriculture in this case, only represents a worldview of a certain group over others. It constructs a reality that is then utilised in political decision-making processes as the basis for shaping further policies and other political actions. Although international trade and the global agri-food system have had the adverse effects of degrading the environment, aggravating poverty and reinforcing inequalities (La Via Campesina, 2021a), the Occident has been promoting the integration of poor countries into the global economic system, as well as the globalisation of the industrial agricultural model as levers for development (Trépant, 2012). The inherent inequalities and injustices to the global agri-food system therefore reveal deep power structures built upon “anthropocentrism, coloniality, patriarchy, capitalism and developmentalism” (Figueroa-Helland et al., 2018, p.175). Instead of recognising that

those countries may be able to meet their basic needs themselves (Pimbert, 2009c), these Western-centric ideologies disregard the diverse forms of understanding the world and organising life that are place-specific (Escobar, 2012). In sum, globalisation therefore “works actively and oppressively to undermine and destroy alternatives” (Figueroa-Helland et al., 2018, p.195) to propagate the hegemonic model of development (Pimbert, 2009c).

As a result of such neoliberal ideologies around the development narrative, small-scale food producers and Indigenous peoples are doomed to eventually disappear (Pimbert, 2009b). In particular, the global agri-food system poses severe threats to Indigenous food systems and practices (Coté, 2016). In addition to degrading the environment and endangering biodiversity, industrialised food production provokes the erosion of traditional ecological knowledge and the loss of cultural diversity (Pimbert, 2009b). Local food systems and the local organisations that govern them are also jeopardised, and the integration into regional and global food markets implies for local populations losing their autonomy and self-determination (Pimbert, 2009a).

Furthermore, when development interventions are intended towards Indigenous peoples, their consultation and involvement in decision-making are in most cases limited or absent so that they do not have the possibility to express their needs and priorities (International Labour Office, 2017). In the context of climate change adaptation and mitigation more specifically, inadequate and unsuccessful interventions result from Indigenous peoples’ exclusion from or weak participation in policy processes and the design of development interventions funded by development agencies (Eriksen et al., 2021; International Labour Office, 2017). Those initiatives create new vulnerabilities or reinforce existing ones among local communities as they lacked understandings of specific social-ecological systems (Eriksen et al., 2021). Yet, grasping how Indigenous peoples perceive and deal with the adverse effects of climate change is central to design and implement locally appropriate strategies (Ahmed et al., 2022).

2.5. Relevance and contribution to the field of sustainability science

Indigenous peoples’ environmental stewardship has proved to be essential to deal with climatic and environmental changes over the last hundreds or thousands of years (Koohafkan and Altieri, 2010). Their traditional ecological knowledge has been increasingly recognised as central to cope with climate change and global challenges ahead (Loch & Riechers, 2021; Ahmed et al., 2022; Valdivia et al., 2010). Yet, this knowledge is eroding due to the predominance of the western knowledge system, while it represents a valuable source of inspiration to reorientate our food systems towards more

sustainable pathways, and ultimately to coexist with our natural environment in a sustainable way. Additionally, experts have argued that Indigenous knowledge revitalisation along with agroecological methods may constitute the only viable pathway for Indigenous small food producers to cope with climate change, as well as to ensure the sustainability and resilience of their food production (Altieri & Nicholls, 2017).

In this master thesis, I explore how an (Indigenous) food sovereignty approach, founded on Indigenous knowledge and agroecology, empower Indigenous peoples to take the control of their own food systems and their fate. Figueroa-Helland et al. (2018) discuss how the food sovereignty paradigm addresses structural drivers of numerous and interconnected crises, and conceives long-term ecological and equitable alternative lifeways. By restoring ecosystems and fostering carbon sequestration, it addresses the climate crisis and climate-related impacts of intensive agriculture. It also deals with the energy, water and resource crises as sustainable farming is decoupled from agrochemicals use, mineral extraction and mechanisation. Working towards food sovereignty finally confronts the inequality and migration crises as it enables small food producers to create livelihoods and a promising future for their communities.

3. Theory and concepts

3.1. Theoretical frameworks

3.1.1. Food sovereignty

The concept of food sovereignty was introduced in 1996 by La Via Campesina, a transnational agrarian movement representing 182 organisations from 81 countries and about 200 million farmers, peasants, landless, rural women, and Indigenous peoples from both the South and the North (Coté, 2016; La Via Campesina, 2021b). This global movement arose from common concerns about the globalising industrial model of food production and its food, agriculture, and trade policies that harm small-scale food producers and ecosystems throughout the world (Coté, 2016; Soper, 2020; Wittman, 2011; Wittman et al., 2010).

As a collective response for food justice (Figueroa-Helland et al., 2018), La Vía Campesina defined food sovereignty as “the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and the right to define their own food and agriculture systems” (La Via Campesina, 2021b). This definition stresses the right of peoples to self-determinate their models of food production, distribution, and consumption, and to shape their own

policies for agriculture, food, the environment, and livelihoods accordingly (Pimbert, 2009b). By democratising food systems, those who produce, distribute, and consume are involved in decision-making, and their needs and aspirations are placed at the heart of the governance of food systems (La Via Campesina, 2010). In addition, this alternative approach promotes agroecological practices and traditional ecological knowledge to manage natural resources and produce food in a sustainable way so as to preserve ecosystems, land, water, soils, seeds, and biodiversity (Pimbert, 2009a; Nyéléni, 2007).

Pimbert (2009b) argues that food sovereignty goes beyond an individual, peoples, community, or nation's self-sufficiency within the existing political and economic structures, and entails a paradigm shift away from the industrial and neoliberal ideologies for food and agriculture towards the regeneration of locally determined food systems. The food sovereignty paradigm envisions fundamental changes in four interconnected areas – the political, economic, social, and ecological – to realise the right to food sovereignty. La Vía Campesina along with other organisations and civil society actors have been developing the food sovereignty policy framework for food and agriculture (Wittman et al., 2010). It identifies a series of directions and policies shifts for governments and other actors that are willing to implement food sovereignty within their societies (Pimbert, 2009b). Besides, individuals, small producers, and grassroots initiatives fostering local food systems are planting the seeds of this alternative paradigm (Figuroa-Helland et al., 2018).

While the food sovereignty framework has been criticised for not providing a comprehensive approach to tackle challenges faced by small producers and Indigenous peoples (Agarwal, 2014), how food sovereignty is put in place varies according to the context, and therefore such framework cannot universally apply to all situations (Pimbert, 2009b). It is built around a core set of principles (Grey & Patel, 2015), and context-specific factors – local, historical, cultural, socio-ecological, economic, political, and institutional – shape how food sovereignty is expressed and implemented across the world (Daigle, 2019; Vallejo-Rojas et al., 2022).

