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Social innovation strategies to improve agroecological product marketing: A case study in rural Colombia

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Abstract

The purpose of this study is to identify improvement strategies in the commercialization of agroecological products based on social innovation factors. A qualitative methodology based on case studies was adopted, focused on the Asociación de Mujeres Microempresarias de Tenjo (Association of Women Microentrepreneurs of Tenjo, or AS HOGAR), in Colombia, through interviews and analysis using ATLAS.ti software, where categories such as prevalence, accessibility, relevance, supply, and demand creation were explored. The results reveal challenges including limited economic resources, barriers to obtaining certifications in sustainable production, unfair competition, and insufficient product promotion. In response, social innovation strategies were co-designed with the producers, including product diversification, implementation of digital marketing, and strengthening of networking. These actions aim to enhance the competitiveness and sustainability of agroecological producers. The study highlights social innovation as a transformative tool to overcome structural barriers and promote inclusive and sustainable development in rural communities.

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Introduction

Global interest in sustainable development, formalized in the 2015 Sustainable Development Goals (SDGs), has driven international agreements and public policies committed to a future that balances economic growth, social inclusion and environmental protection. In Colombia, initiatives such as the 2014 National Green Business Plan (Plan Nacional de Negocios Verdes), the 2018 Green Growth Policy (CONPES 3934), and the 2019 Mission of the Wise Men demonstrate this national commitment.

Within this framework, sustainable businesses, particularly those linked to agroecological systems, ecotourism, and non-timber products, form the backbone of Colombia's green markets (Aguilar et al., 2020; Díaz-Ariza et al., 2022; García-Castiblanco et al., 2021). Agroecology is an integrated approach combining ecological and social principles to optimize interactions among plants, animals, humans, and the environment. It also addresses the social dimensions necessary for a sustainable and fair food system (Food and Agriculture Organzation of the United Nations [FAO], 2018).

This approach aims to transform food systems through locally driven solutions and co-created knowledge, by empowering communities and emphasizing the rights of women, youth, and Indigenous peoples. Hence, agroecological businesses, as part of this productive ecosystem, represent an opportunity to diversify Colombia's exportable supply (Minciencias, 2020), while generating decent employment and improving rural incomes.

However, this type of business faces competitiveness issues due to its small size and limited support (Díaz-Ariza et al., 2022), with inefficient marketing networks (Varón, 2011), unfair conditions in terms of prices and payment conditions (Marín-Rivera et al., 2018), and with structural problems such as the absence of a brand, limited marketing strategies, and weak administrative management, among others (Díaz-Ariza & Aguilar-Galeano, 2024). These issues hinder business consolidation and access to markets.

In this context, social innovation is proposed as a tool to improve the participation, empowerment, and competitiveness of agroecological systems (Da Silva et al., 2020; Mancha-Cáceres & Ramírez-García, 2018; Yacamán-Ochoa & García-Llorente, 2020) as it facilitates a cooperative approach, collaborative networks, associativity and agreements between the different actors.

Social Innovation and Agroecology

Social innovation has been approached from various perspectives, although it has generally been understood as a strategy for addressing systematic social problems, oriented toward social transformation and promotion from empowerment, inclusion, and participation (Bataglin & Kruglianskas, 2022), cooperation, and associativity networks (Yacamán-Ochoa & García-Llorente, 2020). It is considered to arise when a group of individuals modifies its attitudes, behaviors, and perceptions, transforming into a network that works toward common interests (Pel et al., 2020). These cooperative actions not only generate changes within the group but also foster broader social improvements, benefiting the communities where they operate (Rover et al., 2017).

There are three categories through which it can be measured: resonance, which assesses participatory processes that design future scenarios by describing how individuals and networks interact to generate alternatives to current situations; scale, which measures the number of people impacted, whether directly or indirectly; and scope, which reflects changes in formal and informal rules, norms, and institutions (Soma et al., 2019).

Over the last decade, research on social innovation has grown significantly, expanding from fields such as sociology and anthropology to areas including as management and business (Bataglin & Kruglianskas, 2022; Haskell et al., 2021). This interest has intensified because of crises such as 2009 global economic downturn and the COVID-19 pandemic, highlighting the need for tools to strengthen local economies (Bataglin & Kruglianskas, 2022). Among the recurring themes, social entrepreneurship, sustainability, and govern-

ance stand out, suggesting that social innovation can facilitate more effective local solutions to global challenges, although more empirical research is required (Haskell et al., 2021).

The relationship between social innovation and agroecology has gained relevance in recent years, highlighting its role in strengthening sustainable practices that integrate economic, social, and environmental dimensions (Bezner Kerr et al., 2022). Recent studies show how social innovation fosters cooperation, increases social capital, and improves economic outcomes for both producers and consumers (Espelt, 2020; Piccoli et al., 2021; Yacamán-Ochoa & García-Llorente, 2020). Additionally, it enables the redefinition of production and consumption practices by promoting shorter supply chains, reducing costs, and fostering greater community engagement (Espelt, 2020; Mancha-Cáceres & Ramírez-García, 2018). Cooperative networks and social innovations have proven to be strategic in strengthening producers' capacity to adapt and transform, by enabling the collective sharing of resources, knowledge, and problem-solving, which in turn reduces vulnerability to market shocks and ensures long-term viability (Castella et al, 2022; De Grandpré et al., 2022; Oliveira & de Oliveira, 2022).

