



Article

Short Commercialization Circuits and Productive Development of Agroecological Farmers in the Rural Andean Area of Ecuador

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Abstract: Fair commercialization networks represent a direct economic and social participation mechanism for small producers in rural areas. Women's participation is a pillar in short commercialization, which incorporates family income and economic independence, as well as food diversification in the territory. This research aims to analyze short commercialization circuits (SCCs) for agroecological foods as a contribution to productive development in the rural Andean area of Pillaro canton. This research, developed between April 2019 and May 2020, involved a quantitative approach and cross-sectional data collection. The Farm Sustainability Indicators (IDEA) method was used for the analysis, which establishes three scales: agroecological, socio-territorial and economic sustainability. The results show that SCCs contribute to food security through low-cost food, diversification, and nutritional products. In addition, SCCs allow a closeness between producers and consumers that provides greater confidence in the products offered. The ratings of 35.0 for the sustainability scale, 30.52 for the socio-territorial scale, and 17.5 for the economic scale indicate that the short commercialization circuits observed in the area consist of a sustainable system that allows for the social and economic improvement of producers in the rural Andean area of Pillaro canton, as well as the improvement of the natural environment.



Citation: Franco-Crespo, C.; Cordero-Ahiman, O.V.; Vanegas, J.L.; García, D. Short Commercialization Circuits and Productive Development of Agroecological Farmers in the Rural Andean Area of Ecuador. *Sustainability* **2023**, *15*, 6944. <https://doi.org/10.3390/su15086944>

Academic Editor: Ting Chi

Received: 20 February 2023

Revised: 27 March 2023

Accepted: 10 April 2023

Published: 20 April 2023



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1. Introduction

Conventional food production has generated negative impacts on natural resources over the years [1–3]. About a third of the land destined for agriculture is degraded by the excessive use of fertilizers and pesticides, and the erosive practices of cultivation [4,5]. In addition, the genetic diversity of plant species has been reduced by 75%, and in some cases, it has disappeared completely [6,7].

The use of agrochemicals increases the yields of many products but has consequences for the environment and people's health [8–12]. Increased productivity helps to meet food demand and increases farmers' and intermediaries' incomes [5,13]. In consequence, the economic aspect of agriculture is focused on commercialization, self-consumption, and barter-trading of products of the harvest, generating incomes for producers. [14,15]. The way that crops reach consumers is another important issue that needs continuous innovation and the improved participation of farmers and allocation of their products [10,15]. However, in some cases, the routes of commercialization are managed by small groups of non-farmers who control sales [16].

Small-scale farmers thus have few opportunities for access to markets, given their small production volume, and even when they can enter the market, their bargaining power and relative share of profit is limited due to internal competition among them [17,18]. Farmers with access to production resources and areas apply various sustainable practices

with different levels of agrochemical use [19,20]. In this context, agroecological production competes in the same market as conventional production that uses fertilizers and chemicals [21].

Sustainability concerns have led to the development of alternatives in food production that affect the environment and societies in different ways [22,23]. In agriculture, sustainability is important in all areas (livestock, agroexportation, food production, forestry, fishing, etc.). Implementing sustainable concepts in agriculture reduces inequalities and environmental effects such as greenhouse gas emissions, water, and land allocation, as well as pollution from production and transportation chains [24,25].

