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Conceptualization of alternative food networks in Latin America: a case study of a local food system in Southwestern Colombia

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Alternative Food Networks (AFN) is a concept that has emerged in opposition to conventional food systems and the global food regime. AFN are localized food networks that connect actors from food producers to consumers creating a pathway that strengthens ecological, social, and economic sustainability. Much of the literature on AFN focuses on geographies and food systems in the Global North, often recommending schemes such as farmers' markets, community supported agriculture, organic certification, and fair trade. However, these strategies are not always appropriate for food systems in the Global South. In Colombia, small producers have maintained a parallel traditional food system, despite the growing pressure and investments to transition to a conventional food system. This research analyses the local food system of Cauca addressing the following questions: 1) what are the dynamics of the local food system in the Andean region of Cauca and 2) how can the local food system in the Andean region of Cauca be conceptualized as an alternative food network in the context of the Global South? To answer these questions, transdisciplinary research was carried out using SWOT analysis during multiple stakeholder workshops, followed by a reflexive thematic analysis of the results. The results show coexistence of both traditional and conventional food system dynamics, with participants assigning greater value to traditional food systems and agroecological production (akin to AFN literature), yet the economic insecurity and socio-political unrest that underlies daily life prohibits a more robust transition from conventional food system. It is argued that the understanding of AFN should be expanded to incorporate socio-cultural context as well as the dynamics of AFN in the Global South.

KEYWORDS

alternative food network, local food system, traditional knowledge, Global South, sustainable agriculture

1. Introduction

Food systems, which refers to the interconnected, multi-scale web of food production and food provisioning, play a key role in modern environmental and social crises. According to the IPCC (2022) food systems are responsible for about 42% of anthropogenic greenhouse gas emissions, contributing significantly to climate change, as well as 70% of freshwater use,

biodiversity loss, and soil depletion (Millennium Ecosystem Assessment (MEA), 2005; De Schutter, 2017). These impacts are most often associated with 'industrial' or 'conventional' food systems, characterized by large-scale monoculture production, typically with mechanization and technification, where food travels through a long supply chain before it is consumed (Michel-Villarreal et al., 2019). Conventional food systems emerged as the dominant or 'mainstream' food system in many countries in the Global North in the second half of the 20th century, justified by the discourse that food needed to be produced on larger scales in order to feed a growing global population (Shaw, 2007).

As power in the food system became consolidated in the hands of corporations (supported by governments and international trade organizations), counter movements arose in opposition to the social injustices and environmental harm caused by the mainstream food system (Cleveland, 2014; Altieri and Nicholls, 2015; McMichael, 2016). Efforts that challenge the mainstream food system by prioritizing ecological health, social equity, and community relationships towards more localized food systems, are often referred to as Alternative Food Networks (AFN) (Feenstra, 1997; Whatmore et al., 2003; Wald and Hill, 2016).

The types of schemes that have been most studied in AFN literature are localization, community-supported agriculture, farmers' markets, organic certification, food cooperatives, solidarity purchasing groups, community gardens, and fairtrade (Harris, 2010; Goodman et al., 2012; Michel-Villarreal et al., 2019). Generally, there is support in the literature for AFN schemes as pathways to build trusting relationships between producers and consumers to increase access to healthy food (Whatmore et al., 2003; Tregear, 2011; Kremen et al., 2012). However, there is concern for AFN that become "exclusionary" or "elitist" with high costs of organic produce and fairtrade foods, or where access to farmers markets and food co-ops is limited or distant (Goodman et al., 2012), and as DuPuis et al. (2006) indicates, "localization" can often exacerbate social injustices in food systems.

Although the concept of AFN has become more widespread, the vast majority of AFN literature focuses on food systems in the Global North, particularly the United States, Canada, Europe, the United Kingdom, and Australia (Holloway et al., 2016; Michel-Villarreal et al., 2019). AFN schemes have become part of the sustainable food movement discourse in countries of the Global North, where behaviors and business models are driven by ecological and social values (Reckinger, 2022). There is a gap in the literature exploring AFN in the Global South[1], despite the need to bolster sustainable food systems (Guibrunet et al., 2023). In Latin America, for instance, the conventional food system is becoming more problematic and would benefit from AFN research.

Given Colombia's vast cultural and biological diversity, as well as its complex socio-political history, this Global South country was used as a case study in this research to evaluate the food system in its Andean region in the southwestern department of Cauca as a model of an AFN in Latin America. The Colombian food system transformed with the arrival of the Green Revolution and the vigorous promotion of rural development by the State, together with the neoliberal period of trade liberalization in the 1990's (Roa-Clavijo, 2021). Conventional food systems became more prevalent, shifting from small scale, local production using traditional methods to more export-driven production using industrial agricultural methods (León Sicard and Rodríguez Sánchez, 2002; Correa and Forero, 2008). The growing demand in the international market for cash crops such as sugar cane, coffee, beef, and bananas incentivized Colombian farmers to prioritize production of these commodities, contributing to the decrease in agrobiodiversity throughout the country and adopting conventional agricultural methods more widely (Corporación Grupo Semillas y Vélez Ortiz, 2019).

Yet, despite the efforts to industrialize the Colombian food system, small-scale producers throughout rural areas of the country were able to resist and maintain much of their traditional food systems (Roa-Clavijo, 2021). This is especially evident in the Andean region of the department of Cauca. Cauca is an agrarian society; over 60% of the population lives in rural areas and agricultural production is the main livelihood (Departamento Administrativo Nacional de Estadística (DANE), 2018).

Small-scale peasant and indigenous farmers make up the majority of food system producers in Cauca, sustaining an alternative food system with significant local production and consumption, bartering networks, preservation of landrace varieties, traditional practices, and a plurality of knowledge systems. However, the local food system is not without conventional agricultural activities with related impacts such as deforestation, water insecurity, ecological degradation, and social inequalities in the region (Etter et al., 2008; Ruiz et al., 2017). There is a gap in literature regarding the dynamics and relationships of the local food system in Cauca; the tacit knowledge of food systems actors has not been sufficiently explored.

Given the complex web of 'traditional' and 'conventional' activities in the food system of the Andean region of Cauca, the following research questions are addressed in this study: 1) what are the dynamics of the local food system in the Andean region of Cauca and 2) how can the local food system in the Andean region of Cauca be conceptualized as an alternative food network in the context of the Global South? To answer these questions, transdisciplinary research was carried out through multiple workshops with stakeholder participation, and an analysis of the results was conducted using reflexive thematic analysis.