Furthermore, women play a leading role in many agroecological initiatives, although their contribution is often undervalued across food systems. Women are key agents of social and environmental change in agroecology. They engage in all stages of the food system as entrepreneurs and innovators (Dagoudo et al., 2023; Malapit et al., 2020; Zaremba et al., 2021). Studies document women's leadership in cooperative formation, participatory innovation, and farm-level agroecological design (Gomori-Ruben & Read, 2023; Oliver, 2016; Benítez, 2023; Souissi et al., 2024).

However, challenges remain. These include low economic compensation for producers, a lack of public and private support, and the disarticulation of value chains (Muñoz et al., 2021). Networks face structural and contextual limits; these can weaken their protective effects or capacity to scale (Anderson et al., 2021; Mesa Valencia & Hendrickson, 2024). Constraints on women's leadership include less schooling, weaker legal and de facto control of land and resources, and limited access to credit and support services. The "triple burden" of productive, domestic, and community responsibilities further complicates matters (Malapit et al., 2023). Social innovation emerges as a viable pathway. It enhances adaptive capacity, influences policy, and enables scaling for agroecological systems.

Accordingly, this study aims to address the following research question: How do social innovation factors influence the improvement of the marketing of agroecological products in rural areas of Cundinamarca? Addressing this question is significant because strengthening agroecological businesses requires the identification of strategies that enhance their marketing processes, based on social innovation principles. Such strategies have the potential to improve the competitiveness and sustainability of such organizations (Haskell et al., 2021), while at the same time equipping producers with tools to systematize the information needed to manage their production processes (Espelt, 2020).

To that end, this article analyzes the interests, needs, and aspirations of an association of agroecological producers in Cundinamarca, Colombia, with particular attention to their access to markets. The study describes the co-design—through an interdisciplinary collaboration between producers and academic actors—of social innovation strategies aimed at addressing the identified challenges, and highlights both the opportunities and difficulties involved in this participatory process.

Methodology

A qualitative approach was used to identify improvement strategies in the commercialization of agroecological products from the perspective of social innovation, as it allows for an in-depth exploration of experiences, perceptions, and dynamics (Da Silva et al., 2024; Pigatto & Brunorim, 2021) of the agroecological producers who were part of the study.

In this context, a case study methodology was adopted, as it enables for the collection and analysis of valuable data that provides a deep understanding of the context, the connections between the actors involved, and the impacts generated by social innovation (Novikova, 2022). It facilitates a

detailed understanding of how social innovation influences commercialization dynamics and the results obtained.

The study was carried out with members of the Asociación de Mujeres Microempresarias de Tenjo–AS HOGAR (Tenjo Association of Women Microentrepreneurs), a collective of women producers committed to agroecological and sustainable farming practices since 2002. Based in the municipalities of Tenjo (Cundinamarca) and Turmequé (Boyacá), central Colombia, the association seeks to connect women producers, strengthen their processes, and facilitate the marketing of their products. Their offerings include over 60 varieties of vegetables and greens, along with byproducts such as dried herbs and spices. While each production unit manages its own direct sales channels—mainly in nearby municipalities and Bogotá—they also collaborate under the group "Camino Verde," selling collectively at the Tenjo farmers market every Sunday.

Between 2023 and 2024, five in-depth interviews were conducted with women producers who are members of the association. They were middle-aged and older women purposefully selected for their experience, their leadership in both the association's actions and their support for the transformation of the region's production systems toward agroecological systems, and the marketing of the network's products through managed spaces in local markets. Therefore, visits to each of their production units were conducted during the study period, complemented by virtual meetings.

The interviews were designed with open-ended questions that allowed the participants to express their perceptions and experiences related to the commercialization of their products, as well as the barriers and opportunities identified in this process.

The theoretical categories used for analysis (Table 1) were based on principles of social innovation defined by Soma et al. (2019) and De Silva et al. (2020). ATLAS.ti software was used to code and analyze the interviews, organizing the information according to the predefined categories. Two main categories were identified: "Social" and "Market Opportunity." These categories were used to organize the codes applied in ATLAS.ti.

The "Social" category included the codes *accessibility*, *prevalence*, and *relevance*, while the "Market Opportunity" category comprised the codes *supply creation* and *demand creation*. In this way, discursive patterns were identified in the interview transcripts and classified according to these analytical categories (Table 1). The analysis focused on identifying patterns and relationships between categories, exploring how social innovation factors interact to influence marketing strategies.