Marketing and consumption trends often focus on health concerns, with consumers seeking out products of better quality and at lower prices [26,27]. There is therefore a need to produce clean and efficient alternatives to products that can have serious health and/or environmental effects, as well as to find ways to efficiently link each of the steps in the production chain [28–30]. When the actors in the chain become aware of their actions and the repercussions that they may have in the future, concern for and a commitment to maintaining sustainable action in all dimensions can be generated [28,31]. Although farmers are the base of the entire production chain, it is important to also take intermediaries, and even consumers, into account. That is, sustainability needs to not be solely applied in the agricultural sector but to the entire marketing and supply chain [31]. For the construction of sustainable models, an important aspect to deal with is marketing. When a short commercialization circuit (SCC) is implemented, the main clear advantage is the close relationship that arises between farmers, agroprocessors, small-scale operators, and retailers. These actors represent great potential because, with proper structure and organization, employment can be improved and increased, generating profitable economic benefits, especially for rural producers [32]. In rural areas, small farmers participate in efficient alternatives to manage resources at each link in the production chain, and commercialization alternatives can be incorporated into SCCs [33]. SCCs are fundamental to structuring sustainable trade since, unlike traditional fairs, short channels are differentiated by the type of food offered, in addition to the fact that consumers participate directly in the purchasing of products. Conventionally, fairs are managed by intermediaries and the food comes from conventional agriculture, whereas in an SCC the spaces are managed directly by the producers [28]. According to Pierri and Valente [34], the commercialization of small farmers is consolidated in channels such as sales to institutional markets (government purchases, e.g., the National School Feeding Program, PNAE and the Food Purchase Program, PPA) and direct sales to the consumer, which are features of SCCs. Supermarket chains are direct competitors of SCCs, with more capabilities and economic capital to satisfy consumer demand [35], but food is transported long distances from its sources to supply the needs of supermarket chain customers [36]. In contrast, as a complement to the sustainable cycle, the SCC is a particular type of product commercialization within the agri-food chain, the purpose of which is to reduce the physical distance between producers and consumers and avoid the need for intermediaries [37–39]. SCCs allow closer interactions based on trust and make healthy food available at a fair price for both consumers and farmers [40]. Weber et al. [41] describe the emergence of alternative markets as dependent on certain conditions such as the adoption of a market exchange value for products, a producer community that constructs external boundaries, and like-minded entrepreneurial producers that are motivated and connected.

Rural trade practices use SCCs to reduce intermediaries and increase the profit margins of farmers. An SCC is an effective way of commercializing products that allows small farmers to participate directly and provides options to sell their harvest. Further, decision-makers and government institutions work to find market alternatives to supply small farming products because the demand in major cities and their markets is linked to nearby production zones, in particular those that have adequate ways to transport their products [38,42].

SCC actors work to generate sustainable actions across all dimensions [43]. Farmers in SCCs work within agroecology systems, not only in the agricultural or consumer sphere

but also in terms of social issues such as the creation of laws, strategic support from the authorities, and the responsible participation of the entire population [30,44].

In this context, sustainability is an inherent feature of agroecology, which is defined as a form of agriculture based on a harmonious and respectful relationship between human beings and nature [40]. The main focus of agroecology is the transformation of food systems, from the early stages such as planting through to harvesting and, finally, selling [45–47]. For authors like Schneider and Ferrari [38], the presence of farmers in SCCs has environmental benefits in terms of developing cleaner production processes, but also with regard to guaranteeing product quality, favoring the consumer–producer relationship, access to markets, and improvement in sales at fair prices, in addition to the preservation of traditional systems of family farmers.

The main aim of this study is to analyze SCCs for agroecological foods as a contribution to productive development in the rural Andean area of the Pillaro canton. This study features an evaluation of short trade circuits in terms of economic, productive, and social indicators and establishes a sustainable marketing model for agroecological farmers.

2. Materials and Methods

2.1. Location

The present study was carried out in the rural area of the Pillaro canton, which is in the province of Tungurahua and is located on a high Andean plain in the Sierra region of Ecuador, at 2800 m above sea level [48].

2.2. Data Collection

A cross-sectional research design was used, which involves collecting data and then examining variables at a certain timepoint [29]. Primary data was collected through surveys of producers who were part of the Pillaro Ramal Norte Irrigation Board. In total, 78 agroecological producers belong to this board; however, only 56 surveys were carried out, mainly because some producers expressed a feeling of distrust and did not wish to participate.

The participating agroecological producers were recruited through the CESA Foundation (formally known as the *Central Ecuatoriana de Servicios Agrícolas* in Spanish). The foundation also provided secondary information about the study area.

2.3. Indicators

The analysis is based on the *Indicateurs de Durabilité des Exploitations Agricoles*, or Farm Sustainability Indicators (IDEA) methodology, which is an evaluation framework to assess the agricultural sustainability of farms [49–56]. The method is based on three scales of sustainability: the agroecological scale, the socio-territorial scale, and the economic scale (Table 1). Each one includes quantitative and qualitative indicators, with the numerical indicators being out of 100. These scales express the level of sustainability of the area under study [49–51,53–55].