3.1.2. Indigenous food sovereignty

Food sovereignty is a relevant approach to address issues affecting Indigenous peoples throughout the world (Indigenous Food Systems Network, n.d.; Martens et al., 2016). “Indigenising” food sovereignty brings to light the intimate relationships that Indigenous peoples have maintained with their natural environment since time immemorial, as well as their subsequent cultural responsibilities (Coté, 2016). In the efforts to restore their connectedness with Mother Earth and associated ancestral knowledge (Figuroa-Helland et al., 2018), Indigenous food sovereignty “places

responsibility and action on individuals and communities to repair and strengthen relationships to ancestral homelands weakened by colonialism, globalization, and neoliberal policies.” (Coté, 2016, p.12) Indigenous food sovereignty therefore advocates decolonisation, including the independence of Indigenous peoples from the global agri-food system, and the revitalisation of their cultural worldviews, practices, and values indispensable for their empowerment and well-being (Kamal et al., 2015).

The Indigenous Food Systems Network (n.d.) developed four key principles to guide the Indigenous food sovereignty movement. The first principle highlights that the right to food is sacred and cannot be subjected to colonial institutions, laws, or policies. Indigenous food sovereignty implies for Indigenous peoples the responsibility of sustaining mutual relationships with their natural environment that provides them with food. The second principle calls for maintaining cultural harvesting strategies to sustain Indigenous food sovereignty for current and future generations. The third principle then insists on the self-determination of Indigenous food systems to ensure the decision-making regarding and fulfilment of healthy and culturally appropriate foods. Finally, the fourth principle argues that in the attempt to foster Indigenous cultures and foods within the global economic system, Indigenous food sovereignty “provides a restorative framework for policy reform in forestry, fisheries, rangeland, environmental conservation, health, agriculture, and rural and community development.”

3.2. Useful concepts

3.2.1. Agroecology

Agroecology has built up from different fields of research, such as rural development studies and Indigenous agricultural knowledge (Figueroa-Helland et al., 2018), and is now viewed as “a multifunctional approach to food production that incorporates livelihood provision, conservation of biodiversity, and ecosystem function and community well-being” (Wittman, 2011, p.95). Indigenous peoples have therefore been practising types of agroecology for millennia (Price et al., 2022). Yet, agroecology differs from Indigenous knowledge since it does not attach spiritual and cultural meanings to Mother Earth, and lacks critiques of the Western knowledge system from decolonial and Indigenous viewpoints (Figueroa-Helland et al., 2018).

3.2.2. Resilience of traditional agroecosystems

Resilience is described as the “capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and feedbacks, and therefore identity” (Folke et al., 2010, p.3). In the course of time, traditional farmers have been

coping with climatic variability and environmental shocks (Koohafkan and Altieri, 2010). Their traditional agroecosystems have stood the test of time and proved to be resilient (Koohafkan and Altieri, 2010). Contemporary practices and varieties are therefore the fruit of traditional ecological knowledge that has been evolving in time to enable social-ecological systems to deal with disturbance (Haider et al., 2021; Lujan Escalante & Mortimer, 2022). When confronted with adversity, a certain community draws on experiential learning to select among its methods and varieties, test new farming practices, and retain the most adaptative responses to new environmental and climatic conditions (Altieri & Nicholls, 2017; Haider et al., 2021).

3.2.3. Local food systems and local organisations

Pimbert (2009b) contends the significance of local food systems and the local organisations that govern them to food sovereignty. Local food systems comprise diverse activities around food production, processing, distribution, use, waste, and recycling, from which local people generate their incomes and livelihoods. Worldwide they also represent local populations' basis for nutrition, economies, and culture. Local organisations, such as producer cooperatives and solidarity networks, are crucial to sustain local food systems, livelihoods, and the environment, and therefore achieve food sovereignty. When pursuing an adaptive and sustainable management of local food systems, such organisations are re-adjusting to changing conditions through experiential learning so as to preserve the environment, natural resources, and the beneficial ecological services they provide. At the same time, they also deal with social dynamics, notably by coordinating collective action, and mediating conflicting interests. Ultimately, Pimbert argues that "the widespread implementation of food sovereignty partly depends on strengthening such local organisations and their networks." (p.6)

4. Methodology

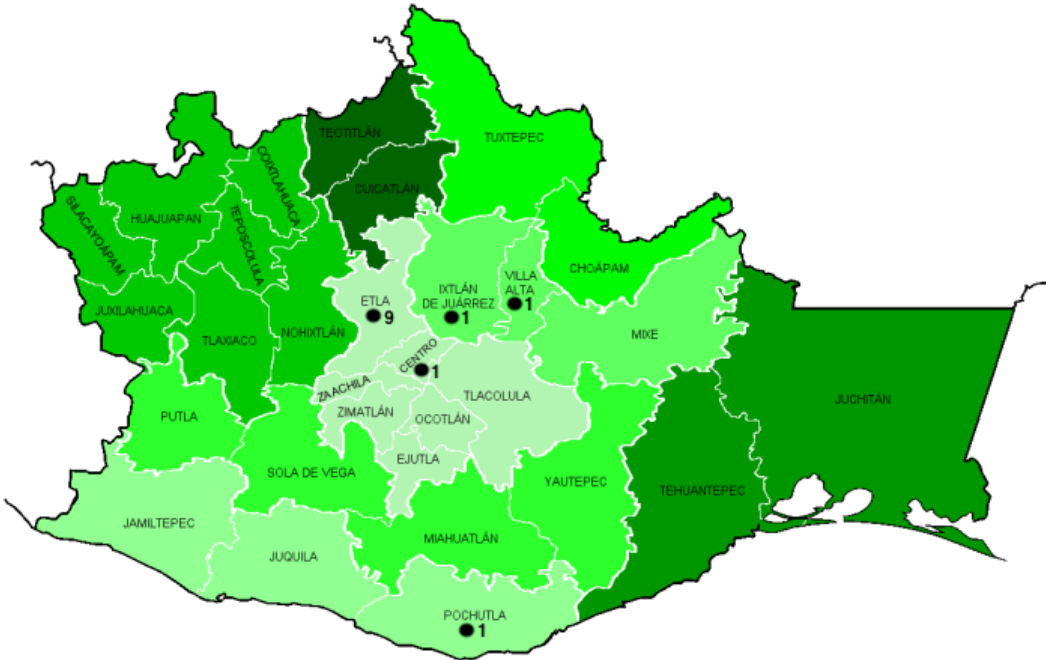
4.1. Data collection

I collected qualitative data through semi-structured interviews with local actors in Oaxaca, including small food producers and members of local organisations. I prepared an interview guide with a series of questions that were slightly adapted and asked in a certain order to suit each interviewee. I asked additional questions during interviews to further develop and better understand the interviewee's perspective. As a research method, semi-structured interviews thereby offer "great potential to attend to the complexity of your research topic", by gaining insights from lived experiences while addressing theoretically informed research questions (Galletta, 2013, p.24). Interview questions were focused on the actors' experience in advancing their right to food sovereignty.

