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Production And Commercialization Of Deciduous Trees In The Municipality Of Sotaquira Boyacá: Associative Model As A Strategic Tool

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ABSTRACT

Fruit production and marketing involve factors that in one way or another affect the farmers' income. In particular, intermediation, investment in technology, pest treatment, and inputs, among other aspects, has led to peach, plum, apple and pear producers in the municipality of Sotaquirá, Boyacá - Colombia, not receiving adequate income for the work they do. From the contextual analysis, one of the possible causes of this problem is the lack of implementation of strategic tools. In this sense, the purpose of this research was to implement a new model of associativity by linking 60 fruit producers in the region. Methodologically, this is a qualitative study oriented through the descriptive method and the Participatory Action Research (PAR) design, in which the participation of the sample subjects in the exchange of knowledge leads to the resignification of a model of associativity oriented to the productive chains, to guarantee benefits to the peasant community in their agricultural activity. Based on the configuration of this model, it is concluded that collaborative work among deciduous producers allows them to achieve significant economic improvements.

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INTRODUCTION

The agricultural industry in Colombia is an important sector for the country's economy, since it provides different sources of employment, guaranteeing the food security of Colombians. Information corroborated by the National Statistics Department, DANE (2020), indicates that this sector of the economy has had significant increases in recent years. Thus, in the first quarter of 2021, it grew by 3.3% contributing 0.3 percentage points to the GDP, being one of the activities that most contributes to the value generating dynamics, after the manufacturing sector with 7% and public administration with 3.5%.

The National Department of Statistics indicates that agricultural activity, especially in the department of Boyacá, contributed with an average of 3.4% of the 6.8% registered at the national level, participation in the GDP for the year 2020, according to DANE data, the contribution of this department during the last 15 years was 17.1% and a notable drop for the year 2021 to 11%. As noted by Puentes (2006), productive units are based on smallholdings (16%), micro-holdings (18%) and small farms (16%), mostly with artisanal technology. This decrease has led Boyacá, to be categorized as the sixth poorest department in Colombia since 2014, with a monetary poverty rate of 15.1 percentage points, a situation that has not presented greater variation to the year 2020, when it is identified that the poverty rate remained at 14.7% (DANE, 2020). This situation is due to the lack of employment and low educational level of the inhabitants. In the year 2021, it has been further accentuated by the public health emergency resulting from the Covid 19 virus.

Among the factors that have the greatest impact on poverty in the department are related to the production and commercialization of agricultural products, particularly in the municipality of Sotaquirá, peach and plum crops are predominant, with a production of 43% at the national level; however, in the process of harvesting and placing fruit production on the market, farmers must face various economic situations that reduce the reasonable value of their production. For Caicedo Díaz del Castillo (2013), the lack of opportunities for farmers, the appropriation of land destined for cultivation by urbanizing entities, changes in soils, the purchase of agrochemicals and above all the lack of association and farmer organization, are leading fruit producers to have fewer opportunities for well-being and to be more vulnerable and powerless in the production and marketing of their crops.

In addition to this situation, the lack of economic resources of farmers limits the marketing of their products, sometimes leading them to prefer to discard productivity, burying it or using it as feed for some animals. This situation is consistent with the statements of Bond et al. (2013) and Parfitt et al. (2010) who point out that more than 1.3 trillion of the food produced in the world is not used due to a lack of opportunities. Furthermore, according to the authors, market intermediation is another factor that has a significant impact on the supply and demand of crops to reach the final consumer, and this also means that farmers must assume high productivity and marketing costs, a situation that has a direct impact on expected income.

Consequently, the few opportunities for deciduous fruit farmers derive from the lack of organization and strategic associativity that would allow them to reduce costs and earn higher incomes

through organized chains. Therefore, this study, based on the integration of the agricultural community of the municipality of Sotaquirá, seeks to propose a strategic model to redefine the productivity and marketing chain of the region's deciduous trees and thereby guarantee the economic development of the region.

Production and commercialization of deciduous trees in the Department of Boyacá

Fruit production in the department of Boyacá is due to environmental conditions that allow the development of deciduous species such as apple, peach, pear, and plum, among others. The name deciduous is given because they are species that lose their leaves during specific periods due to their metabolic activity. Ducuara Cabrera (2017), refers that the word deciduous derives from the Latin cadūcus 'deciduous' and folium 'leaf'.