The co-design of social innovation strategies to

Table 1. Criteria Used to Apply the Codes

Principle of social innovation	Theoretical definitions	Classification of discursive patterns
Prevalence	Own needs that translate into social opportunities.	Text segments referring to individual or collective needs that could be addressed by the organization were included.
Relevance	Significant aspects for the strengthening and commercialization of productive units.	Statements were considered that reflected elements considered priorities by producers for strengthening their production units and their commercial integration, specifically in relation to the role of the organization. This included assessments of strategies, resources, or support perceived as key.
Accessibility	Barriers and opportunities to access formal marketing channels.	Content related to structural or logistical obstacles in the marketing process was included, such as geographic, economic, or institutional limitations that affect market access.
Demand creation	Strategies implemented to capture the interest of consumers.	Mentions of differential product attributes (quality, origin, sustainability) and benefits perceived by consumers were considered.
Creation of supply	Elements that strengthen the productive and commercial capacity of the association.	Statements about productive and commercial capacities that require development, from the perspective of the associations, were included.

overcome the identified challenges was based on the interdisciplinary collaboration between Universitaria Agustiniana's academic programs and the producers who participated in the study. This collaboration resulted in proposals that can contribute to improving access to markets. In this way, producers joined with teachers and students from the fields of international business, gastronomy, and marketing.

Results and Discussion

Interview analysis yielded five primary categories: *prevalence*, *relevance*, *accessibility*, *demand creation*, and *supply creation*, each shedding light on specific challenges and opportunities. These categories were analyzed using ATLAS.ti software, through which five codes were generated, and the interviews were reviewed with these codes (Figure 1). Key findings are summarized below.

Table 2 presents the frequency with which each code was applied to data segments in ATLAS.ti, known as code grounding. This measure reflects how often specific themes were mentioned or identified in participants' narratives, allowing for the recognition of their relevance within the analysis. A higher number of quotations associated with a code suggests that the theme was more recurrent or significant during the interviews, providing empirical support for the interpretation of results and the design of social innovation strategies.

Identifying Patterns by Category

The following presents the identification of patterns in the five primary categories, which allow the identification of social innovation factors relevant to the co-design of strategies.

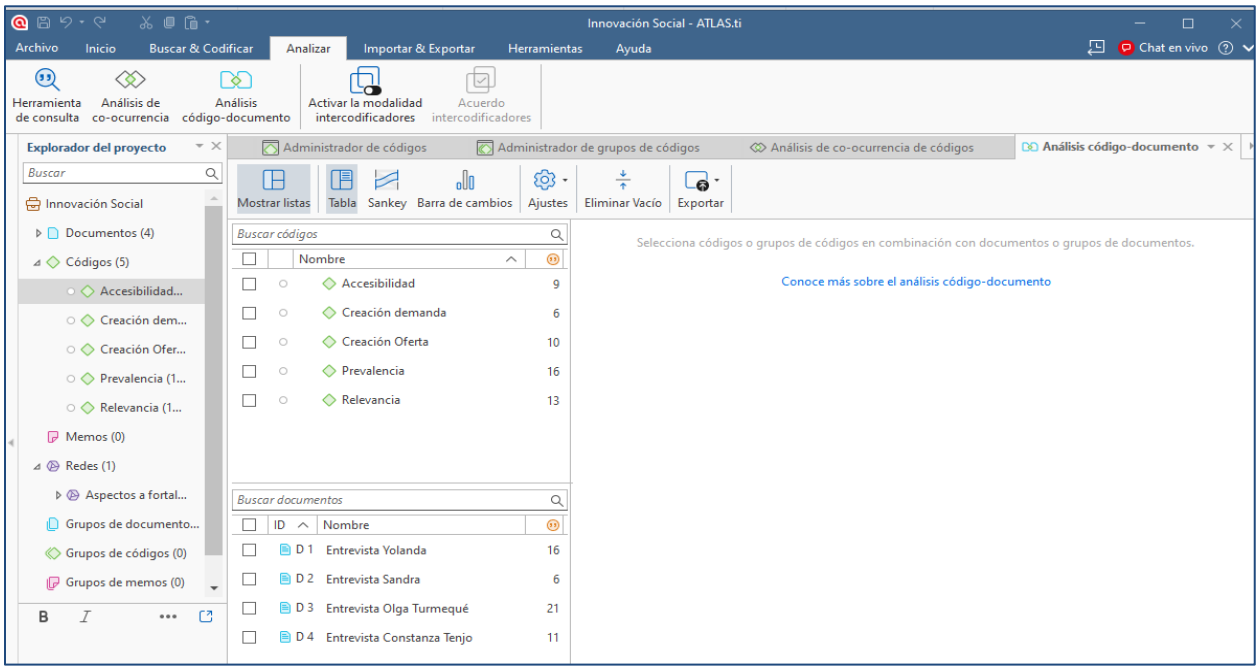
Prevalence

The category of *prevalence* refers to the specific needs of agroecological producers that, within the framework of social innovation, are reinterpreted as opportunities for collective transformation.

Table 2. Frequency Table of Codes

Code	Grounding
Prevalence	16
Relevance	13
Offer creation	10
Accessibility	9
Demand creation	6

Figure 1. Codes Generated via the ATLAS.ti Software



Among AS HOGAR producers, one of the most recurrent themes is the importance of *collaborative work*. As one producer expressed, "I have always thought about joining forces; for me, that is key," while another stated, "It's about awareness. … It is teamwork." These expressions reflect not only a cultural inclination toward cooperation but also a strategic understanding. This aligns with Lucas and Gasselin's (2022) findings, that in the field of agroecological production, and especially in environments with scarce resources, cooperation and collective work become essential to optimize processes, share resources, and strengthen the capacity to face adversity.