A few months prior to my field work, I asked the local organisation *Unitierra Oaxaca*, that is based in the state capital, Oaxaca de Juárez, and engaged in the food sovereignty approach, to collaborate with me on my master thesis and help me find some participants. Following an internal restructuring of the organisation, it was in the end a volunteer from the association and one sister organisation, *Unitierra Huitzo - Yelao*, that guided me towards several interviewees that also me suggested other participants, thereby applying the snowball sampling technique (Galletta, 2013). Besides, I also went to markets in Oaxaca de Juárez to meet small food producers and interview them on their experience advancing food sovereignty.

Between the end of May and the beginning of June 2023, I carried out the interviews at the participants’ house, farm, store, or office. Figure 1 shows in which districts of Oaxaca the interviewees’ communities are located. Lastly, the interviews were conducted in Spanish and lasted from half an hour to one hour and a half.

Figure 1
Interviewees’ location in Oaxaca



Notes. The map shows the different districts of the state of Oaxaca. The black points under the name of some districts correspond to the districts from which interviewees come. The number next to the black points indicates the number of interviewees coming from this district. The shades of green represent the different regions within Oaxaca. Adapted from *División distrital de Oaxaca* by Mario Fuente Cid, 2006, Wikimedia Commons (https://commons.wikimedia.org/wiki/File:Oaxaca_distritos.png). In the public domain.

4.2. Data analysis

I conducted a total of 13 interviews with small food producers and members of four local organisations. Table 1 provides a brief description of the interviewees' involvement in food production and/or in a local organisation. I distinguished food providers from food producers. Food producers grow food for their own consumption. While food providers are food producers that also take part in local food systems by selling their food production. Table 1 also indicates how long interviewees have been practising sustainable farming to highlight the interviewees' experience in food production and advancing food sovereignty.

Table 1

Interviewees' information

Code	Date	Actor's description	Time practicing sustainable farming	District
A1	28/05/23	Food provider, Member of Red de Amaranto	6 years	Etla
A2	28/05/23	Food provider, Member of Red de Amaranto	15 years	Etla
A3	29/05/23	Food provider	All her life	Villa Atla
A4	29/05/23	Food producer	All his life	Pochutla
A5	31/05/23	Food producer	All her life	Etla
A6	1/06/23	Food producer	< 2 years	Etla
A7	3/06/23	Food provider, Member of Red de Amaranto	> 25 years	Etla
A8	4/06/23	Food provider, Member of Red de Amaranto	3 years	Etla
A9	5/06/23	Food provider	All her life	Ixtlán de Juárez
A10	6/06/23	Representative of Puente a la salud	/	Centro
A11	6/06/23	Food provider, founder of Biohuacal	> 10 years	Etla
A12	6/06/23	Member of Unitierra Huitzo - Yelao	/	Etla
A13	6/06/23	Food provider, Member of Red de Amaranto	13 years	Etla

Note. Own creation.

After transcribing all the interviews, I sorted the data around common thematics that were discussed during interviews. The food sovereignty and Indigenous food sovereignty frameworks served as baseline and guidance for the analysis of my data. Since interviews were conducted in Spanish, the few quotes I cited in the findings are translations.

4.3. Limitations

My research methodology presents limitations regarding the participants in the study. This research focused on the roles of small producers practicing sustainable farming and local organisations to foster the right of peoples to food sovereignty at a local scale, notably by regenerating local food systems. Yet, to better understand the advancement of the right to food sovereignty among local

populations, the essential role that local actors play, as well as the potential of such approach to face globalisation and climate change, it would have been relevant to also conduct interviews with consumers that undertake to exercise their right to food sovereignty by consuming locally produced organic food.

Moreover, choosing the state of Oaxaca as a case study has the advantage of offering a bigger picture of how Indigenous peoples are working towards food sovereignty across the state. Yet, most interviews were conducted in the district of ETLA, and more precisely close to the district of Centro where the state capital is situated. The impacts of globalisation might therefore have been more harmful in the communities nearby. I also conduct an interview with one participant from four distinct districts. There is therefore a bias to generalise findings in these four communities based on a participant's interview. Finally, the number of interviewees and the representativity of actors are limited due to the extent of this research. More participants would increase the reliability of the results.

4.4. Context of the case study

Market liberalisation, and more specifically the integration of Mexico in the North America Free Trade Agreement in 1994, resulted in unfair trade conditions for Mexican small food producers as they have to compete with US large-scale farms that export cheap and highly subsidised staple foods to the country (Saldaña-Zorrilla, 2008). The prices of food that is produced in Mexico therefore drastically decreased to align with lower market prices (Saldaña-Zorrilla, 2008), thereby affecting small producers' incomes and livelihoods. To align with the industrial model of agriculture, Mexican agricultural and trade policies have since incentivised export-oriented crops production, and the use of agrochemicals, high-yield varieties, and machinery (Astier et al., 2017; Novotny et al., 2021).

The setting for the case study is the southern state of Oaxaca, Mexico. It has a population of 4.1 million inhabitants (INEGI, n.d.), over half of which are Indigenous peoples living in rural communities dispersed across this highly mountainous region (Schaefer, 2013). Oaxaca has the third highest poverty rates in Mexico (Shvili, 2021), with 61.7% of the population living under the national poverty line in 2020 and 20.6% considered as extremely poor (CONEVAL, n.d.). While globalisation and industrial goods penetrated the region, many communities still rely on subsistence agriculture, and local and regional food systems (Denham & Gladstone, 2020).

Oaxaca comprises a total of 570 municipalities, 418 of which are still governed by *Usos y Costumbres* (Customs and Traditions) (Schaefer, 2013), that imply "*cargo* (unpaid communal service), consensus-based governance in assemblies, and communal councils in charge of creating and managing

community enterprises” (King et al., 2013, p.165). Although legally recognised, this traditional form of local governance implies that local affairs and rural poverty in these communities are not addressed by the federal government (Cohen & Mata-Sánchez, 2021). Indigenous communities in the region have therefore long been politically and economically marginalised (Shvili, 2021).

5. Findings

5.1. Impacts of globalisation and climate change in Oaxaca

In this chapter, I report on various issues in Oaxaca caused by the global agri-food system and increasingly pronounced changes in climate.