The agroecological scale includes indicators of the diversity of production for both temporary and perennial crops, which refers to the number of productive items that each producer grows (and among these, the number of perennial crops, since these are principal elements for ecological stability), the size of the plot, the land space available to each producer, and the soil protection techniques used [50,52,53].

The socio-territorial scale includes four indicators such as social participation, indicating that farmers receive agricultural training promoting sustainable production, and an indicator of commercial and multi-activity services linking production and the direct sale of farmers' products, such as through home delivery services. The quality of the food produced is evaluated according to the conditions through which a product reaches its point of sale, and involvement in associations refers to the number of producers who are part of small associative groups—an indicator of productive agricultural vitality [50,52].

Table 1. Sustainability indicators as defined by the Farm Sustainability Indicators (IDEA) method.

| Scale | Indicator | Value | Points |
|----------------------------------|--|-------|--------|
| Agroecological sustainability | Diversity of annual or temporary crops | 15 | 41 |
| | Perennial crop diversity | 15 | |
| | Plot size | 8 | |
| Socio-territorial sustainability | Soil protection techniques | 3 | 34 |
| | Social participation | 7 | |
| | Commercial and multi-activity services | 5 | |
| Economic sustainability | Quality of the food produced | 12 | 25 |
| | Involvement in associations | 10 | |
| | Income effectiveness | 10 | |
| | Self-financing capacity | 15 | |
| | Total Rating | 100 | 100 |

Finally, the economic scale consists of two indicators: self-financing capacity and income effectiveness. The capacity to self-finance refers to the generation of sufficient income to guarantee a certain autonomy to farmers, allowing them to adopt a sustainable approach, while the effectiveness of income evaluates the capacity of a farmer to generate added value for their products [50,52,53].

2.4. Analysis

A quantitative approach was adopted for this research, although data treatment also involved a descriptive and explanatory analysis of the system of production and the commercialization of agroecological foods. A statistical analysis was developed to complement information on the characterization of short commercialization circuits (SCCs). The data obtained were tabulated and analyzed using the SPSS® 24 statistical package and database managed with Excel MS software version 365, which allowed the construction of tables and graphs to aid in interpretation.

3. Results

The purpose of this study was to analyze short commercialization circuits (SCCs) for agroecological foods as a contribution to productive development in the rural Andean area of Pillaro canton. Table 2 provides descriptive statistics for the study population which highlight the crucial role of women in agroecological farms in that all participants were female. In addition, producers have little access to productive credit (96% of farmers) and a large percentage are the owners of the land they cultivate (89% of farmers). Thus, the agricultural production system in Pillaro is characterized by the involvement of women and the production of a specific group of crops, such as non-perennial vegetables, and milk production, with an average of 1.5 cows per family. These characteristics are common among the Andean farms in Ecuador. Moreover, commercialization is a task undertaken by women, who carry their products from farms to markets.

Survey results show that the main sale channel is home deliveries (40% of respondents use this channel), which began due to the COVID-19 pandemic, when people were restricted to their homes. This channel is characterized by a close proximity between producer and consumer, and while the profits are a little higher, the frequency of orders may vary. As Burin [57] points out, crises are the best time to generate better alternatives, and home delivery has emerged from the health crisis as a new form of business that allows producers to reinvent themselves and increase their business. However, 35% of farmers also sell their products through local markets. This occurs when production has been high and they need

other channels. Finally, there are also agroecological fairs, in which 25% of farmers in our sample participate.

Table 2. Description of the variables analyzed from surveys.

| Variable | Data | Percentage |
|--|----------------------|------------|
| Gender | Female | 100 |
| Age | 15–28 | 0 |
| | 29–39 | 32 |
| | 40–50 | 38 |
| | 50–65 | 30 |
| Level of education | None | 0 |
| | Primary | 77 |
| | High school | 18 |
| | University | 5 |
| Marital status (1–3) | Married | 88 |
| | Single | 7 |
| | Divorced | 5 |
| Number of family members | 1 | 0 |
| | 2 to 4 | 73 |
| | 5 or 6 | 27 |
| Productive credit | Yes | 4 |
| | No | 96 |
| Owner of the land | Own | 89 |
| | Lease | 11 |
| | Occupied | 0 |
| Short Commercialization Circuits (SCCs) | Home deliveries | 40 |
| | Local markets | 35 |
| | Agroecological fairs | 25 |
| | Price | 52 |
| The disadvantage of the commercialization of agroecological products | Competition | 30 |
| | No disadvantages | 18 |