Another recurring theme is the centrality of *trust* as a of social capital. Producers highlighted the strength of informal relationships: "We know each other and help each other," and "I have not put a sign that says I sell; it's a network of trust." Trust, in this case, replaces conventional marketing, acting as a mechanism of accountability and a guarantee of quality. This type of *relational marketing*, rooted in personal ties, is especially relevant in agroecological contexts where values such as health, care, and sustainability play a decisive role in consumers choices (Lianu et al., 2024).

Sustainability also emerged as a prevalent concern. One participant noted, "We recycle pollutants. … What the forest does is recycling." This indicates not just practical knowledge but also an *ecological awareness* that underpins their production philosophy. The farmers' practices reflect a clear application of agroecological principles, particularly the reduction of external inputs and the closing of nutrient cycles. This is consistent with the work of Brzozowski and Mazourek (2018), and Hawes et al. (2021), who argue that long-term sustainability requires environmental balance, with practices that reduce the use of external inputs by taking advantage of internal ecosystem services.

Finally, the *lack of generational renewal* emerged as a pressing challenge: "There is no generational change, and there is no one to work with." This concern speaks to the structural vulnerability of the system and the risk of losing agroecological knowledge. Consentino et al. (2023) identify this as a widespread pattern across rural areas, urging for targeted strategies that integrate technology, value rural identities, and make agriculture appealing to youth.

In summary, the prevalence category reveals core issues: cooperation, trust, sustainability, and generational renewal, that shape both the daily experiences and strategic needs of agroecological producers. These findings are not merely anecdotal; they illustrate broader structural conditions and suggest focal points for policy and innovation. Importantly, they also demonstrate how producers are already articulating *incipient forms of social innovation* grounded in lived experience.

Relevance

The relevance category captures the aspects that producers themselves identify as essential to strengthen their production units and improve the marketing of agroecological products. Three key dimensions emerged from the interviews: limited access to resources, difficulties in meeting formal requirements, and the need for institutional support.

First, the *scarcity of economic and technical resources* was repeatedly mentioned as a central obstacle. One producer noted, "Until now, I have not had the resources to do that." This referred to her ability to meet quality standards or scale up operations, highlighting the constraints she is facing. This lack of capital directly impacts competitiveness and scalability. It limits producers' ability to access better technologies, innovate in value addition, or expand their operations. As Zbarsky and Mastylo (2024) explain, access to technical and financial resources is critical for increasing competitiveness, especially in small-scale agricultural ventures.

Second, the *burden of regulatory compliance* emerged as a recurrent barrier, particularly regarding National Institute of Drug and Food Surveillance (INVIMA) certification. While such certification is recognized as a pathway to market expansion ("INVIMA would open a gigantic door to many options"), producers also expressed frustration: "There are several processes and infrastructure aspects for INVIMA to approve it." This tension illustrates a paradox: producers are aware of the value of formal recognition but are constrained by the high costs and bureaucratic complexity.

Anselmi and Vignola (2022) recognized that complying with these regulations can open opportunities to access new markets, particularly more formal or international ones. So, these describe a structural contradiction in certification schemes, where the same processes intended to guarantee safety and quality also exclude smallholders who lack the means to comply.

Third, producers expressed a *desire for support* from public or community institutions to overcome their limitations but found these processes inefficient or disappointing. One interviewee shared: "Last year I was here, at the mayor's office, looking for a business opportunity, but in the end, I had no luck." This reflects not only the expectation of support but also a disillusionment with institutional responsiveness. It reinforces the need for public policies that are context-sensitive, adaptive, and capable of engaging directly with the realities of small agroecological producers.

These findings underscore that relevance, from the producers' perspective, is not limited to market access; it encompasses structural enablers such as resource availability, institutional coordination, and the simplification of regulatory pathways. As Thorpe (2018) and Mohania and Pandey (2024) argue, effective public-private partnerships in agriculture help to catalyze new investments, improving the performance of value chains and facilitating market access, resulting in higher sales volumes and productivity.

The category of relevance reveals how producers interpret their constraints not merely as individual shortcomings but as systemic barriers requiring coordinated solutions. Their testimonies offer insight into a practical understanding of what social innovation must address: the interdependence between institutional design, resource distribution, and regulatory justice. These insights can guide more inclusive approaches to policy and program design in the agroecological sector.

Accessibility

Accessibility refers to the difficulties agroecological producers face in reaching marketing channels and meeting market entry requirements. In the case of AS HOGAR producers, access is largely constrained by three interrelated factors: the prohibitive costs of certification, resource constraints, and knowledge gaps.

A recurring theme in the interviews was the *financial inaccessibility of certifications*, particularly those required by entities like INVIMA. As one producer explained: "When a producer is small, it cannot cost them 50, 60, 100 million [Colombian pesos], because they are going to recover in the long term and often, they do not have that money." This statement captures a fundamental asymmetry in the agroecological sector: the expectations of formal markets contrast sharply with the realities of smallscale production. Certifications, while important for transparency and consumer confidence, often function as gatekeepers that exclude producers without the capital to invest. This finding is consistent with González and Nigh (2005) and Solarte et al. (2023), who note that rigid certification schemes tend to reinforce inequality in access to value chains, marginalizing precisely those who could benefit most from inclusion.