5.1.1. Effects of globalisation on the environment, local populations, and small producers

Agrochemicals are seen as an attractive option for small producers as they provide higher production yields and enables to produce more crops in larger agricultural lands and with less workforce (A3; A7; A10; A11). Despite their short-term benefits, several interviewees highlighted detrimental effects that those chemical inputs have caused on the environment, biodiversity, and health. A1 pointed out that agrochemicals left the soil sterile in her plot so that she could not to grow food anymore. A3, involved in beekeeping, noticed that bees do not proliferate anymore. A7 added that beneficial insects are also dying off due to pesticides. Besides, A7 recounted that her husband got severely sick for using and being frequently exposed to agrochemicals.

Furthermore, A4 illustrated how market liberalisation has disrupted Indigenous communities’ food autonomy and natural resources. A4 explained that a few decades ago, his community put its self-sufficiency aside to focus on coffee production as its market price was more attractive at that time. Yet, the market price of coffee barely increased over the years and was not covering the production costs anymore. He also recounted that due to the success of mezcal – a traditional alcohol produced from agave – on international markets, some areas in Oaxaca were deforested to establish large-scale farms and massively produce agaves. While they are paying a small rent to landowners, these companies are consuming considerable amounts of local resources, such as water and firewood, to prepare the alcohol before exporting it. A4 specified that if local populations deforest, it is of necessity as they are pressured by the economy.

Finally, during my visits in the interviewees’ communities, I came across numerous stores that sell imported industrial food. A2 pointed out that there was rubbish everywhere before her community

started to recycle. A5 also raised their landfill is full so that they do not know where to put the rubbish anymore.

5.1.2. Erosion of Indigenous cultures

The expansion of the agri-food system has led, to varying degrees, to a mix of cultures in Oaxaca, thereby causing the erosion of Indigenous cultures and knowledge. A3 and A11 pointed out that most producers now use agrochemicals and machinery, and only a few are still practising traditional agriculture. Long-term relationships with the environment and their associated knowledge are being lost due to lack of practice (A3; A7; A8; A11). Even among the interviewees, only a few still maintain some sense of connectedness with their natural environment. A3 expressed that nature has now been commodified and is not seen anymore as “a living being that is nourishing you, that is part of you”. In addition, fewer and fewer people are willing to work in the fields (A3; A11). Many of them migrate to cities and touristic destinations in search for better living conditions, so that part of their indigenous cultures is being lost (A3; A4).

Besides, globalisation has brought another kind of alimentation, including junk food and industrial food, that has caused serious health issues among the Mexican population, such as obesity, diabetes, and digestive system problems (A5; A7; A12). A7 also emphasised how the diffusion of Western knowledge threatens Indigenous diversity. She recounted that even as organic, Indigenous farmers, there are some local and traditional varieties that they stopped producing since their clients rather ask for certain imported fruit and vegetables, such as grapes and broccolis. She explained that Mexicans were recommended to eat spinach, for instance, whereas the intense climate conditions in Oaxaca are not favourable to its production and there are other traditional plants that provide the same nutritional value.

5.1.3. Impacts of climate change on food production

The interviewees all expressed serious concerns over the changing climate and its impacts on small producers' ability to grow food. Temperatures are rising (A5; A7; A8; A11) and farmers are experiencing delayed and shorter rainy seasons (A2; A7). While farmers used to sow at precise dates, shifts in the traditional seasonal pattern entail that they cannot foresee any more when it will rain and when it is best to sow (A3; A7; A8; A9). If they sow but the rain does not come, seeds may not germinate (A1; A2; A3). They will have to sow again if they have some seeds left or can afford others.

There have also been considerable changes in the quantity of water available for small producers that rely on irrigation. A1 and A5 mentioned that the river dried up in their localities. While rainfall in the rainy season used to replenish the rivers, each year the river's flow is becoming weaker (A5).

Likewise, the level of water in farmers' well after the rainy season is dropping each year (A1; A8), thereby compromising their ability to grow food until the following rainy season. In addition, water scarcity jeopardises human consumption of fresh water. A5 mentioned that her locality is experiencing water stress so that it is not allowed anymore to construct wells for personal consumption. More critically, A6 also expressed that inhabitants in her village have access to running water at home only 2 hours every three days.

Furthermore, farmers are experiencing drought, and delays in the rainy season are exacerbating such phenomenon (A8). Plants that are not heat-resistant are drying up (A7; A8; A11). A7 and A13 recounted that the soil dries so fast after they watered their crops that they need more water to secure their production. While the interviewees are making considerable efforts to use sustainable farming methods and protect their environment, water scarcity poses severe threats to their ability to produce food. Besides, small producers are faced with extreme weather events and climate-induced disasters, such as hurricanes, hailstorms, and torrential rains, that destruct part or all of their crops (A1; A4; A7; A8; A9; A10).

Conversely, A4 and A9 pointed out that their communities at altitude benefit from rising temperatures as they can grow certain crops that they could not formerly. Yet, there are also other varieties that that they cannot produce anymore, and their production is also threatened by unpredictable climatic and weather conditions.

5.2. Reversing globalisation processes

In this chapter, I present core aspects of (Indigenous) food sovereignty that Indigenous food producers are implementing to enable the right to healthy and culturally appropriate food produced through sustainable farming methods. I thereby also investigate the key role of these actors to revitalise Indigenous knowledge and practices in the face of globalisation.

5.2.1. Awareness of issues brought by globalisation

Realising the disrupting effects of globalisation is the first step to shift away from the neoliberal, industrial paradigm and deliberately implement food sovereignty. Interviewees all have a general understanding of the detrimental impacts of malnutrition and industrial agricultural methods. Health concerns have been a major motivation for various interviewees to start growing organic food (A1; A2; A3; A4; A7; A8). They emphasised the critical importance of producing and consuming nutritious food without chemicals, thereby reflecting the fundamental right of people to healthy food defended by the food sovereignty movement.

Some small producers also realised the harm they were causing to the environment by using agrochemicals (A1; A5; A7). As A8 highlighted, most Indigenous peasants used to take care of the environment and now, they see the consequences of neglecting it. A few interviewees expressed the responsibility they have towards the environment to protect it from pollution (A1; A3), to repair the damage that has been done (A1), and to find again an ecological balance that enable them to cultivate and eat healthy without harming their natural surroundings (A7).

5.2.2. Revitalising Indigenous cultures

Faced with adverse side effects of globalisation, interviewees are now aware that they should go back to traditional practices. *Los Abuelos* (their grandparents, forefathers) knew how to be healthy, how to cure, and how to nurture the environment (A7; A8; A12). Although much of this knowledge has been lost due to the predominance of the Western knowledge system, it has been transmitted in a way or another, and Indigenous food sovereignty advocates play a central role in revitalising traditional knowledge (A7; A12).