In Boyacá, deciduous production is extensive, with the municipality of Sotaquirá as one of the largest growers of peaches, plums, pears and apples. However, the United Nations Development Program, UNDP (2012) refers that the lack of strategic models for the production and commercialization of these fruits has led farmers to face situations that in one way or another limit the perception of reasonable income in their crops. Among the factors that have the greatest impact on production and marketing is the involvement of intermediaries to bring the products to the final consumer, the high costs of access to appropriate technologies for cultivation, crop losses, the constant fight against pests and the attitude of independent work that does not allow growers to associate in search of strategies that favor the community.

Regarding the technological factor in deciduous production, Galdeano, Román and Montoya (2002) point out that changing environmental conditions, including loss of soil components and nutrients, abundant or scarce rainfall, and intense winds, among other factors, condition deciduous production These factors condition the production of deciduous crops, leading farmers to invest in adequate technologies to overcome the problems that arise in their crops, because due to the characteristics of space and production, a large number of growers fall into the category of smallholders, that is, their crops are grown in orchards or small plots. For this reason, they prefer to use mostly artisanal technology in production, a situation that in one way or another may limit the quality of productivity.

The author's references are consistent with the reality evidenced in the municipality of Sotaquirá, Boyacá, Colombia, since most farmers when developing their productive activity in small plots, integrate rudimentary techniques in the production processes of deciduous trees. In their opinion, this situation has generated losses in their harvests and their economic acquisition, since they do not have the necessary resources to link technologies that make possible a greater productive development.

On the other hand, the marketing of deciduous crops is directly affected by the involvement of intermediaries, who according to (Trienekens and Willems, 2007; Howells, 2006) have the function of positioning products in the market, making agreements, transporting production, negotiating with buyers, among others, to guarantee sales of the entire production.

Although intermediaries are shown as collaborators, Gerrsbro and Vendel (2008) consider that their actions do not always seek to favor the grower, because sometimes they look for customers who pay lower costs than the real value of productivity, a situation that has a negative impact on the economic conditions of producers. For their part (Filser, 2012; Michel,2014; Oddone and Stella Beltrán, 2014), consider that

sometimes intermediaries seek to appropriate significant profits at the expense of farmers' work, this generates economic gaps between farmers and intermediaries, since the latter practically control the management of chain transactions, taking advantage of the little knowledge that farmers have on technological, market and financing issues, leading to an inequitable distribution of the resources received in the commercialization of crops.

Consequently, in the production and commercialization of deciduous crops, different factors intervene that in one way or another do not make it easier for farmers to obtain fair profits for their work. This situation is the reality experienced by deciduous producers in the municipality of Sotaquirá, Boyacá, because due to a lack of knowledge, design and implementation of associative models, a large percentage of the economic results derived from fruit productivity are not perceived and remain in the hands of intermediaries.

Models of Associativity in Deciduous Production

Associativity is as old as mankind; in the past, primitive people sought to integrate to satisfy basic needs. According to Salazar (2016), in Colombia, models of association were initially directed to cooperative, understood as a strategy of cooperation for the achievement of collective purposes.

In addition, the purpose of associativity is to integrate organizations to permeate different markets in regional, national and international contexts. Busson (2012), and Steiner and Ramírez (2019) refer that in Colombia there are significant experiences at the organizational level that have shown that this can be a strategic tool for economic development.

Mathews (2013) refers that the implementation of associative models should be aimed at meeting the economic objectives of the organizations, for which there must be a commitment among the different agents that are part of the production and marketing chains, and above all, transparency in the processes framed in the financial part. In this sense, its implementation can generate benefits, among them the predominance of members' confidence, even in times of uncertainty, the reduction of intermediaries and therefore the achievement of net profits derived from production and marketing, which makes possible the economic stability of the members.

From this perspective, over time, different models of associativity have been formulated, which seek to satisfy the particular needs of the organizations, including access to technology, improving production processes, generating marketing strategies and market positioning. Figure 1 shows some associative models related to the agricultural sector.

Figure 1 Models of associativity in the agricultural sector.

Note: The figure shows some models that can be integrated in the agroindustrial sector

Associations

This associative modality allows organizations and individuals to participate in a communitarian way. Lozano (2010) states that through it, agricultural producers can make decisions that favor their economic stability, position themselves in the market and implement strategies that guarantee the common good. Likewise, Salazar (2011) indicates that associations enable market balance and, above all, allow members to express their disagreements when they feel that their economic activity is being violated.

On the other hand, Tokman (2012) sees in the associative model an opportunity to mitigate the impact of intermediary agents in the production and marketing of crops, thereby achieving an adequate level of competitiveness and, above all, a fair return for the work carried out.