Beyond financial constraints, producers also identified a *lack of resources and adequate logistics* as key barriers. Statements such as "If the product is not sold, I have to keep paying" and "There are many processes and installation issues for INVIMA to approve it" reveal a lack of support systems (storage, processing, transportation) that would otherwise enable producers to meet formal requirements. Without these logistical backbones, smallholders remain locked into short, informal value chains, relying on intermediaries, which limit their autonomy and reduce their profit margins, as noted by Vicente-Vicente et al. (2023).

In short, the accessibility category reveals that market entry is constrained not only by economic factors, but also by a broader ecosystem of exclusion, including financial, infrastructural, and informational barriers. Addressing these barriers requires rethinking certification systems, investing in rural infrastructure, and developing tailored programs that support smallholders as legitimate market actors. From a social innovation perspective, this means co-designing mechanisms of access that are equitable, context-sensitive, and empowering.

Demand Creation

The category of demand creation explores how agroecological producers seek to make their products attractive to consumers through differentiation strategies and relational marketing. For AS HOGAR, building consumer demand involves communicating the distinct value of agroecological practices, innovating in product presentation, and fostering direct trust-based relationships with buyers.

A key insight is that *product differentiation* functions not only as a market tactic but also as an identity strategy. As one producer expressed: "It is our slogan, food with vital energy," while another noted, "That is the added value, because in the tent where I sell it, it is also an agroecological tent." These quotes reflect how producers use narratives to position their products as ethical, healthy, and environmentally responsible alternatives. Such differentiation appeals to conscious consumers who prioritize local and sustainable production. As noted by Chaparro-Africano and Garzón-Méndez (2021), this type of storytelling can reinforce the value proposition of agroecological products and fosters brand loyalty.

The interviews also revealed innovative forms of *value addition* that align with both functional and symbolic benefits. Strategies such as dehydration, the use of attractive packaging, and the focus on eco-friendly features stand out as important differentiators. These products not only reduce waste but also extend shelf life and facilitate transportation and storage—factors essential for scaling operations. This strategy directly addresses barriers discussed in other categories, such as perishability and limited access to cold chains. Connolly et al. (2022) note that processed agroecological goods often perform better in niche markets, especially where consumers seek convenience without compromising on values.

Another core mechanism for demand creation is *direct and relational marketing*, which producers perceive as to build trust, ensure loyalty, and retain higher profit margins. Statements such as "We deliver at home" and "We sell in the local market every Sunday" reflect intentional efforts to bypass intermediaries and maintain close relationship with clients. These practices reinforce social ties while enabling producers to receive real-time feedback and adjust supply. Rode et al. (2023) highlight that these practices not only improve profit margins but also allow producers to better respond to market needs and preferences.

In summary, this category reveals that demand creation among small agroecological producers is driven by a combination of innovation, narrative building, and trust-based trade. These findings demonstrate the agency of rural women entrepreneurs in navigating competitive environments and suggest that social innovation must recognize and amplify such grassroots strategies, particularly when designing programs for market linkage and brand development.

Offer Creation

The category *offer creation* refers to the capacity of agroecological producers to organize, expand, and add value to their production to respond to current and emerging market demands. In the case of AS HOGAR, this involves the articulation of collective work, the incorporation of a business mindset, and the need for infrastructure and policy conditions that enable growth.

Producers repeatedly emphasized the need to *work collectively and pool efforts* as a strategy to strengthen production and marketing capacities. One producer noted, "I think we have to join forces," while another stated, "We have to make some agro-industrial centers." These perspectives reveal a clear awareness that collective action is essential for scaling operations, especially when faced with resource limitations. The desire to develop shared facilities such as processing centers or packaging plants reflects a proactive approach to overcoming barriers typically faced by small-scale producers. This is consistent with Barzola et al. (2018) and Abulbasher et al. (2024), who argue that entrepreneurial orientation among farmers increases when supported by platforms that foster collective innovation.

A second theme relates to the need to adopt a *business-oriented vision* that moves beyond subsistence agriculture. Several interviewees spoke of the importance of planning, standardizing processes, and producing for specific market niches. However, they also recognized that achieving this shift

requires targeted training and technical support. As Mashrabovich and Toxtasinovna (2024) suggest, the creation of agro-industrial clusters can facilitate this transition by providing producers with shared access to technologies and commercial services that increase efficiency and competitiveness.

An additional challenge identified by AS HOGAR members is the *unfair competition* from imported goods and large retailers. Statements such as "All the large stores bankrupt the small ones" and "They bring much cheaper products from India" reflect a perception of structural disadvantage. These conditions not only erode local markets but also disincentivize innovation and investment in agroecological practices. This aligns with Muñoz et al. (2021), who document how industrial food systems often undermine small-scale agroecological networks through price dumping and unequal access to distribution channels.

The offer creation among AS HOGAR producers reflects a dynamic tension between potential and structural constraints. On one hand, there is a clear commitment to innovation and collective work; on the other, systemic barriers continue to limit expansion. Addressing this requires multilevel intervention investment in infrastructure, support for associative models, and protective public policies that help level the playing field. Social innovation, in this sense, must operate not only at the level of ideas but also through concrete mechanisms that enable producers to transform their aspirations into market-ready realities.