2. Theoretical and methodological approach

In thisresearch, the alternative food network in the Andean region of Cauca is approached from food system studies, using socio-ecological systems framework. Socio-ecological systems (SES) contain multiple subsystems, which are in constant interaction, producing complexities and emergent properties (Ostrom, 2009). Food systems are inherently complex, due to the relationships between biological,

1 In this paper the terms 'Global South' and 'Global North' are used to differentiate socio-political and economic dynamics among countries more so than to denotate geographical locations (Braveboy-Wagner, 2009). The concept of the 'Global South' (Latin America, Africa, parts of Asia, and Oceania), refers to countries or regions with similar experiences of endured colonialism, imperialism, and more recently, neoliberalism (Dados and Connell, 2013). While flawed, the concept attempts to encompass the general "spirit" of the regions, highlighting efforts of decolonization, plurality of knowledge systems, and opposition to the hegemonic world power structure (Grovogu, 2011).

cultural, and social subsystems, requiring a framework that allows for the analysis of multi-scale, nonlinear interactions (Allen and Prosperi, 2016; Vallejo-Rojas et al., 2016).

Food systems are comprised of distinct dimensions throughout the food supply chain from production, to processing and packaging, distribution, commercialization, consumption, and finally, disposal (Ericksen, 2008; Ericksen et al., 2009; Virapongse et al., 2016). It is important to determine the scale at which a food system is being evaluated, given that the scope and relevance of each dimension will change accordingly. In this study, the local food system of the Andean region of Cauca was analyzed considering the following seven dimensions: cultivation, harvesting, packaging, transportation, commercialization, consumption, and disposal, integrated into the socio-ecological system (including traditional knowledge and practices), considering the interaction with biogeochemical and climate conditions as well as the political, economic, and socio-cultural conditions (see Figure 1).

To compliment socio-ecological systems framework, food regime analysis was also applied to incorporate an historical and geo-political lens of the local food system in Cauca. The concept of food regimes, development by Friedmann and McMichael (1989), claims that during periods of (relative) political stability, hegemonic powers emerge which drive socio-economic trends in the global food system. Given that food systems are connected across scales, trends in the global food system affect dynamics in food systems at national, regional, as well as local levels. In applying a food regime analysis (McMichael, 2009; Pritchard, 2009; Bernstein, 2016), historical elements, power dynamics, and political influences have emerged that have had significant impacts on the local food system in the Andean region of Cauca.

Considering these frameworks, transdisciplinary research was carried out through four workshops with multi-stakeholder participation representing different roles within the alternative food network in the municipalities of Silvia, Cajibío, Totoró and Popayán, which are located in the Central range of the Andes mountains in the Southwestern department of Cauca, Colombia (see Figure 2).

The region is part of the Upper Cauca River Basin, which is one of Colombia's most important river basins economically, biologically, and culturally, traversing the country from the Central range of the Andes to the Northern Atlantic Ocean. The altitude ranges from 1,200–3,800 m.a.s.l. in high Andean and cloud forest ecosystems. The region has a cold and wet climate with temperatures ranging from 5 to 24 degrees Celsius and a high average annual precipitation of 2,000 mm (Alcaldía de Popayán, 2020; Acaldía de Silvia, 2020). The main economic activity of the region is agricultural production, due to the suitable climate and soil conditions, as well as the abundance of water sources. The region is also rich in cultural diversity with distinct ethnic groups.

For this research, workshops were carried out in rural areas in each of the four municipalities over a one-month period in 2022 with 143 participants, most of whom identify as members of indigenous or peasant communities. Participants were recruited through two research projects already taking place in the region that had developed connections with food system actors: the Water Security and Sustainable Development Hub, and SHARE – Water and Food Security Strategies for the Economic Reactivation in the department of Cauca. Participants represented different roles within the food system; from home gardeners, ranchers, dairy farmers, commercial farmers, to prepared food vendors, restaurant owners, and representatives of local government.

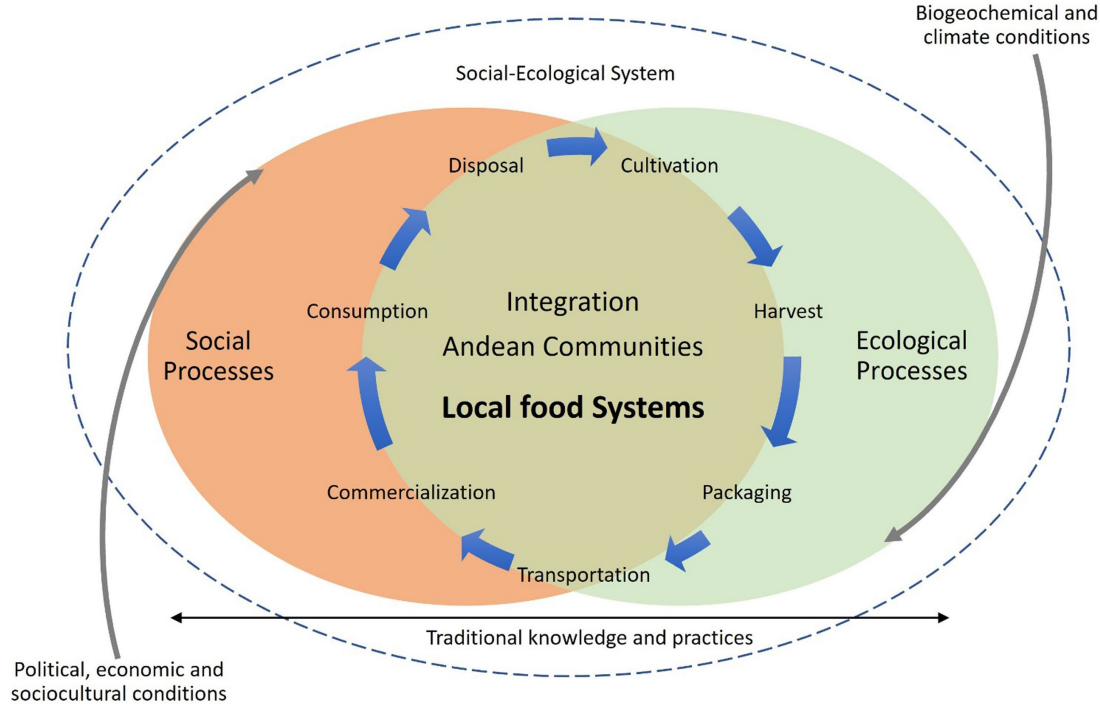

FIGURE 1
Conceptualization of local food systems as socio-ecological systems elaborated by the authors; adapted from Virapongse et al. (2016).