The main disadvantage when marketing agroecological product is price. Producers indicate that the price of agroecological products at fairs is much higher than in local markets (52%). To benefit from the advantages of an SCC and their added value allowing everyone involved to enjoy better living conditions, consumers must pay a little more for products [58,59]. Martínez [60] confirms that the prices of agroecological products can be high, and consumers do not always take into account the benefits that can be obtained by purchasing this type of product. Another disadvantage is the level of competition (mentioned by 30% of respondents), with many farmers relating their experience of consumers preferring to buy products from street vendors since the prices and quantities offered are more agreeable, obviously considering financial considerations over health. However, fairs are also educational, cultural, and socially interactive spaces that provide a space for the exchange of experiences between producers and consumers [37]. Likely because their products are offered through multiple marketing channels, 18% of producers in our sample indicated that they do not have any problems with commercialization.

The results in Table 3 show that products are offered in small quantities, sorted, washed, and sheathed. This and the fact that they are produced through responsible agricultural practices increases the price of these products. However, many consumers are concerned with buying products that are not detrimental to their health, in addition to allowing them to get involved in caring for the environment and the social development of rural areas. This type of relationship between producers and consumers is an example of a

plausible alternative link between parts of production chains, where the consumer in the SCC becomes a social agent helping to improve food supply and nutritional security [61].

Table 3. Products grown by participating producers, divided by category.

| Group | Product |
|-----------|--|
| Gramine | Corn |
| Vegetable | Lettuce Zucchini Onion Chard Leek Cabbage Broccoli Pea Garlic Cauliflower Pepper Bean Lima beans |
| Legume | Radish Beetroot |
| Tuber | Potato White melloco Red melloco Tomato (tree) Babaco |
| Fruit | Strawberry Raspberry |

3.1. Evaluation of Short Commercialization Circuits

The evaluation of short commercialization circuits was undertaken across three dimensions by comparing an ideal scenario against the agroecological chain in Pillaro. The blue line in Figure 1 indicates the ideal level of sustainability, while the red line indicates the level of sustainability in the territory. The rating of 35.2/41 on the agroecological sustainability scale reflects the finding that each farmer has an approximate land size of 4 hectares, in which there is a diversity of temporary agricultural production, including potatoes and Andean tubers known as mellocos (*Ullucus tuberosus*), as well as other vegetables and perennial crops such as raspberries and blackberries. In addition, sustainable production techniques such as composting and fumigation with rue or garlic, among others, are used for the cultivation of these items.

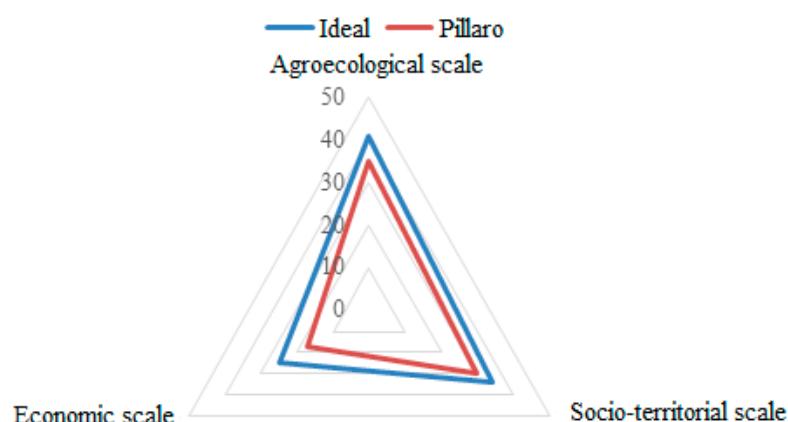


Figure 1. Evaluation of IDEA indicators.