Some interviewees are making efforts to preserve part of their cultural heritage. Some are still producing and selling culturally important species while explaining their nutritious and cultural value to customers. Some respondents also conserve original seeds and keep growing several traditional crop varieties. While globalisation and its underlying mix of cultures have undermined a long history of sustainable co-existence between Indigenous communities and their local environment, some small food producers still value their connectedness with their environment and foods. For instance, they demonstrate respect to the earth before working it (A3; A8; A9), and they reintegrate unsold food and cut vegetation in compost to complete regenerative cycles (A8; A11).

Besides, knowledge transmission is of paramount importance to preserve Indigenous knowledge. A2 explained that her grandchildren regularly accompany her in the fields and to the cooperative store where she works. By involving her grandchildren in these activities, she passes down knowledge. A3 mentioned that she cooks traditional food for her grandchildren for them to learn and conserve flavours. Revitalising traditional knowledge is also about sharing with others. A5 is notably part of a small group of women that teach each other traditional recipes and remedies.

5.2.3. Sustainable farming

Among the small producers I interviewed, some have been practising Indigenous-based agriculture their whole life, others converted to sustainable farming practices or recently started growing organic food. Most of the sustainable farming techniques several interviewees told me about, are traditional practices that are nowadays considered as agroecological methods. During certain

interviews, informants used those two terms interchangeably. I presume that the confusion comes from the fact that some of them have only recently learnt how to farm and did not learn traditional agriculture from their parents or grandparents. To avoid further confusion, I will hereafter use the term “sustainable farming” to refer to the combination of traditional and agroecological practices.

Polyculture, crop diversification, and crop rotation are all efficient methods that enable small farmers to produce diverse food, even on a small plot, and to sustain themselves while regenerating the earth (A1; A3; A6; A7; A8). The *milpa*, a traditional technique that consists in growing maize, beans, and squash together, is also commonly used. Interviewees are still using the yoke of oxen or bulls and/or use tractor in their fields. Besides, various respondents highlighted that they use organic fertilisers, such as compost, animal manure, ashes, and rock flour, to nourish the earth (A1; A3; A5; A7; A8; A11; A13). Some interviewees are also making natural repellents to chase certain insect pests away (A2; A7; A13).

5.3. Sustainable farming: opportunities, limitations, and threats

This chapter first aims to identify opportunities of sustainable farming for small producers to generate livelihoods and cope with climate change. It then highlights limitations of and threats to such approach encountered by interviewees.

5.3.1. Livelihood opportunities

Sustainable farming provides various livelihood strategies to Indigenous farmers, both women and men. Most informants stressed that growing food enables them to gain a certain economic independence as they consume their own food production, thereby limiting expenditures on food (A1; A5; A6; A7; A8; A13). Producing food themselves contributes to their food security and is essential in case they run short of money (A5; A7). Additionally, having a good nutrition enhances farmers’ health, and therefore decreases expenditures on doctors and chronic illnesses (A1; A3; A10). A7 added that by growing medicinal plants, she can cure herself and does not have to spend more money on healthcare. Accordingly, small producers can dedicate their incomes to other needs (A10).

Some small-scale farmers that I interviewed depend on rain-fed agriculture and only produce once a year during the rainy season. They then have additional livelihoods and/or off-farm jobs to earn a living. Others rely on irrigation to grow food all year for their own consumption and to sell the surplus a few times a week in their communities, other localities, or markets in urban areas further away. In addition to growing food, some farmers also raise animals and/or sell eggs, fruit, wild fruit, medicinal plants, flowers, seeds, and organic fertiliser as part of their livelihoods.

Processing food into products that they can sell more expensive is another key livelihood strategy for small-scale producers. Instead of directly selling their food production, they can generate an added value on the same food. Food processing also represents a livelihood activity when they have to wait to harvest their crops or for the rainy season (A10). Making preserves is another form of processing food that also has the advantage of avoiding food loss in case farmers do not sell their whole food production (A11).

Although producing organic food is not very profitable (A13), several interviewees highlighted the satisfaction they get out of farming and being in contact with the environment (A1; A6; A13). In chapter 5.4., I will also discuss diverse benefits for small producers to be part of local organisations.

5.3.2. Strategies to cope with climate change

In addition to the sustainable farming methods described above, interviewees are adopting a series of coping mechanisms to deal with changing climate and environmental conditions. A3 pointed out that small producers draw on experiential learning to find out the most adaptative responses. Selection is a key practice whereby farmers choose the seeds of the plants that were the most abundant and drought-resistant (A3; A8). Food producers also turn to other plant varieties or species that are likely to withstand higher temperatures (A3). In this regard, greenhouses and shading meshes have been helpful to protect crops from extreme weather conditions and climatic events (A8; A13).

Due to delays in the rainy season, farmers are now adjusting the timing of sowing and wait for the onset of the rainy season to sow (A6). Facing water stress, drip irrigation systems have proved to be an efficient water management technique that allows small food producers to optimize and control the quantity of water they are consuming (A8; A11; A13). In addition, various small producers recollect rainwater and use it for watering plants, home cleaning, and toilets (A1; A2; A5; A6; A12; A13). A11 also noticed that by regenerating the soil in her plot with compost, it became spongy. In this regard, Altieri & Nicholls (2017) contend that adding organic matter into soils is an effective coping mechanism to drought as it “increases water holding capacity, infiltration, drainage, aeration and biological activity which enhances water use efficiency.” (p.40)

5.3.3. Economic limitations

Growing food through sustainable farming practices requires more time and efforts than by using agrochemicals. Yet, most small producers I interviewed have no choice but to sell their products at the same price or slightly higher than conventional food. A3 explained that most people rather opt for the cheapest options than for health-related benefits associated with organic food. If organic

producers do not align with market prices, they will not sell their production. A13 stressed that they earn little money and are not remunerated at a fair price for their hard work.

Besides, although there are effective solutions, such as greenhouses, shading meshes, and rainwater tanks, that would help small-scale producers to secure their food crops in the face of climate of change, several interviewees pointed out that those solutions are particularly expensive (A3; A8; A13). Their lack of financial resources therefore impedes them from accessing efficient coping mechanisms.

5.3.4. Sustainable farming is no panacea

Despite the health, livelihood, and environmental benefits of sustainable farming, there are significant limitations that impede small producers to convert to such agricultural model and individuals to start growing organic food. A10 explained that using agrochemicals enables low-income families to get higher production yields, and therefore earn more incomes for making ends meet. Additionally, the transition to sustainable farming takes about three years for food production to become more abundant (A10; A11). Yet, a family that lives from hand to mouth cannot afford to think in the longer term and to lose a large part of incomes in the meantime (A4; A10).