Relationships Between Categories

Based on the categories identified during the interviews with the producers, a co-occurrence analysis was conducted using the ATLAS.ti software to explore the relationships among the codes, taking as a reference the frequency of their joint appearance. The results of this analysis are presented in Table 3. The relationships with the highest frequency of co-occurrence, highlighted in the results, are described below.

Accessibility and Demand Creation: Exclusion from Formal Distribution

The co-occurrence between *accessibility* and *demand creation* illustrates a structural barrier: although producers strive to differentiate their products via sustainability narratives and added value, their access to markets is limited by the high cost and complexity of certification processes, even when consumers value characteristics such as sustainability and its perceived quality, as Kharabsheh (2024) established.

This situation creates a paradox: producers have marketable, high-value products, but are excluded from formal distribution channels due to resource constraints. As González and Nigh (2005) argue, this dynamic reinforces a vicious cycle: limited accessibility restricts visibility, which in turn hinders demand growth, undermining the full potential of agroecological entrepreneurship. Certification processes often institutionalize exclusion when applied to smallholders without adequate support.

Table 3. Co-Occurrence Analysis

	Accessibility Gr=13*	Demand creation Gr=9*	Offer creation Gr=13*	Prevalence Gr=16*	Relevance Gr=13*
Accessibility Gr=13*	0	3	1	3	1
Demand creation Gr=9*	3	0	0	0	0
Offer creation Gr=13*	1	0	0	0	3
Prevalence Gr=16*	3	0	0	0	0
Relevance Gr=13*	1	0	3	0	0

* Total number of grounded codes (Gr) for each category.

Prevalence and Accessibility: Structural Needs and Systemic Barriers

The limitations of producers, such as lack of resources and generational renewal, are directly related to the barriers to accessing formal markets; furthermore, the lack of economic resources limits investment in certifications, infrastructure, and technology, which perpetuates a dependence on informal or local markets. These barriers reinforce dependence on informal markets and constrain producers to limited commercial circuits. Solarte et al. (2023) emphasize that without targeted institutional support, these systemic limitations remain unresolved and perpetuate inequality within the agri-food value chain.

Moreover, the absence of young people interested in agricultural activities aggravates this problem, as it hinders the introduction of modern and technological practices necessary to meet the quality standards required in competitive markets, as Ayyıldız et al. (2025) suggested.

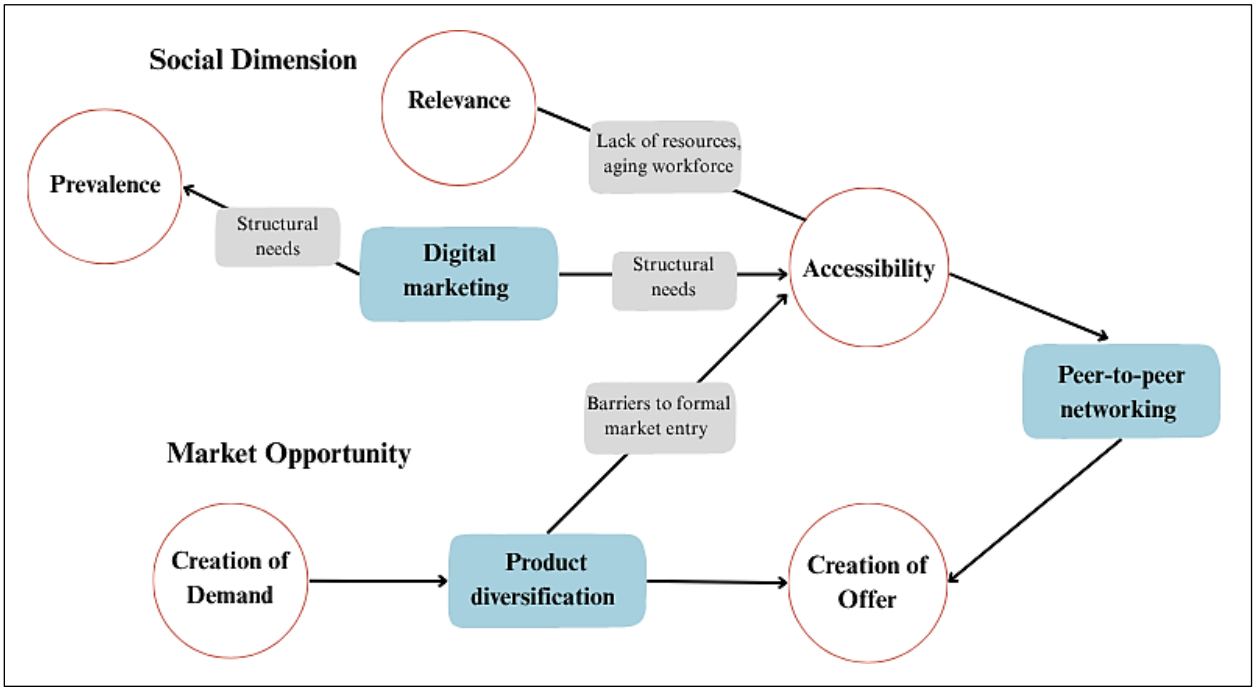
Relevance and Offer Creation: Building Capacity Through Collective Infrastructure

The strengthening of each productive unit, through resources and infrastructure, is linked to the construction of strong producing communities and collective projects. Resources and infrastructure enable smallholders to overcome individual constraints and address more ambitious demands; for example, Ismayilov (2021) implied that agro-industrial or transformation centers not only improve the supply of products but also promote joint work. This relationship indicates that the offer creation is not an isolated task but one anchored in producers' recognition of structural needs and their potential resolution through cooperation and shared assets.