- **Consortiums**

Specifically, the consortia model, as Galvis and Rojas (2011) show, is used by associations that are of the same nature, through this organizational figure it is sought to achieve significant improvements in the services of the associates. Therefore, it is usual that, at the time of linking them as an associative model, they are not integrated with a specific purpose, for example, exporting, activities inherent to the agricultural part such as tillage, irrigation and technology, among others. In addition, consortia allow the integration of significant aspects of organizational experiences to seek quality in the operations deriving from the production and marketing processes.

- **Contract farming**

This associative modality is one of the most popular in recent years, because, as Gotrett and Junkin (2012) point out, it seeks to ensure that the parties benefit, so that, for example, input-producing

organizations can establish agreements with farmers and provide them with materials for the production processes, and the latter in turn build loyalty with the suppliers. In this way, the agents involved in the contract farming model can develop a win-win relationship.

- Maquila Contract

This associative model is similar to contract farming, but its difference lies in the fact that in this contract there is an exchange or barter between agricultural producers and agribusinesses, through the industrial processing of products that are then marketed. In the deciduous agricultural sector, as indicated by Van der Heyden and Camacho (2006), the maquiladora is mostly directed to the processing of fruits and thus preventing the loss of harvests, in this sense, the agroindustrial entrepreneur offers services for this purpose, and in return, the farmers pay for them with part of the production, a situation that allows the intervening parties to maintain their independence and establish the proportion that corresponds to each one.

As the authors point out, this model is quite functional, and particularly tends to benefit the agricultural producer, who sometimes does not have the necessary economic resources to transform his products and place them on the market, a situation that can lead him to generate losses, since due to the lack of agroindustrial support, he sometimes prefers to discard his harvests or use them as animal feed. The fact of being able to establish a cooperative relationship with businessmen who have the necessary technology to carry out maquiladora processes allows the small and medium-sized producers to generate economic benefits, while at the same time favoring the agroindustrialists. Consequently, the parties benefit mutually, allowing their continuity in the market.

- Joint Venture

This associative model is oriented to the integration of two or more companies, which make available different resources to promote the commercial development of the associates, the main characteristic is that the linked entities continue to carry out their work without affecting their independence. Gutiérrez and Gotrett (2012) assert that most of these forms of cooperation promote associativity by cooperatives or commercial companies.

The purpose of a Joint Venture is not simply to seek development opportunities, but the contribution of the associated companies from different factors that favor the other organizations, which is why this form of associativity could not be consolidated if it is only oriented to a specific purpose, for example, marketing.

- Clusters

Cluster associations focus on a specific productive activity, are located in a particular geographic space, and usually seek to generate agreements that strengthen a sector or productive sector. Based on the references of the Ministry of Environment and Rural Development (2012), clusters are generally developed through roundtables in which different producers of a region, companies, equipment or input facilitators, and governmental entities that in one way or another seek to assist with the linked subjects to strengthen the production and marketing processes are linked.

- Associative Networks

Castellanos and Gonzalo (2010) indicate that they go beyond a simple association, particularly if state entities are linked to them, their actions seek to generate welfare for the producers. Thus, because of the factors that intervene in the commercialization processes, the state, to control the uncertainty of the entrepreneurs, can sometimes buy productivity and seek strategies to put these products on the market. For this reason, associative networks are a strategy that allows entrepreneurs to solve situations that may be unfavorable in the activity they develop.

- Production Chains

The associative model of productive chains, as referred to in the State Program for Science and Technology of the State of Jalisco (2007), is one of the most widely accepted in the business sector, since it seeks at all times to guarantee the commercialization of services or products until they reach the final consumer; therefore, in this model, the parties involved are usually organized to perform specific tasks to position their products in national and international markets.

In this model, as ECLAC (2003) refers, the actors involved seek to achieve collective welfare, since each process involved in the productivity and commercialization of goods or services is examined from a detailed analysis, and subsystems are created to take charge of the different activities to reach the final consumers. One of the added values of production chains, as indicated by Kaplinsky (2000), is the possibility of allowing organizations to carry out analysis processes to establish critical points that may limit organizational development and thus establish contingency mechanisms to maintain organizational harmony.

In this sense, for this study, this alternative of associativity was selected for the design and implementation of a new model that contributes to strengthening the processes of productivity and commercialization of deciduous trees. It also allows farmers in the municipality of Sotaquirá, Boyacá to receive a fair income for their work.