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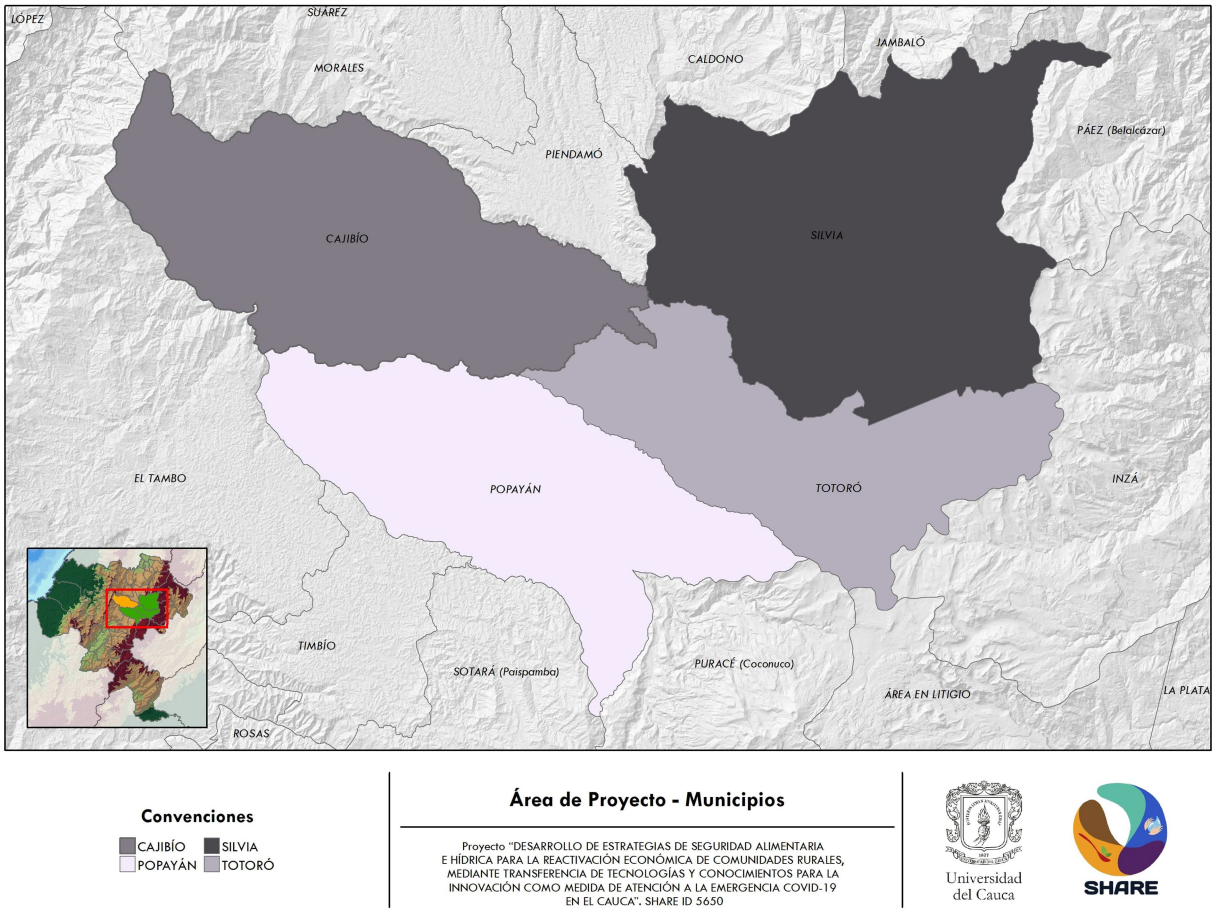

FIGURE 2
Map of the study area in Andean region of the department of Cauca. Source: SHARE project, 2021. Environmental Studies Group (GEA), Universidad del Cauca.

Local actors were involved in the study as part of a co-creation process to better understand the realities of the food system from place-based experience and expertise, together with academia. This transdisciplinary approach allows for mutual learning for both actors and researchers bringing together different knowledge systems (Scholz and Steiner, 2015a,b). This is especially important for the analysis of the alternative food network in Cauca, as there is not a wide array of data available, and the in-depth territorial knowledge of local actors is crucial for insight into the socio-ecological complexities of the system (Foran et al., 2014; Lamine, 2015; Polk, 2015).

To answer the first research question, 'what are the dynamics of the local food system in the Andean region of Cauca?', participants carried out a SWOT analysis to identify the strengths, weaknesses, opportunities, and threats for each of the seven dimensions of the local food system. In each workshop, four to five groups were formed based on geographical location, and facilitators guided each group to record their analysis on poster paper (see Figure 3). At the end of the activity, each group presented their SWOT diagram, which was recorded, and the audio was transcribed.

Subsequently, the 18 SWOT diagrams developed across the four study areas were combined and digitalized in Excel. A reflexive thematic analysis was carried out (Braun and Clarke, 2006; Braun and Clarke, 2019; Terry and Hayfield, 2020) in three phases: 1) familiarization of the data, where researchers reviewed the results based on discussions and participant observation during the workshops, 2) coding of the data, which was developed inductively during analysis, and 3) determining emergent themes, based on grouping of the codes and the narrative of the transcripts.

To address the second research question, 'how can the local food system in the Andean region of Cauca be conceptualized as an alternative food network in the context of the Global South?', the emergent themes identified from the SWOT analyses were compared to aspects of AFN literature in the discussion section.

3. Results and analysis

3.1. Results of SWOT analysis of Cauca's local food system

In order to consider the food system of the Andean region of the department of Cauca as a model of an alternative food network, the dynamics of the food system had to first be identified. SWOT diagrams developed by workshop participants produced an extensive matrix of data, which was subsequently condensed by consolidating similar responses (see Supplementary Appendix S1) and then summarized

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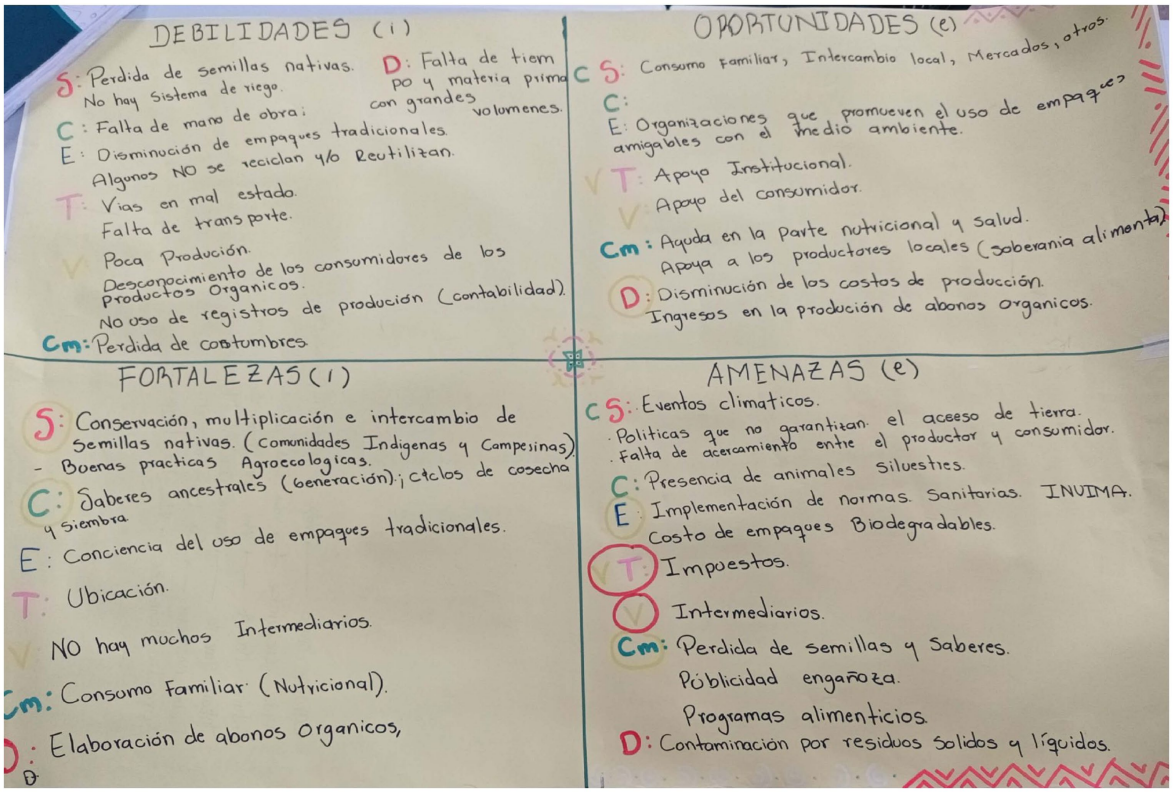