With a rating of 30.52/34, the socio-territorial scale reflects the finding that producers are generally members of associations through which they receive agricultural training, allowing producers to form relationships of trust and create cooperative agreements for the proper management of natural resources and trade. As for commercial and multi-activity services, which are also assessed in this scale, farmers commonly provide direct sales services through a home delivery service in which they prepare baskets containing items from their crops and deliver them directly to households in the canton of Pillaro. In this way, farmers can guarantee fresh produce of excellent quality for consumers. For Sabourin [29], this strategy based on the close proximity between consumer and producer is part of the so-called free economy and solidarity, and is therefore a guiding element for understanding the social construction of these short circuits or so-called proximity markets.

Finally, on the economic scale, a scale that addresses the trade practices and behaviors of the farmers, the rating of 17.5/25 reflects the finding that through the sale of their products farmers can self-finance, reducing the need to resort to financial institutions to fund their production. In addition, a percentage of these farmers have decided to generate added value for their products, as demonstrated through the production of wines, jams, and dairy products. Combining the results of all three scales, the total rating of 83.23/100, indicating an elevated level of sustainability for small agroecological producers in the canton of Pillaro.

3.2. System of Production and Commercialization of Agroecological Products

The agroecological system involves three dimensions of sustainability: agroecological, socio-territorial, and economic and is intimately connected to the environmental, social, and economic context. The system can also be described in terms of three main phases: production, commercialization, and distribution (see Figure 2).

As shown in Figure 2, the first phase, production, is the stage that defines the nature of the crops for self-consumption and sale (through the agricultural practices employed). Production also encompasses association activities, with small groups of agroecological producers being formed to improve their products and promote the sale of agroecological foods, as well as to effectively manage natural resources (water, soil, and seeds). For example, associations emphasize the use of sprinkler systems for crop irrigation and soil management, which allows farmers to save a remarkable amount of water and labor. They also focus on implementing other eco-friendly production practices, such as the reduction of chemical inputs. In terms of seeds, most farmers use native and recycled seeds, reflecting considerable care for the environment and biodiversity. Thanks to this and the strong diversification of crops, which promotes food security and sovereignty for the canton of Pillaro, this phase shows a high sustainability index.

Many agroecological producers implement distribution services for their products, an example being the direct sale of their products to households in the canton. This is usually in the form of baskets containing small portions of a range of products obtained from the crops of farmers. Through this system, the consumer receives fresh, high-quality products at a reasonable price. Farmers also travel to markets to sell their products, with an average travel time of about 30 to 40 min from their farms to the place of trade. Distribution involves direct sale in markets and fairs, with a small number of intermediaries. There is a great diversity of products on offer from producers, such as various fruits and vegetables, each with a standard price. This stage thus offers economic development for the producer, since direct sales to consumers occur in a way that promotes fair trade.