There are many factors that contribute to extreme poverty (A4; A10). Although sustainable farming enables small producers to enhance their health and generate livelihoods, this approach does not systematically resolve other critical issues to get out of poverty, such as unfavourable policies, gender inequalities, or low liquidity (A10).

5.3.5. Threats to food production

Although sustainable farming provides small producers with a series of strategies to cope with climate and environmental changes, most interviewees are confronted with water stress and scarcity that seriously compromise their ability to produce food in the near future. This critical situation jeopardises their food security, livelihood sources, and ultimately food sovereignty as they might not have other choice than consuming cheap, inorganic food. Water stress also refrains other individuals from growing food (A3; A5; A8).

The coping strategy of adjusting the timing of sowing is also subject to risks. As Pardoe et al. (2016) argue, seasonal variability entails that farmers may experience dry spells, between initial rains and the onset of consistent rain, that young plants might not withstand. Likewise, young plants might not resist heavy and consistent rains.

5.4. Regenerating local food systems

In this chapter, I first introduce four local organisations that I interviewed. I then discuss their key roles in fostering diverse aspects of (Indigenous) food sovereignty by regenerating local food systems. Lastly, I identify challenges that restrict the consolidation of local food systems.

5.4.1. Introduction of four local organisations

Biohuacal is an agroecological farm that has been producing all sorts of vegetables, dairy products, chickens, and eggs for 10 years. The organisation sells its products at the price of organic food directly to clients and through over 10 distributors in Oaxaca de Juarez and surroundings. Biohuacal also recently opened a store in the city. Its mission is to raise awareness about food production processes, as well as to reduce the environmental footprint of its activities. In addition to the eight people working in the organisation, Biohuacal is collaborating with over 20 small producers to commercialise their products and remunerate them at a fair price (A11; Biohuacal; n.d.).

Founded in 2003 in Oaxaca, *Puente a la Salud Comunitaria* (Bridge to Community Health) is an US-financed civil society organisation working to advance food sovereignty while improving the health and economic well-being of rural communities in the region (Puente a la Salud Comunitaria, n.d.-a). The organisation has focused on reintegrating amaranth into rural families' diet, a highly nutritious cereal that was once banned by the colonisers (A10). Puente has provided small producers with knowledge, tools, and continuous support to produce amaranth (A10). To foster the commercialisation of amaranth, as well as livelihoods opportunities for small producers, it has also supported the development of two amaranth networks in Oaxaca, one of them is discussed hereunder (Puente a la Salud Comunitaria, n.d.-b).

Formed 9 years ago, *Red de Amaranto Valles Centrales* (Amaranth Network Valles Centrales) is a community network composed of amaranth farmers, microenterprise groups, and consumers guided by the principles of agroecology and solidarity economy. Microenterprise groups buy amaranth to producers and process it into various products such as popped cereal, granola, flour, and crackers. Although Puente still provides some guidance to the leadership committee, the network is governed through collective decision-making (Puente a la Salud Comunitaria, n.d.-b).

The community space *Unitierra Huitzo – Yelao* saw the light of day in Huitzo 10 years ago and is voluntarily maintained by a permanent group of 10 women. The organisation's first intention was to use the space to demonstrate a series of ecological techniques, such as wood-saving cookers, dry toilets, rainwater harvesting cisterns, and soapy water filters. Unitierra also organises various workshops, activities, and initiatives to raise awareness about nutrition and environmental care.

More recently, the organisation has put its space at local producers' disposal to organise markets on Saturdays (A12).

5.4.2. (Re)creating livelihoods

While advancing food sovereignty, relocating food-related activities contributes to “adding value to the agroecological production of small farmers by participating in new markets and developing better ways to generate sustainable incomes” (Puente a la Salud Comunitaria, n.d.-a). Local organisations and the local actors that are forming them, are at the heart of the coordination of activities around food production, processing, and distribution (Pimbert, 2009b).

As a civil society organisation, Puente has empowered local people to create livelihoods opportunities around the production, processing, and distribution of amaranth. The organisation has helped them to create added value on amaranth production by processing it into over a hundred products (A1; A10), and to commercialise their products. A10 stressed that among the families that participated in Puente's programmes, the migration rate has been kept low.

Since then, amaranth producers and processors have joined forces to create Red de Amaranto and coordinates these activities. Within the community network, A1, A2 and a few other food producers and processors recently decided to open a cooperative store in which they sell the products of over 20 local food producers and processors. Together they share opening hours and expenditures to maintain the place. The store provides a point of sale for these local products to reach a greater public.

In the case of Biohuacal, A11 explained that it is central for the organisation to valorise traditional farmers' work and for their products to reach clients that are willing to pay a fair price for organic food. By buying small producers' products to commercialise them, Biohuacal provides them a place of distribution, and ensures sales to small producers.

5.4.3. Fostering good nutrition

In addition to the health benefits provided by small producers practicing sustainable farming and that were discussed above, local organisations also play a key role in fostering good nutrition.

One of Puente's *raison d'être* is to improve rural communities' health by fostering good nutrition. The organisation has helped tens of thousands of people by organising informative workshops and promoting the nutritional properties of amaranth (A10). By producing, processing, and distributing amaranth products, Red de Amaranto contributes to expanding access to locally produced healthy food. Likewise, Biohuacal also participates in the expansion of local healthy food systems by offering

a wide range of organic products. Besides, in the attempt to promote good nutrition in its community, Unitierra has offered a space for local small producers to sell their food production and for community members to have an easier access to healthy food.

5.4.4. Revitalising Indigenous cultures

Regenerating local food systems provides a space to recreate local Indigenous identities eroded by globalisation. As discussed above, small food producers and processors are central to preserve and revitalise Indigenous cultures by providing culturally important foods, using traditional agricultural practices, and transmitting traditional knowledge. Through local food systems, Red de Amaranto and Biohuacal have the opportunity to revalorise Indigenous food producers and processors' work, and to share their cultural heritage with consumers. A2 expressed the importance for the members of Red de Amaranto to conserve their local identity in the face of globalisation. A1 also shared that being part of the network awakened a sense of identification in her.

5.4.5. Promoting social and solidarity economy

Regenerating local food systems is also a way to boost social and solidarity local economies. As A1 highlighted, in this way, money circulates locally among local populations and is not sent elsewhere without knowing whether it will come back. In addition to the potential to (re)create livelihood opportunities, diverse forms of solidarity arise between members of local organisations. A8 pointed out that members of Red de Amaranto help one another by selling each other's products to their personal clients. As a producer for instance, he buys processed products to food processors to sell and bring them to his clients. A8 also expressed that network members buy food from each other for their own consumption and in case they are lacking certain food ordered by clients.