FIGURE 3
SWOT diagram developed in the workshop in the municipality of Popayán.

into the principal strengths, weaknesses, opportunities, and threats for each of the seven local food system dimensions as shown in Table 1. Due to the wide range of responses, only those repeated most frequently across the four study areas were included in the results.

Strengths identified for the local food system highlighted activities that are carried out and propelled by rural communities. Existing sustainable agricultural processes, for example, are rooted in traditional knowledge of the diverse cultural groups in the region, as well as processes to recover and sow landrace and native seed varieties. The incorporation of technical, scientific agricultural knowledge, such as agroecology, was considered to strengthen sustainable agriculture efforts as well. The trade networks and associations that communities have formed, together with diverse epistemologies applied to agricultural production, has resulted in robust localization of food production and consumption in the region.

The weaknesses assigned to the local food system during the workshops were associated with endogenous behavior of their own communities that they wish to improve. Most notably, conventional agricultural practices such as use of agrochemicals were considered to harm the health of themselves and the environment. This was in part credited to a lack of awareness, but more so due to the delayed benefits of transitioning to more sustainable practices. Many participants are not financially stable and expressed concern that yields would decrease if they stopped using chemical fertilizers and pesticides, resulting in inability to earn enough to feed and sustain their families.

The opportunities recorded directly addressed many of the weaknesses identified by participants. Underlying many of the responses was the opportunity to recover, preserve, and apply traditional knowledge towards processes in all seven dimensions of the food system including cultural recipes, learning from elders, cultivation rituals, plant-based food packaging, and seed saving. Additionally, trainings and capacity building were often listed as strategies to strengthen commercialization of products as well as transitioning towards sustainable agricultural production. Participants noted the importance of institutional support for trainings, as well as the participation of experts from their own communities.

The threats that participants noted were exogenous dynamics that affect Cauca's local food system. Liberal trade policies, such as the Colombia – U.S. free trade agreement, were identified as negatively impacting the diet of communities as well as creating more competition within the market for staple foods. Moreover, climate change and climate variability were considered threats during cultivation, harvesting, and transportation. Extreme weather conditions combined with poor road infrastructure and frequent road blockages create difficulties in food distribution.

3.2. Results of the reflexive thematic analysis

For the first phase of the reflexive thematic analysis, the raw data from the 18 SWOT diagrams was coded inductively among three researchers. This process went through several iterations until the researchers were in agreeance with the distinction between the codes. At the end of this stage, 21 unique codes were produced. After reviewing the frequency of the codes, two codes were found to appear

TABLE 1 Summarized results of SWOT analysis.

Food system	Summarized strengths, weaknesses, opportunities, and threats
Cultivation	S: preserved landrace and native seed varieties, traditional knowledge applied
	W: degraded soil, conventional agricultural practices, loss of landrace seeds, lack of land access
	O: seed and knowledge exchange, support for sustainable agriculture trainings
	T: climate change, pests and disease, hybrid and transgenic seeds, illicit crop production
Harvest	S: subsistence production, traditional knowledge applied
	W: crops contaminated with agrochemicals
	O: sustainable agricultural practices, subsistence production, planning with agricultural calendars
	T: climate change, pests and animals, lack of farm labor
Packaging	S: traditional, biodegradable packaging for food products
	W: extensive use of plastic, environmental pollution, lack of awareness
	O: return to traditional packaging materials, alternative materials training
	T: packaging regulations, foreign market demands, high cost of biodegradable materials
Transportation	S: high rate of local food consumption, producer-run associations, community organization
	W: roads in poor condition, absence of roads, uncommon to own private vehicles
	O: producer-run associations, community transport options, institutional support
	T: climate change, extreme weather, landslides, high fuel and transport costs, roadblocks
Commercialization	S: producer-run associations, diversity and quality of produce to sell, barter and trade
	W: high competition in markets, inadequate records, lack of value-added products
	O: farmers markets, direct sales from producers to consumers, publicity and marketing
	T: low costs of imported products, price instability, intermediaries, free trade policies, conflict
Consumption	S: subsistence production, preservation of traditional foods, availability of diverse food products
	W: preference of external and processed foods, loss of traditional food preparations
	O: recover traditional recipes, cultural gastronomy workshops, education re. organic food
	T: influence of modern diet, health impacts from processed foods
Disposal	S: existing processes of organic fertilizer production, organic waste supplements animal diets
	W: environmental pollution, common to burn garbage, lack of awareness
	O: production and sale of organic fertilizers, recycling business, educational workshops
	T: no trash or recycling collection in territories, lack of institutional support

much more often than the rest: 'traditional knowledge and practices', and 'costs and earnings', as shown in Figure 4. This was the case throughout the four study areas and across cultural groups.

During the second phase of the reflexive thematic analysis, the codes were grouped together according to similarity of content. This was also an iterative process, as researchers did not all interpret the responses of participants in the same manner. In these cases, transcriptions from the workshops were used to corroborate researchers' decisions. Once codes were grouped together, themes were assigned that attempted to capture the emergencies in the data. The six emergent themes and their corresponding codes are shown in Figure 5. Codes were not exclusive to each theme; some did overlap according to the content of individual data. The themes that emerged were: 1) Influence of conventional food systems and value of sustainable agricultural production, 2) Economic struggles throughout the food system, 3) Impacts of climate change and climate variability, 4) Social and political obstacles in territories, 5) Importance of self-organizing and multisectoral, intercultural cooperation, and 6) Recovery and application of traditional knowledge. These six themes are considered defining characteristics of the local food system in the Andean region of the department of Cauca, according to the participants. Each theme is explored in further detail below.

3.3. Influence of conventional food systems and value of sustainable agricultural production

Participants expressed concern for the widespread implementation of conventional agriculture practices, particularly the increasing area of monocultures sowed with "*non-native*"[2] seeds, and the continual use of agrochemicals. The overapplication of agrochemicals was associated with the pollution of waterways and degraded soils in their territories. Native and landrace seed varieties are thought to have disappeared due to the widespread use of transgenic and hybrid seeds.