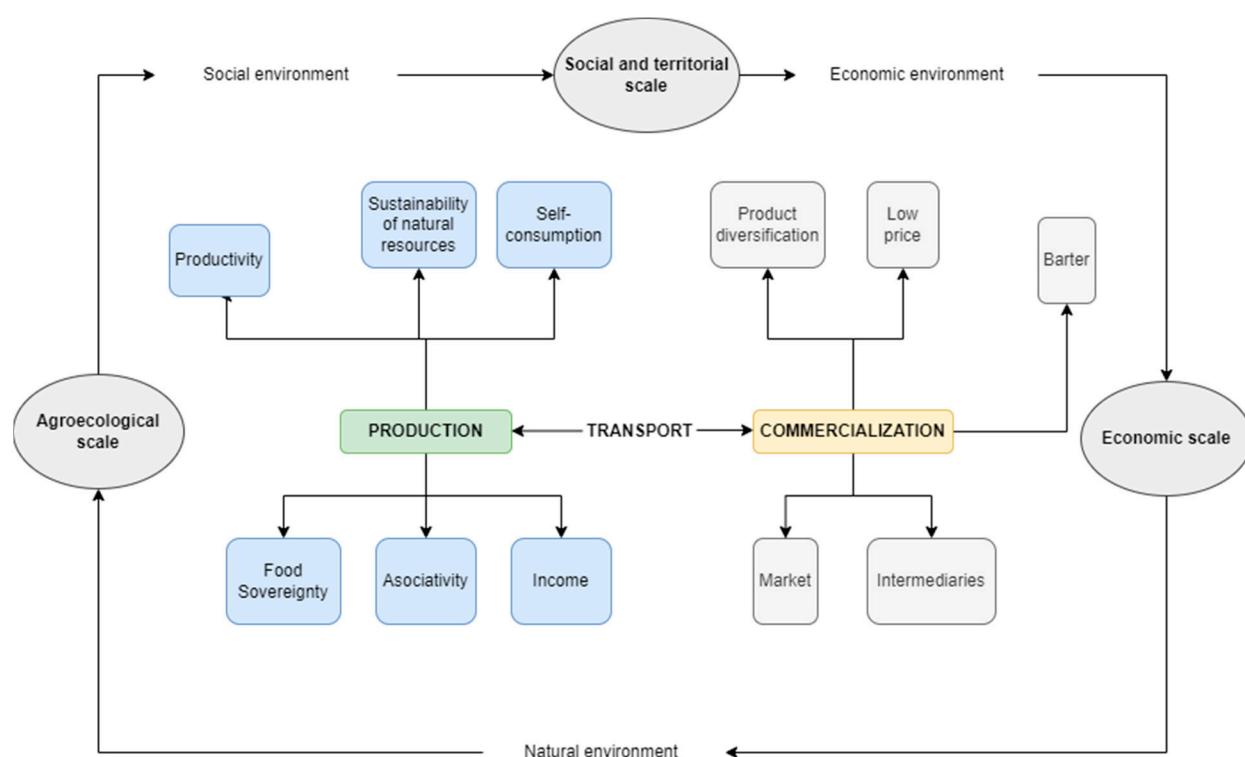


Figure 2. System of production and commercialization of agroecological products in the canton of Pillaro.

3.3. The Short Commercialization Circuit Model

There are three main channels of commercialization in the short commercialization circuit model (traditional markets, specialized fairs, and home-delivery baskets). As discussed above and shown in Figure 3, the system features three interconnected dimensions (agroecological, social, and economic; see Figure 3).

Figure 3 graphically demonstrates the interaction between the processes forming the commercialization chain, with the yellow boxes presenting the specific characteristics of each channel. The producers can be categorized into three groups, depending on their business model. In the case of traditional markets, the first group (40% of producers) offers a minimum of 13 different products with a capacity of production of 3595 kg per month in total. Products are distributed at markets five times per month, and the producer must travel an approximate distance of 18–23 km to the nearest market. There is some participation of intermediaries, namely those responsible for distributing the products to restaurants, micro-markets, stores, and micro-food microenterprises, with these goods eventually reaching the final consumer as transformed products. This means of commercialization commands a lower price for producers compared to the other two channels, however. Home baskets and agroecological fairs involve a direct sale to the final consumer; therefore, a higher price can be obtained.

The second group participates in specialized fairs or agroecological markets. A total of 34% of producers in our sample sell their products directly to consumers this way. An average of 1607 kg are traded per month through this channel, equivalent to 1916 USD/month. The farmers need to travel a distance of 5–10 km, on average from their farms to the marketplace.

Finally, the third group involved in home-delivery baskets represents 26% of producers in our sample. Through this commercial pipeline, approximately 1854 kg of food is sold per month, generating an approximate income of 2363 USD/month. The distance traveled by the producer to use this channel is typically 4–8 km (10–25 min). This channel involves the shortest travel time out of the three channels, as the outlets are located near the producing farms; home delivery baskets thus encourage direct sales and promote the consumption of fresh and high-quality food.