The collaboration of Biohuacal and various traditional farmers is also an initiative promoting a social and solidary economy. Additionally, by generating a network of small producers, the organisation also has tightened stronger community bonds among farmers that help each other, for instance, in case some need help to make preserves and not waste their food production (A11).

5.4.6. Sustaining the environment

Local organisations play a critical role in sustaining the ecological basis of food systems (Pimbert, 2009c). The four organisations all emphasised the great significance of nurturing the environment within their organisation by using sustainable farming methods to grow food, as discussed in different parts of this study. Besides, Biohuacal and Unitierra put initiatives in place to limit single-use plastic bags. Biohuacal's clients can order products in reusable bags that they return at each

purchase (Biohuacal, n.d.). In its store, the organisation also favours food in bulk (A11). Likewise, Unitierra encouraged to stop using plastic bags in the local market the organisation organises (A12).

Local organisations are also a place where small producers have the opportunity to share experiences and exchange knowledge regarding food production, and environmental and climatic challenges (A8; A11; A13). For instance, A13 pointed out that when members are having some issues, they ask other members for recommendations. A11 also highlighted that local organisations include diverse forms of thinking, strategies, and knowledge from which members can benefit.

5.4.7. Challenges to consolidate local food systems

Despite the societal services that local food systems and local organisations provide to local populations, they are confronted with obstacles that restrict the consolidation of local food systems.

A6 and A11 expressed that it is a difficult task to change people's consumption habits. Although the economic rational leads most people to buying the cheapest products, A1 explained that having a good nutrition is a choice and that her clients are mainly low-income families that favour nutritious and healthy food. She stressed that most people live from hand to mouth and do not take the time to get interested in those topics. Accordingly, the limited demand for locally produced organic food impedes local food systems from expanding and consolidating.

A8 explained that legal requirements also present a barrier for local food producers, processors, and organisations to reach more consumers. Without the organic seal, for which they have to pay, they have to sell their products at a lower price than food recognised as organic, as well as gain their customers' trust regarding their products quality. In addition, if they want to sell larger quantities to local governments or on social media, local food producers, processors, and organisations need to register their trademarks and obtain an invoice number. A11 pointed out that scaling up projects is complex as there are many points to deal with.

Furthermore, A4 pointed out that the lack of local organisations in certain areas hinders local populations to exercise their right to food sovereignty. He recounted that his community in the mountains does not have conducive conditions to produce certain staple foods since there is no flat plot and appropriate climate. Low-income community members have therefore been importing cheap conventional food. Although this community cannot ensure its food self-sufficiency, food sovereignty also entails for people to define their own model of consumption, thereby choosing to support certain production models. More local organisations are needed to expand access to locally produced organic food, and thereby consolidate local food systems.

5.5. Fostering food sovereignty

This chapter brings to light the roles of local authorities and local actors in advancing food sovereignty and protecting the environment. It concludes with challenges to provoke a paradigm shift towards food sovereignty.

5.5.1. Weak involvement of local authorities

When asking interviewees about initiatives undertaken by local authorities to foster food sovereignty and protect the environment, most of them stressed their weak involvement. Only a few interviewees mentioned positive initiatives in their localities. For instance, local authorities lend a space to organise farmer markets (A1), recommend community members to take care of water and use certain crop varieties that are more drought-resistant (A6), or are committed to recycling (A2). Conversely, A5 expressed that while her locality had to recycle, the succeeding authorities did not make recycling compulsory anymore so that the locality backed out instead of moving forward. Besides, A12 explained that Unitierra has been insisting to local authorities to clean up the contaminated river that runs through the village. The organisation brought academics expert in water treatment to study the situation. Yet, the local authorities have not done anything so far to deal with this issue.

5.5.2. Agents of change

Given the weak involvement of local authorities in fostering food sovereignty, most interviewees and local organisations act as agents of change and take several initiatives in hand to raise awareness about good nutrition, sustainable farming, and environmental care. As A12 highlighted, “changes come from below, we will not wait for them to come from above”. A7 emphasised the importance to make people understand that there exist other ways to conceptualise societies than the one dictated by the global economic system.

Various small producers that I interviewed give their time to organise free workshops on how to farm, make compost, cook certain dishes, among other things (A1; A2; A4; A7; A9; A13). A1 expressed that members of Red de Amaranto adapt their workshops according to what people want to learn. Some of them also go to schools and municipalities to give workshops (A8). As far as Biohuacal is concerned, the organisation is also dedicated to explaining food production processes on social networks for anyone willing to start growing food at home (A11). Rather than growing its project, Biohuacal focuses on how to become a reference point for other people and organisations to start similar initiatives (A11).

Puente was built on the principle that rural families have the right to an informed understanding of nutrition and health (Puente a la Salud Comunitaria, n.d.-a). In addition to their efforts to incorporate amaranth into families' diet, the organisation has also given a series of workshops and strategic equipment, such as shovels, seeds, and wood, to train community members (A10). A10 explained that at first, only a few families participate to their workshops. Progressively, other community members realise the positive outcomes and are also willing to learn. Puente has thereby helped over three hundred peoples annually, and between 40 and 50 thousand in 18 years.

Unitierra also originated from the intention to teach and spread the use of ecological techniques in communities nearby. A12 recounted that the organisation also organises workshops on how to produce food, as well as activities, on Mother Earth Day for instance, to raise awareness about the importance of the environment. Members of the organisation also went to all schools in their village to talk about nutrition and health.

5.5.3. Challenges to change the status quo

When asking interviewees if they try to influence governments to foster food sovereignty, most of them rather emphasised initiatives they take themselves in hand due to the weak involvement of authorities. Yet, A7 recounted the experience of Red de Amaranto that asked a municipality to support social and solidarity economy by buying amaranth products and reselling them to schools that usually give biscuits to pupils. After struggling to arrange meetings and peaceful discussions, local authorities agreed but has not made anything concrete so far, pretending that they are still constituting internally. In this regard, A10 pointed out that municipalities change every three years, and that public administration is not structured. If individuals or local organisations are trying to influence on certain matters, priorities are likely to shift after a government change, and previous initiatives are interrupted.

At the federal level, A10 further explained that the government changes every six years and the president in place put people he trusts in charge of functions for which they do not have the expertise. A10 stressed that influencing policy changes is a difficult task as it requires many funds to lobby, local organisations cannot afford such actions. In the case of Puente, the organisation rather takes action to change public opinion through social media, interviews, and events.