2 Words/phrases in italics are direct quotes taken from SWOT diagrams or transcriptions that have been translated.

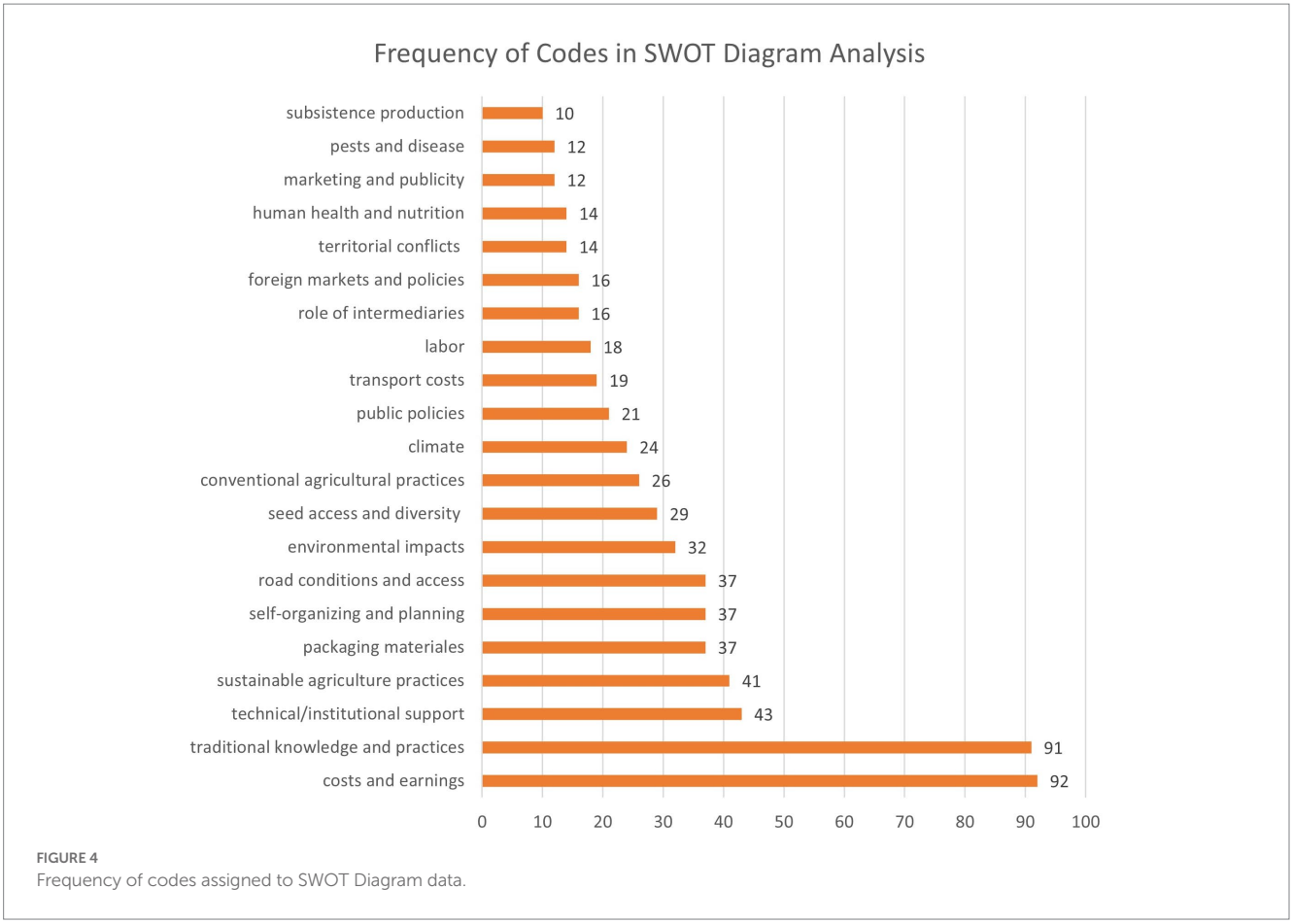

FIGURE 4
Frequency of codes assigned to SWOT Diagram data.

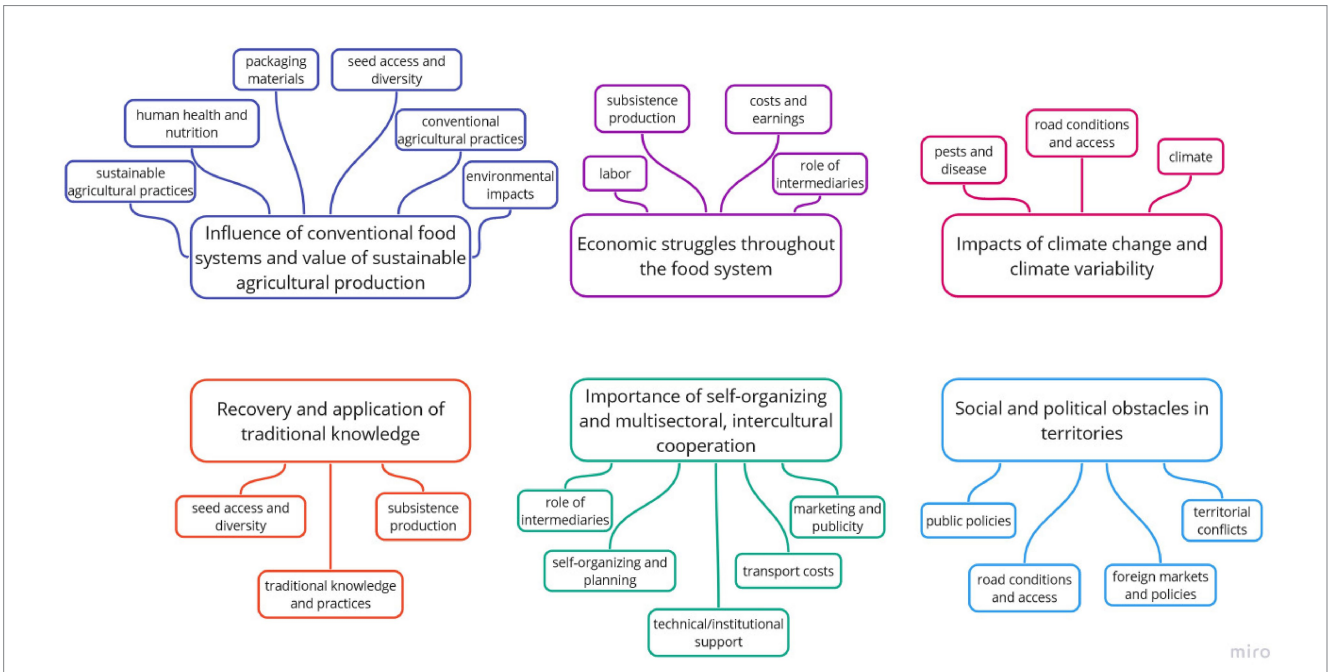

FIGURE 5
Emergent themes resulting from reflexive thematic analysis.