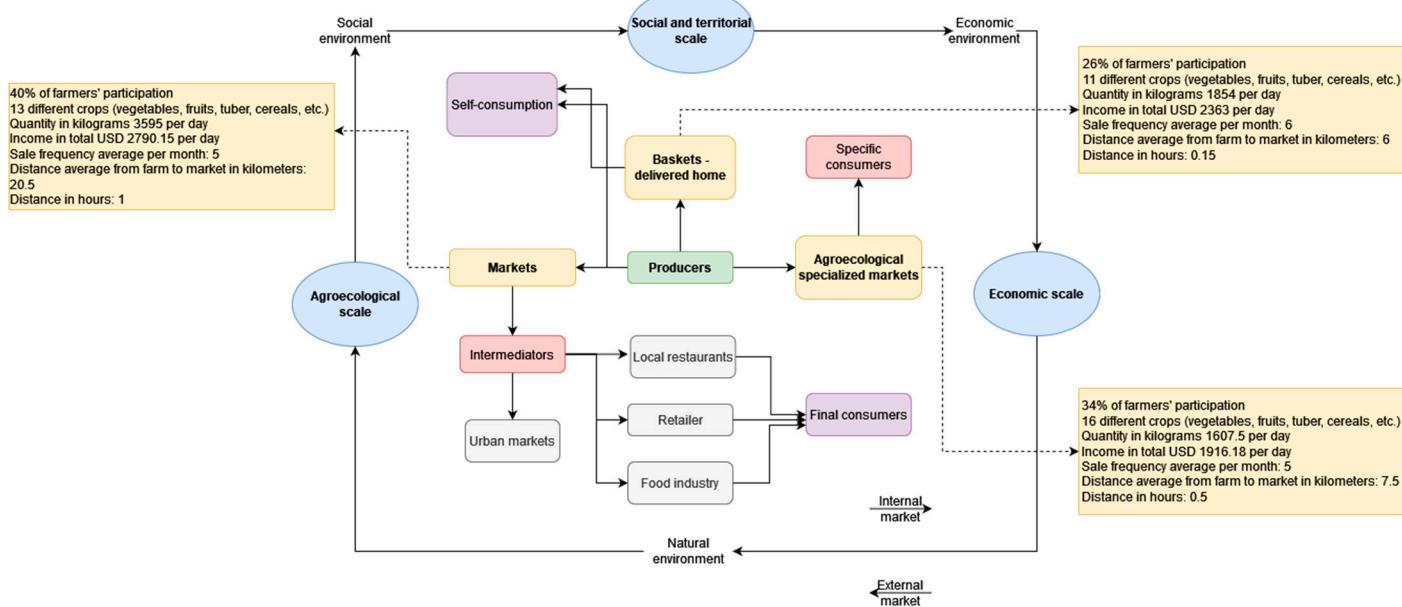


Figure 3. Short commercialization circuit model for the trading of agroecological products in the canton of Pillaro.

4. Discussion

The results show that the region features a high level of sustainability, with a high rate of diversification of healthy foods, the revaluation of ancestral knowledge through clean production practices, and producer associations, all of which has driven the growth of the local economy. As mentioned by Cardoso et al. [62], these types of activities promote the participation, visibility, and inclusion of women in activities that are generally believed to be only performed by males.

The distribution system in the canton of Pillaro is characterized by the commitment of producers to providing fresh and chemical-free products. Moreover, there is an important level of inclusion of women, with the circuit being led by women, who are in charge of tilling the fields and taking their products to the different sales outlets. In this way, the system also features the active participation of producers and a direct producer-consumer relationship [24,27]. Although the environmental credentials of products have been questioned and the price is higher than in industrialized food production, these products have grown in popularity, driven by demand from consumers who seek to buy products that are good for their health and enable them to get involved in the social development of rural areas [63,64]. As a short trade circuit, the system features a reduced commercial distance, with an average of 40 min needed for a producer to move their products from farm to market. Finally, as indicated in Figure 3, the system is characterized by an open trade circuit where commerce occurs within the canton but distribution extends outside of the province: through the LAIF (Latin American Investment Facility) project, farmers' products can also be sold in markets in the provinces of Pichincha and Cotopaxi. As Boenzi et al. [65] report, most cultivation areas are located in rural zones, away from urban and industrial areas. Therefore, the entire agri-food supply chain, from the processing and distribution stages, often requires transportation across long distances, with a corresponding environmental and economic impact. The short commercialization circuits examined here offer an alternative system with a lower environmental cost.