6. Discussion

6.1. Addressing the research questions

Findings showed how globalisation has led to a mix of cultures in Oaxaca, thereby eroding Indigenous identities and knowledge. In this research, fostering food sovereignty is seen as deliberately reversing globalisation processes for local actors to retake the control of their food systems and revitalise their Indigenous cultures. Relocating activities around food enables local actors to exercise their right to food sovereignty as they self-determine their models of food production, distribution, and consumption. Rather than depending on global markets and external forces, local actors' needs and aspirations are at the heart of decision-making (La Via Campesina, 2010). Besides, findings suggested that local food systems are a space where local actors can reconcile livelihood opportunities with environmental protection, health benefits, social values, and Indigenous cultures revitalisation, thereby fostering (Indigenous) food sovereignty. By retaking the control of their own food systems, local actors are empowered against a government that still pursues industrial and neoliberal ideologies.

Food producers practising sustainable farming are of key importance in advancing food sovereignty as local food systems rely on the food they provide. They are also among the first affected by the adverse effects of climate change. As discussed in the findings, interviewees rely on both traditional ecological knowledge and agroecological methods, to varying degrees, to protect the environment and cope with climate change. Small producers are thereby building more resilient agricultural systems. Yet, in some areas of Oaxaca, findings revealed that water scarcity coupled with more intense temperatures poses severe threats to small producers' future ability to produce food and remain the sovereigns of their food production and consumption models.

Although interviewees are using traditional practices, traditional ecological knowledge is jeopardised. Environmental and climatic changes are compromising the relevance of certain knowledge, while the cultural erosion caused by globalisation has disconnected most interviewees from their natural surroundings. The real challenges are therefore to keep revitalising traditional wisdom and foster the production of new knowledge for small producers to build resilience to climate change. As several interviewees pointed out, local organisations also provide a learning space for small producers to share experiences and exchange knowledge. In this regard, Altieri & Nicholls (2017) put forward that extending and consolidating social networks are key components to reduce small farmers' social vulnerability to climate changes and thereby increase agroecosystem resilience.

Lastly, local actors working towards food sovereignty and the consolidation of local food systems are faced with obstacles. While they are implementing alternative lifeways for local populations, they are still restricted by the system in place that favours the importation of cheaper conventional and industrial products in local markets. The economic rational leads a large part of the population to consuming these cheap products, rather than supporting environmental, social, health, and livelihoods benefits of local food systems. Local populations' lack of awareness and agency are therefore also a major obstacle to advancing the right to food sovereignty and for local actors to benefiting from the full potential of this approach. Besides, while an (Indigenous) food sovereignty approach, founded on traditional and agroecological knowledge, empowers small farmers to cope with climate change, changing environmental and climatic conditions are compromising their ability to produce food, as well as their food security, livelihood sources, and ultimately their food sovereignty. Their lack of economic resources also hinders small producers from accessing effective solutions, such as greenhouses, and rainwater tanks, that would help them secure their food production.

6.2. Grassroots transformations towards food sovereignty

As Pimbert (2009b) argues, transformations in the political, economic, social, and ecological areas are required to realise the right of peoples to food sovereignty. Hitherto, policies in Mexico primarily enforce industrial and neoliberal ideologies, and the Mexican government has not expressed radical policy shifts in favour of the implementation of food sovereignty. Yet, acting at the scale, the local actors I interviewed, are advancing and diffusing food sovereignty. Their roles as agents of change and the actions they undertake bring about changes in these four areas.

By regenerating sustainable livelihoods around food at a local scale, local actors gain autonomy from the global agri-food system and its destructive policies. They recreate a local economy, whose benefits are concentrated locally, promoted along with social values such as solidarity and reciprocity. As discussed throughout the findings, local actors are playing a critical role in sustaining the environment. While environmental care was not the primary reason for most interviewees to practice sustainable farming but rather the health and resilience benefits it provides, they undertake a series of initiatives to raise awareness among local populations about the importance to take care of the environment and adopt environmental-friendly practices. Local actors' actions thereby reflect their cultural responsibilities to restore their relationships with their natural environment.

In addition to creating and strengthening local organisations, Pimbert (2009b) highlights that achieving food sovereignty depends on social change for people to reclaim power over their lives.

Although the interviewees can hardly influence the political sphere, they take actions to inform people, show that alternatives are possible, and ultimately change their production and consumption behaviours towards the realisation of their right to food sovereignty.

6.3. Further research

I suggest several research avenues to further explore the potential of local food systems in advancing food sovereignty. Studying diverse local organisations within a local food system would be a relevant approach to highlight and reinforce positive features. Investigating how local actors participate in decision-making processes is another avenue for better understanding how local food systems and local organisations recreate democratic processes. In addition, gaining insight from consumers would also be useful to identify motivations behind and obstacles to responsible consumption. Lastly, exploring to which extent local organisations provide a learning space for small producers to gain knowledge and build more resilient agricultural systems, would further develop the potential of an (Indigenous) food sovereignty approach to address climate change.

7. Conclusion

This master thesis aimed to unfold the notions of food sovereignty and Indigenous food sovereignty and explore how they empower Indigenous peoples in the face of globalisation and climate change. I presented the case study of Oaxaca where local actors act as agents of change to implement (Indigenous) food sovereignty from a bottom-up approach. To shift away from the neoliberal and industrial ideologies for food and agriculture, sustainable farming and regenerating local food systems are key components for peoples to exercise their right to food sovereignty. I discussed their benefits for local actors to reconcile livelihood activities with environmental protection, health benefits, social values, and Indigenous cultures revitalisation.

While working towards (Indigenous) food sovereignty conceives alternative pathways for empowering rural populations, the reach of food sovereignty and the consolidation of local food systems are still limited by the global food system, and more precisely by the presence of cheaper conventional and industrial food in local markets, as well as local populations' lack of awareness and agency. Besides, while sustainable farming offers key strategies for small producers to cope with climate change, such phenomenon is already jeopardising their food production, food security, and livelihood sources. Facing the predicted climate scenarios, it is therefore crucial to rescue Indigenous wisdoms eroded by globalisation, as well as foster new knowledge and knowledge exchange for small producers to build resilience to climate change. In this regard, researchers stress the relevance of

collaborative approaches that combine traditional ecological knowledge and scientific knowledge to develop more effective coping strategies to climate change (Loch & Riechers, 2021; Ahmed et al., 2022)

Although it will be “a long and hard struggle to see food sovereignty become the standard model for food production and rural development” (Wittman et al., 2010, p.2), the food sovereignty movement keeps gaining momentum across the world, thereby reflecting that food sovereignty inspires initiatives around the world that empower small producers and local populations.

8. References

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