A young indigenous farmer from Guambia noted, "*The pollution and loss of culture is very complicated, using transgenic seeds…it is very difficult to continue opting for them in our land, since our land is becoming more and more contaminated and destroyed.*"

"*Contamination*" of foods grown with agrochemicals is also a concern in the local food system. Participants deemed it "*unsafe*" for their health that they regularly consume "*products with a lot of chemicals*." They regard the quality of their food to have decreased, as the land can no longer produce "*good quality*" crops as it once did, due to agrochemical use. Moreover, participants considered that the adoption of a more westernized diet has negatively affected nutrition in the region. They reported that people are eating less fruits and vegetables, while consuming more processed "*junk*" foods with little nutritional value, attributing the change in diet to higher rates of disease, food insecurity, and poor nutrition in their communities.

Participants are aware of and concerned by the ecological degradation occurring in their territories; often citing conventional agricultural production as the main driver. Throughout the region there is a growing movement to transition towards "*clean*" and "*agroecological*" production, and participants highlighted sustainable agricultural production as an opportunity to strengthen their food systems. Among the practices mentioned were planting more native species (both in cultivated and natural ecosystems), increasing organic fertilizers and compost application, expanding agrobiodiversity, improving soil health, and fortifying seed banks. Of these, seed sovereignty was emphasized across the four study areas. A peasant farmer from Cajibío expressed, "*It is important to consider the issue of seed autonomy. Usually commercial seed come specialized, adapted to specific systems. I believe that we should stop depending on external seeds and have our own seed banks.*"

3.4. Economic struggles throughout the food system

Participants highlighted the economic hardships that many rural families face in the region. They associated behaviors within the local food system to economic necessity and survival, rather than value driven. For example, farmers tend to prioritize cultivation of commodity crops that are more easily sold in markets and thus, solely produce those crops as monocultures in order to maximize profit. Over time more farmers transitioned away from subsistence production to commercial production, resulting in families having to purchase more of their food than before. This phenomenon was expressed by a peasant farmer in Totoró: "*There is something that happens in our territories nowadays, we commercialize a lot of what we produce. And a big mistake, is that we take the best to sell and we keep the smallest…as if just the leftover is for us, as if we were more interested in the economic part than in feeding ourselves.*"

Concern was raised about the low profit producers earn, compared in proportion, to the final price of the products. According to participants, price instability in markets and the power of intermediaries stifle profits for producers. High competition in local markets forces producers to either substantially lower their prices or sell their products at a reduced value to intermediaries who sell their products in markets outside the region at a much higher price point. This dynamic favors intermediaries and gives them bargaining power thereby putting producers at a disadvantage. To address this issue, participants advocated for the diversification of their production as well as generating more value-added products.

3.5. Impacts of climate change and climate variability

Climate variability and climate change was identified as threatening to crop production. While the region is lush with springs, lakes, wetlands, and rivers, participants noted that water access and availability has become increasingly difficult, especially with prolonged periods of El Niño (drought) and La Niña (downpours). Severe rainfall caused by the weather phenomenon La Niña, has led to mudslides and landslides in the region, impeding movement in rural areas. An indigenous rancher from the Kisgó reservation expressed, "*In terms of transportation, we also saw the deteriorated roads as a threat, because now with the change in climate and the heavy downpours, we can also have a landslide or a road that is not really suitable for us to transport ourselves and our products.*"

Farmers have also noticed that their crops are inflicted more frequently with pests and diseases with the changing climate, many of which have built resistance to chemical pesticides, insecticides, and fungicides. The reduction of wildlife habitat has also led to an increased presence of animals consuming crops before they are harvested.

As an adaptation strategy for facing climate change and climate variability, participants advocated for the use of native and landrace seeds, which they considered to be better adapted to the region versus hybrid or transgenic seeds. Participants also claimed that cultivating native and landrace varieties leads to a more balanced ecosystem, allowing crops to better resist pests and disease.

3.6. Multi-scale social and political obstacles

Participants noted various social dynamics and trade policies that have caused challenges in the regional food system. Regional and national strikes were identified as threats to the food system; particularly when they lead to blockades on the main highway that connects the department of Cauca with the rest of the country. Within the territories, communities may face blockades, threats, displacement, or violence from armed rebel groups and other hidden actors. It was noted that while interactions with armed groups is no longer a daily occurrence, it is still a danger that overshadows the region. Participants identified the expansion of illicit crop cultivation (often carried out by armed groups) as a serious issue that is a) deteriorating surrounding ecosystems, b) occupying valuable, fertile land, and c) taking away farm laborers (especially young people) by offering wages that are tenfold what typical farm operations can offer.

Participants considered small producers to be at a disadvantage in markets due to trade policies. The Free Trade Agreement (FTA) between Colombia and the U.S.A. was most frequently identified as a threat to the regional food system. Participants claim that because of the FTA, the same agricultural products that they produce are imported by Colombia at lower prices, undermining sales, and creating high competition within markets.

Geopolitically, the war in Ukraine was identified as a threat to the food system, due to the drastic price increase of fertilizers. While many farmers want to eventually transition to organic agriculture, many are still dependent on inorganic fertilizers. Participants claim that organic fertilizers and other organic farm inputs are becoming more widely used, because of economic necessity. As a peasant farmer from Cajibío stated, "*I think it is important for us to think and reflect on the actions we should implement to address the fertilizer crisis unleashed by the war in Ukraine. It has affected us, and we must think about alternatives*." This statement demonstrates that actors of the food system are aware of the connectivity across spatial scales and the effects of modern globalization.

3.7. Importance of self-organizing and multisectoral, intercultural cooperation

There is a strong sense of autonomy in peasant and indigenous communities in the region, and their ability to self-organize and carry out effective action is vital for their way of life. This was noted in the practice of *mingas*, which is a traditional form of communal labor in indigenous communities, where a group of community members work together on a task such as building or harvesting at one person's property (wage-free), and when they are done, move to another property for the next task. Self-organization was identified more formally in peasant/producer-run associations, where decision-making power is distributed among members, and as a united front, have more power in the food system. One of the biggest challenges rural producers face is transporting their goods from farms to markets, as most small producers do not own their own vehicle, and the prices of public transportation have spiked in recent years. Participants proposed forming more producer-run associations to address this issue. Co-owning vehicles, for example would reduce transport costs and reduce dependency on intermediaries to sell their produce. A peasant farmer from Popayán expressed that, *"Sometimes they pay us well for the products, sometimes not so well, and that does not really compensate the production costs. Payments are unfair to the producer verses the product."*

In addition to self-organizing within communities, participants also valued endeavors in collaboration with other communities as well as institutions in private and public sectors. Participants throughout the four municipalities noted the importance of strengthening agricultural networks between communities for processes such as seed trading, bartering goods and materials, *campesino-a-campesino* horizontal knowledge exchange between communities, and more. Participants also acknowledged the supportive role of institutions, calling for more trainings and capacity building for topics such as packaging and storing food, creating value-added products, fabricating and selling organic fertilizers, bookkeeping, and farm planning. With cooperation from local governments, participants aspire to implement more farmers' markets, for the perceived benefits to producers, consumers, the local economy, and to strengthen the rural–urban connection in the region.