Our results show that 45% of respondents state that the implementation of public spaces for the organization of fairs is the main strategy driving the development of a sustainable marketing model. As López et al. [66] point out, these spaces allow for the inclusion of small-scale producers and the improvement of their profits by omitting intermediaries, with a benefit for both consumers and producers. However, in order to be expanded and

strengthened, SCCs need to benefit from targeted public development policies, so that they can continue to guarantee access to healthy and high-quality food, improve food and nutritional security, and ensure environmental preservation [15]. In Ecuador, the social and economic support of municipal governments is supporting sustainable trade [59]. For authors like Connolly et al. [64], the structures that agroecological fairs provide offer an alternative to the industrialized food system and an answer to the lack of laws or government aid, where producers collaborate to co-create a community structure of co-production, generosity, and/or shared resources (e.g., shared delivery of products by producers in a rural area).

5. Conclusions

In this study, the commercialization system of agroecological producers in the Andean area of Pillaro, in Tunguruhua, Ecuador, was analyzed using survey data and sustainability indicators (IDEA). The short commercialization circuits in the area are characterized by the principles of agroecology discussed by Altieri and by institutions such as the Food and Agriculture Organization of the United Nations (FAO). This type of commercialization is key to improving farmer incomes and shortening the divide between consumers and producers. The opportunity to communicate with consumers about how food is produced and the nutritional benefits of SCCs can help improve food security by helping consumers understand the importance of sustainable practices, including the diversification of products. In addition, women play a fundamental role in SCCs, generating incomes that provide education, clothing, and healthcare. In addition, the economic participation of women can help them gain economic independence from patriarchal customs. SCCs also benefit consumers through reasonable prices—and thus greater access to food—while at the same time increasing farmer incomes. As a result, food security can increase through greater food availability, low prices, and highly nutritional products. Moreover, SCCs strengthen the relationship between farmers and consumers, creating dialogue and an interchange of experiences and cooking recipes, as well as promoting diet diversification. The short commercialization circuits that characterize agroecological food production in Pillaro are an effective means of trade through which healthy products can be made available to consumers, while improving the lives of producers and minimizing the impact of food production on the environment.

Author Contributions: Conceptualization, C.F.-C., O.V.C.-A., J.L.V. and D.G.; methodology, C.F.-C., O.V.C.-A. and J.L.V.; software, C.F.-C., O.V.C.-A., J.L.V. and D.G.; validation, C.F.-C., O.V.C.-A. and J.L.V.; formal analysis, C.F.-C., O.V.C.-A., J.L.V. and D.G.; investigation, C.F.-C., O.V.C.-A., J.L.V. and D.G.; resources, C.F.-C., O.V.C.-A., J.L.V. and D.G.; data curation, C.F.-C., O.V.C.-A., J.L.V. and D.G.; writing—original draft preparation, C.F.-C., O.V.C.-A., J.L.V. and D.G.; writing—review and editing, C.F.-C., O.V.C.-A. and J.L.V.; visualization, C.F.-C., O.V.C.-A., J.L.V., and D.G.; supervision, C.F.-C., O.V.C.-A. and J.L.V.; project administration, C.F.-C., O.V.C.-A. and J.L.V.; funding acquisition, C.F.-C., O.V.C.-A. and J.L.V. All authors have read and agreed to the published version of the manuscript.

Funding: The Universidad Técnica de Ambato (UTA), and in particular the Dirección de Investigación y Desarrollo (DIDE). The APC was funded by UTA and DIDE. Else, the Universidad de Cuenca and the Vicerrectorado de Investigación (VIUC) contributed to cover partial publication costs. In addition, the UTA supported the open-access publication of this scientific article. This publication is part of the research project SFFCIAL06.

Institutional Review Board Statement: The study did not require ethical approval because no sensitive personal data was analyzed and no human biological samples were used.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study was obtained from the included studies and was openly available.

Acknowledgments: We want to express our sincere gratitude to the Dirección de Investigación y Desarrollo (DIDE) at the Universidad Técnica de Ambato (UTA). This publication is part of the research project SFFCIAL06, “Mathematical model for the planning of food production in the systems of family and peasant agriculture of the canton Pillaro”. In addition, we thank the Universidad de Cuenca and the Escuela Superior Politécnica de Chimborazo (ESPOCH) for their support in the publication of this scientific article. Special thanks go to the CESA (Central Ecuatoriana de Servicios Agrícolas) Foundation, and all of the farmers from Pillaro Ramal Norte who completed the survey and whose kind participation was a crucial contribution to ensuring the study’s success.

Conflicts of Interest: The authors declare no conflict of interest.

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