Co-design of Strategies

Based on the co-occurrence analysis and the interpretation of relationships among categories, three core strategies were co-designed through interdisciplinary collaboration between academic teams and the AS HOGAR's agroecological producers. The relationship between categories, identified challenges, and co-designed social innovation strategies is illustrated in Figure 2. These strategies aim not only to respond to specific challenges but to unlock synergies among production, commercialization, and social innovation. Each strategy is grounded in the lived experiences and expressed

Figure 2. Relationship Between Categories, Challenges, and Co-Designed Strategies



needs of the producers and addresses at least one of the systemic relationships identified in the previous section.

Product Diversification for Market Expansion

The co-occurrence of *accessibility* and *demand creation* revealed a structural contradiction: although producers offer differentiated, high-value agroecological products, their access to formal markets is constrained by the costs of compliance with certification and packaging standards. To address this, a strategy focused on product diversification was co-designed with the Gastronomy academic team. This initiative was centered on transforming surplus or cosmetically imperfect vegetables into shelf-stable goods such as instant soups, pastes, and herbal seasonings.

This approach enables producers to increase product value and reduce waste. It also helps them reach new market segments, particularly health-conscious urban consumers. As Kessari et al. (2020) and Connolly et al. (2022) argue, value-added products in alternative food systems not only extend shelf life and simplify logistics but also improve market positioning and resilience. Importantly, producers recognized that this strategy could also stimulate youth engagement by introducing innovation into traditionally undervalued agricultural work.

Digital Marketing to Improve Visibility and Positioning

The link between *prevalence* and *accessibility* elicits how producers' structural limitations—lack of resources, generational renewal, and limited networks—directly affect their capacity to access competitive markets. To address this issue, the marketing academic team collaborated with producers to co-design a digital marketing plan tailored to their context. This plan included practical tools, tutorials, a publication schedule, and low-cost strategies for content creation.

This strategy seeks to position the producers' brand narratives, such as sustainability, community values, and "vital energy" products, on platforms where conscious consumers are active. It reduces dependence on intermediaries and increases direct sales to consumers, reinforcing producer autonomy. As Entsminger and McGowan (2024) note, marketing strategies that leverage social and environmental values are particularly effective in expanding the visibility of marginalized producers in highly competitive environments.

Peer-to-Peer Networking for Certification and Scale

The relationship between *relevance* and *offer creation* pointed to producers' shared recognition that scaling up production and improving quality requires collective investment in infrastructure and technical processes. Many expressed interest in forming agro-industrial centers, but they lacked the support to navigate complex certification procedures.

To respond to this gap, the international business academic team facilitated the design of a peer-to-peer networking strategy. This model relies on experienced producers within AS HOGAR who have already obtained certifications (e.g., INVIMA) to mentor others through the process. The strategy includes a guide for accessing public and private funding and encourages collective applications to reduce costs and improve approval rates.

This approach aligns with the principles of social learning and distributed innovation, where networks become platforms for capability transfer and collective problem-solving. As highlighted by Piccoli et al. (2021), peer networks in agroecological contexts can enhance efficiency, foster innovation, and strengthen social capital—ultimately contributing to the sustainability of producer organizations.

Importance of Social Innovation to Overcome Challenges

The commercialization of agroecological products in rural Colombia faces persistent and multifaceted challenges—economic, infrastructural, institutional, and cultural—that limit the sustainability and competitiveness of small-scale producers. These barriers include limited access to financial and technical resources, the high cost and complexity of certifications, logistical deficiencies, and asymmetrical competition with imported goods and large retail chains. In addition, producers' capacity to communicate the distinctive value of agroecological products remains underdeveloped, which restricts

their ability to capture the growing demand for sustainable food.

Within this context, social innovation emerges as a transformative mechanism capable of reconfiguring not only market access conditions but also the organizational capacities and relational dynamics of producer communities. It facilitates bottom-up processes based on cooperation, shared learning, and the co-creation of solutions adapted to local realities. The findings of this study confirm that when social innovation is applied to commercializing agroecological products, it can function as a strategic lever to overcome systemic constraints and open new pathways toward inclusive development.

In the case of AS HOGAR, the co-design of social innovation strategies—such as the development of value-added products, the adoption of digital marketing tools, and the implementation of peer-to-peer networks for certification—enabled producers to address key limitations identified in the analysis. These strategies directly responded to the relationships between core categories such as *accessibility*, *demand creation*, and *supply creation*, reinforcing the producers' agency while fostering collective solutions.

Specifically, product diversification enhanced the usability of surplus and nonstandard produce, while expanding shelf life and market reach. Likewise, digital marketing plans enhanced brand visibility and helped position agroecological values to better engage conscious consumers. Peer mentoring for certification reduced knowledge gaps and transaction costs while strengthening social capital and solidarity within the group.