3.8. Recovery and application of traditional knowledge

Despite the heterogeneity of the participants, nearly everyone agreed that the preservation, recovery, and application of "*traditional*" and/or "*ancestral*" knowledge is the preeminent pathway to strengthen the food system in Cauca. Both indigenous and peasant communities are taking measures to put this into practice, such as creating spaces for intergenerational learning and capacity building, developing seed networks and seed banks, recovering traditional packaging (i.e., plantain leaf, agave fiber, cassava sealant), preparing cultural dishes, cultivating according to moon phases, carrying out rituals for seed selection, implementing ancestral farming techniques, and many more.

Food has significant cultural importance for communities in the Andean region of Cauca; their values, worldviews, history, and social relationships are interwoven into the way they grow, share, prepare, and consume food. Many traditions and customs involve food for peasant and indigenous communities, and culturally important dishes are prepared with staple crops of the region such as beans, potatoes, squash, and most commonly, corn. As noted by a Kishu elder, "*The main cultural crop is corn. It is the source of life for us as indigenous peoples, and let us say that in order to develop the planting of corn, we take into account the rituals, the lunar phases, the selection of seeds, the mingas, which can be family or community.*" Corn is used versatilely and transformed into many popular dishes such as *mazamorra, arepas, sancocho, envueltos de choclo, tamales,* and *chicha*, which are staples for daily diets as well as for special occasions such as holidays, cultural festivals, rituals, and offerings.

Elders in the communities are held in high regard; participants identified them as the keepers and principal transmitters of traditional knowledge primarily through oral narration. For indigenous communities, this transmission of knowledge most often occurs at home. An elder from the indigenous reservation of Ambaló shared that, "*for us, a very important space is the* tul*, which is what we call the gardening space we have around the house; a space for learning and family teaching.*" As such, home gardening is essential for cultural practices, but it also is a vital source for food supply for rural families. Participants noted that the majority of peasant and indigenous families have a home garden where they cultivate herbs, vegetables, and medicinal plants for subsistence use.

4. Discussion

In the results section, the first research question of this study was addressed, identifying the dynamics of the local food system in the Andean Region of Cauca. Dynamics associated with both conventional and alternative food systems emerged. The themes identified in the reflexive thematic analysis revealed the complexities of the local food system and coexistence between traditional and conventional practices.

To continue, the second research question is addressed; how can the local food system in the Andean region of Cauca be conceptualized as an alternative food network? The dynamics of the food system in Cauca, in some part similar to the concept of AFN, has underlying differences that go beyond the understanding of AFN in the Global North. The themes that emerged from the SWOT analysis confirm that many dynamics of the food system in the Andean of region of Cauca are in opposition with conventional food systems. Advocacy for sustainable agriculture production, localization, collectives, challenging power structures, and strengthening relationships between producers and consumers is aligned with AFN literature carried out in the Global North. However, other aspects including

ontological and epistemological pluralism, connections with territory, and behaviors driven by economic necessity diverge from AFN discourse.

The application and expansion of conventional agriculture was widely recognized among participants as detrimental for human health, for the longevity of their production systems, and the environment (degradation and erosion of soils, water pollution, reduction of biodiversity). This is a pattern seen across Colombia, driven by national incentives for economic development in rural areas as far back as the 1960's, evidenced in the Integrated Rural Development Programs which promoted export production and animal husbandry in the countryside (Correa and Forero, 2008; Roa-Clavijo, 2021). Colombia's biological and agricultural diversity has decreased considerably since the widespread adoption of conventional agriculture, particularly in the Andean region (Corporación Grupo Semillas y Vélez Ortiz, 2019), which lead to grassroots popularity in sustainable agricultural alternatives. This is in line with AFN literature, which promotes sustainable production approaches such as organic, diversified farming systems, regenerative, climate smart agriculture, and agroecology (Renting et al., 2003; Kremen et al., 2012; Michel-Villarreal et al., 2019).

Agroecology was identified by participants in the SWOT analysis as both strengths and opportunities in the Cauca food system. Since the 1980s, agroecology has gained traction in Latin America, and there is an extensive network of agroecological projects, academic programs and research studies, as well as social activism throughout the region (Altieri and Toledo, 2011). Studies in Latin America have shown that small-scale farmers applying traditional and agroecological methods can produce higher yields on smaller plots of land compared to conventional agriculture (Altieri and Nicholls, 2008; GRAIN, 2014), and that agroecological systems are more resilient against hurricanes and drought (Holt-Giménez, 2002; Murgueitio et al., 2011; Rosset et al., 2011; Jacobi et al., 2013; San Martín, 2015).

Despite the value participants allocated to "sustainable" and "agroecological" production, there is still a substantial amount of conventional agricultural activity in the region. Many participants admitted to using agrochemicals and transgenic seeds, attributing their resistance to transition to agroecology to a lack of knowledge and delayed results regarding yield. While many producers aspire to produce organically, they do not have the resources (time, labor, capital) to do so, and have a more imminent need to earn wages and feed their family. There is a high rate of poverty and food insecurity in the region; in 2018 Cauca was ranked the third poorest (monetarily) department in Colombia, with a poverty rate of 50.5% (Departamento Administrativo Nacional de Estadística (DANE), 2020) and 20–30% of households in Cauca are considered food insecure (World Food Programme, 2023).

These conditions explain why there is low demand for AFN schemes such as organic produce, community supported agriculture, or fairtrade certification in the region. From the consumers' perspective, it is not feasible to pay more for organic produce, miss work to attend a farmers' market, or pay a large sum of money upfront for community supported agriculture programs. Similarly for producers, these schemes do not result in enough profit, and put them at risk of losing money; driving them towards conventional production to ensure sales (Pasquier Merino et al., 2022). From the perspective of AFN in the Global North, this dynamic may be judged as 'bad behavior' contributing further to conventional food systems, but it is important to distinguish between the values of the food system actors and their behaviors. As shown in the results of this study, food system actors do value ecological, economic, and social sustainability, yet the intersectional challenges they face keep them in survival mode, unable to construct the food system they would like.

This is not to say that the food system in the Andean region of the department of Cauca does not exhibit dynamics of alternative food networks. "Localization" is prominent within the Cauca food system, resulting in a strong connection between consumers and producers, although it differs from the discourse in AFN literature in the Global North. Localization typically refers to transitioning from sourcing foods worldwide and purchasing from supermarkets and chain stores, to buying from a limited spatial range, usually bound by "food miles" (McMichael, 2009; Cleveland et al., 2015). In Cauca, it has long been the norm to source food staples such as produce, bread, sugar cane, and cheese from within the department, most often food shopping in open market *galerías*, comprised of food stalls and small vendors. More recently, there has been a shift towards sourcing foods such as coffee and grains from smaller and local producers, instead of from corporate suppliers.

In this regard, there is a push to create more opportunities for more direct sales between producers and consumers in the region. While some farmers' markets and direct purchasing do exist, there is a great deal of interest from both consumers and producers to expand these efforts. Goodman et al. (2012) suggests that this transformation is more effective when driven by consumers as the agents of change; results reveal that producers do not believe that they know what their consumers want. In general, participants believe that actors of the Cauca food system need more education regarding the benefits of direct purchasing as well as organic food. This path offers potential to strengthen the alternative food network, increase profit and empower producers, and build trust among actors (Whatmore et al., 2003).

Seeds have an important role symbolically and culturally for indigenous and peasant communities in the Andean region of Cauca, which is distinct from most AFN literature. Many of the dynamics identified by study participants were related to seeds, such as connection with territory, adaptation to climate change, cultural identity, rituals and offerings, autonomy, diversification, and preservation of traditions. In Cauca and Colombia in general, there has been an ongoing struggle for seed sovereignty due to the influx of transgenic seeds, making it more difficult for small-scale farmers to preserve landrace and native varieties (Correa and Forero, 2008; Merino, 2020). The concentration of seed production and ownership has caused a 90% reduction in agrobiodiversity in the Global South, resulting in protests and seed sovereignty movements (Holt-Giménez and Patel, 2009). This issue may not appear as much in AFN in the Global North due to the widespread adoption of modern seed varieties and erasure of indigenous culture and traditions. However, for small producers seed sovereignty is pivotal to resist conventional food systems, as only four corporations monopolize the global seed industry: Bayer, Corteva, Syngenta, and BASF (Gliessman et al., 2019).

There is evidence of robust community organizational models in the Cauca food system, which is also noted as a characteristic of AFN in the Global North but is carried out through distinct ontological and cultural lenses. While AFN literature focuses on organizational models such as community supported agriculture, community gardens, and food cooperatives (Tregear, 2011; Michel-Villarreal et al., 2019), in Cauca, producer run associations, *mingas*, and bartering

networks are more common. *Mingas*, are a traditional form of communal labor originated in indigenous communities, but now practiced in all types of rural communities, which creates space for community bonding and relationship-building while carrying out agricultural activities (Muelas Aranda and Gómez Joaquí, 2006). *Mingas* along with bartering networks reflect Andean indigenous ontologies that foster a culture of nurturing and reciprocity and try to resist the complete capitalization of nature (Gonzales et al., 2010). This aspect is crucial for understanding the Cauca food system as an alternative food network as well as in other regions in the Global South.

From a political perspective, community organization among actors can be seen in the transformative agrarian movements that have occurred in the last decade in the region. In 2013, farmers in Cauca joined the largest agrarian movements in Colombia's history due to the injustices and power imbalances that were generated from the 2012 Free Trade Agreement (FTA) between Colombia and the United States, along with other impacts of the neoliberal policies of the food regime (Roa-Clavijo, 2021). The FTA was a culmination of the conventional food system, encouraging subsidized staple crops from the U.S. to enter Colombia, undermining local food systems throughout the country (Ortega García, 2018). The movement showed the capacity of farmers to effectively organize, negotiate, and communicate their experiences (Roa-Clavijo, 2021). To this day, small producers are impacted by the FTA, as noted by the participants of this study.

In this sense, AFN literature does not fully capture the struggles that producers and other actors in the food system endure in Latin America. Not only are people resisting aspects of the conventional food system that diminish social, economic, and social sustainability, they are resisting the erasure of their traditions, cultures, and identities. Globalization and westernization changed much more in Cauca than just food systems, it impacted communities and their territories. In Andean worldviews, the concept of 'territory' represents much more than a physical space with geographical borders; territory is the 'essence of life' where 'identity is revitalized' and 'cultural practices are carried out' (Autoridad Tradicional del Pueblo Kizgó, 2013).

Alternative food networks aim to help connect food consumers with producers in the hope that the resocialization of consumption will drive change within the food system. Such changes are generally geared towards promoting social and environmental sustainability. However, even with benevolent intentions in rural communities in Latin American, AFN are not without their challenges, limitations, and criticisms.

5. Conclusion

At its core, the definition of AFN is a food network where actors develop processes in opposition to mainstream conventional food systems, with the objective of sustainable and just food production and provisioning (Whatmore et al., 2003; Kremen et al., 2012; Wald and Hill, 2016). In the Andean region of Cauca, the local food system can be considered an AFN that challenges the conventional food system through the preservation and implementation of traditional knowledge (including farming practices, seed saving, and food preparation), the effectiveness of grassroots organizing, subsistence farming, and unified agrarian movements against hegemonic food system powers.

For the case of the local food system of the Andean region of the department of Cauca in Colombia, this research has identified the complex socio-ecological dynamics, characterized within six themes: 1) Influence of conventional food systems and value of sustainable agricultural production, 2) Economic struggles throughout the food system, 3) Impacts of climate change and climate variability, 4) Social and political obstacles in territories, 5) Importance of self-organizing and multisectoral, intercultural cooperation, and 6) Recovery and application of traditional knowledge.

These dynamics were considered in comparison with the main concepts of AFN in the Global North. It was found that there are similarities including the importance of connections between producers and consumers, value for sustainable agriculture, and the power in community organizing. Yet fundamental differences did emerge, such as the ontological and cultural foundation of the AFN in Cauca, the difference being value-based behaviors of the North versus necessity-based behaviors of the South, as well as the underlying intersectional challenges that citizens of the Global South endure.

This research has shown that aspects of both traditional and conventional food systems coexist within the AFN in Cauca. This confirms that an AFN is not an 'all or nothing' food system, and that it can be conceptualized based on the relationships between food systems actors and their territories, as well as the historical and socio-cultural context of the geographical area, rather than typical AFN indicators such as food miles or organic certifications (Goodman et al., 2012; Sarmiento, 2016; Matacena and Corvo, 2020). Thus, a socio-ecological systems and food regime approach are helpful to conceptualize location-specific AFN, and why an AFN in Colombia is distinct from an AFN in the United States or Europe.

The field of AFN would greatly benefit from the inclusion of more diversified studies throughout the Global South. This nuanced approach towards AFN is helpful to broaden the understanding in the Global North to include other visions from the Global South towards a more integrated perspective of pluralistic ontologies, relationships between nature and humans, and recognition of historical and geo-political influences in food systems.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary materials, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of the Water Security and Sustainable Development Hub. The patients/participants provided their written informed consent to participate in this study.

Author contributions

RM as lead author on the manuscript with support from AC. RM, JS, and SM designed and carried out workshops as well as realized data

analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fsufs.2023.1216116/full#supplementary-material

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