These actions demonstrate that social innovation is not merely a technical response, but a sociopolitical process that reinforces producers' autonomy, promotes associative models, and builds the adaptive capacity of rural organizations. The interdisciplinary collaboration between academia and producer associations proved to be a key enabling factor, facilitating the design of strategies that were context-specific, feasible, and aligned with the producers' values and aspirations.

Future research could expand on this study by conducting comparative analyses with other agroecological organizations, assessing the long-term impact of social innovation strategies, and examining how public policy frameworks can more effectively support small-scale producers. It is also important to explore youth engagement in agroecology and develop specific indicators to measure the outcomes of social innovation across social, economic, and environmental dimensions.

Conclusions

This study demonstrates that social innovation is a key enabler for addressing systemic challenges in the commercialization of agroecological products, particularly among small-scale rural producers. The barriers faced—such as high certification costs, limited infrastructure, weak marketing capabilities, and unequal market conditions—cannot be resolved through isolated technical fixes. Instead, they require integrated, participatory approaches that leverage local knowledge, build collaborative networks, and strengthen organizational capacities.

The case of AS HOGAR illustrates how interdisciplinary collaboration between academic disciplines and agroecological producers can foster the co-design of context-sensitive strategies, such as product diversification, peer-to-peer support for certification, and digital marketing plans. These strategies addressed concrete operational limitations and also enhanced the producers' collective agency and positioned their products more effectively within value chains.

Key lessons from the study highlight that collective action and trust-based networks are vital for optimizing resources, particularly in contexts with limited external support. Moreover, value-added strategies, such as product dehydration and eco-friendly packaging, contribute to improving competitiveness and help reduce post-harvest losses. Digital marketing and brand positioning were found to be effective tools for reaching new consumer segments, especially in urban markets that prioritize sustainability. Finally, peer learning and producer networks play a crucial role in lowering entry barriers to formal markets by democratizing access to certification processes and reducing associated transaction costs.

The findings underscore the importance of supportive institutional frameworks. While producers demonstrate strong initiative and adaptability,

their efforts must be accompanied by public and private programs that recognize the structural disadvantages they face and provide targeted support in infrastructure, training, and financing.

This research highlights that social innovation is not just a methodological tool but is also a pathway toward more inclusive and resilient food systems. Its implementation in agroecological contexts promotes economic viability, social equity, and environmental stewardship—contributing to the broader goals of sustainable rural development.

Recommendations

Building on the findings of this study and the experiences shared by AS HOGAR producers, a set of recommendations emerges to guide future research agendas, inform policy development, and shape practical interventions that support the commercialization of agroecological products.

From a research perspective, there is a clear need for longitudinal studies to assess the impact of co-designed strategies (product diversification, digital marketing, peer-to-peer networking) on the resilience and long-term sustainability of the partnership. This would provide empirical evidence of the effectiveness of social innovation, developing and validating specific indicators to measure the results of social innovation in economic (sales, market access), social (social capital, youth retention), and environmental (waste reduction, resource efficiency) dimensions. Such studies could offer valuable insights into the evolution of producer networks, the involvement and retention of young farmers, and the economic viability of value-added production models.

Comparative studies with other women-led agroecological initiatives in Colombia (and across Latin America) could help identify scalable innovations as well as region-specific constraints. Additionally, future research should examine the role of youth and technology in agroecology, particularly the potential of digital tools and targeted training programs to foster generational renewal and improve the efficiency and sustainability of farming practices.

On the policy front, this study underscores the urgent need to reform and streamline certification processes, which remain largely inaccessible to small producers due to prohibitive costs and administrative complexity. Public institutions should consider implementing more flexible, context-sensitive certification schemes, accompanied by technical and financial support tailored to the realities of agroecological producers. Cooperative certification models, where producers share the administrative and economic burden, may offer a viable alternative. Furthermore, public incentives should support the creation of agro-industrial clusters that provide shared infrastructure for processing, storage, and packaging, which are key components for adding value and expanding market access. To protect small-scale producers from unfair competition, governments might also explore mechanisms such as minimum price guarantees, preferential procurement from local agroecological farmers, and regulations to curb the market dominance of low-cost imports.

In terms of practical implementation, a critical strategy for strengthening agroecological commercialization involves reinforcing local networks and promoting peer learning. Peer-to-peer mentorship and cooperative knowledge exchange among producers can enhance collective capacities and reduce dependency on external actors. Training programs in digital marketing and brand development, particularly those targeting consumers who prioritize sustainability and local sourcing, can further increase producers' visibility and competitiveness. Practical toolkits and ongoing advisory support can empower producers to engage more effectively with emerging sales channels, including e-commerce platforms. Finally, this study highlights the importance of partnerships between academia, civil society organizations, and producer associations. These collaborations not only generate contextually relevant innovations but also help bridge the gap between theory and practice, ensuring that solutions are both feasible and transformative.

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The authors used AI tools from Gemini and Grammarly to improve the English translation of the article, specifically to improve structure, grammar, and syntax. The authors reviewed and corrected the generated material and assume full responsibility for the content of this publication.

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