MATERIALS AND METHODS

The research process in this study links the quantitative and qualitative paradigms. Therefore, it is said that its nature is of a mixed type, since, as noted by Hernández et al. (2006), in this type of research, the numerical variables support the arguments of the subjects; and in turn, their opinions, reflections and discourse contribute to the explanation of the quantitative data, therefore, both methods are not mutually exclusive but complementary. Likewise, the approach followed to detail the facts that arose in the development of the study is framed in the descriptive method, which, as Ander Egg (1995) refers, allows understanding aspects of the object of study from the traits, attributes and characteristics, through the narration or detailed description of the investigated reality. Particularly, this research sought to describe aspects inherent to the production and commercialization of deciduous trees by farmers in the municipality of Sotaquirá, Boyacá.

Regarding this method, authors such as Elliott (1989) and Fals Borda (2009) state that participatory action research is oriented to understanding and transforming problematic realities of a community, social group or collective, for which it uses the contribution of information and ideas provided by the subjects involved, which guide decision-making to formulate projects, processes or reforms aimed at modifying the existing reality. The authors indicate that this research method specifically seeks to make social change

possible so that people become aware of their role in this transformation process. It should also be mentioned that in PRA, the researcher scrutinizes the object of study and, based on this, proposes specific actions aimed at providing a solution to the established problem, as well as acting as an active agent who is part of the solution.

Because of these considerations, this method coincides with the purpose of the study, since the first step is to characterize the situations that affect the perception of low income by farmers producing deciduous crops in the municipality of Sotaquirá Boyacá, and based on this to formulate a new model of associativity oriented from the model of production chains and interpret their actions in the search for solutions to the problems arising from the process of production and marketing of crops.

Unit of study

The unit of study for this research is the deciduous farmers in the municipality of Sotaquirá Boyacá, according to the database provided by the Colombian Agricultural Institute (ICA), the population corresponds to 150 farmers, from which a representative sample is taken through convenience sampling, taking into account the criteria shown in Table 1.

Table 1
Criteria for sample selection (convenience sampling)

Sample selection	**Participant selection characteristics**
In the particular case of this study, a sample of 40 deciduous farmers was taken.	The sample selection criteria were: - To be a deciduous farmer in the municipality of Sotaquirá - Boyacá. - Preferably grow peaches, plums, apples and pears. - To present difficulties in the production and commercialization of fruit. - Not to be linked to associative models.

Note: The table lists the criteria taken into account for the selection of the farmers participating in the study.

A total of 40 sample subjects were involved in the study.

Table 2
Characteristics of the sample subjects

Criteria	**Description**
Genre	Women: 10 Men: 30
Age	Years: 50 to 70 years
Time spent in production	More than 20 years old
of deciduous	1 y 2

Socioeconomic stratum	The majority of farmers are engaged in deciduous production through smallholder cultivation, and a large percentage own their farms.

Note: The table presents aspects inherent to the sample selected for the research.

Study categories

Taking as a reference the methods integrated in the research process, the study has a qualitative predominance, which is why three categories are formulated to interpret the reality faced by the deciduous tree growers, as shown in Table 3.

Table 3 Operationalization of study categories

Category	**Subcategoría**	**Técnica E Instrumento Recolección De Datos**
Deciduous production	- Related Technology - Professional technical support - Pest management - Crop loss	- Survey (structured questionnaire) - Focus groups - Participant observation (systematic recording in field diaries)
Deciduous marketing	- Intermediaries - Marketing expenses	Survey (structured questionnaire)
Partnership	- Lack of commitment from farmers - Lack of knowledge of associative models.	Focus group (structured questionnaire)

Note: The table presents the study categories through which the feelings of the growers about the production and commercialization of deciduous trees in the municipality of Sotaquirá are interpreted.

Through the proposed categories, it is necessary to delve into the problems that farmers face in the production and marketing of fruits such as peaches and plums.

Stages of the Study

The stages of the study are related to the objectives formulated, in this sense, the research process is framed in four specific stages:

- Stage One: Analysis

The purpose of this stage of the study was to analyze and interpret the opinions and arguments of the sample subjects regarding the problems arising from the production and commercialization of deciduous trees and the incidence they have on their economic solvency.

- Stage two: Planning

Based on the analysis of the agricultural community of the municipality of Sotaquirá, after identifying different situations that limit the production and marketing of fruit crops, producers were involved in the

design of an associative strategy based on the production chain model, to guarantee their economic stability and enable the continuity of their agricultural work.

- Stage three: Reflection

This stage of the study sought to reflect on the impact that could be generated by the design of the associativity model in production chains as a strategic tool to improve the production and marketing of fruits in the municipality of Sotaquirá - Boyacá.

RESULTS

The results of the study derive from the fulfillment of the objectives, therefore, they are presented according to the stages established in the methodological design.

- Analysis stage

In this phase of the research, the opinions, appraisals and arguments of the deciduous producers were analyzed from each of the formulated study categories. Regarding the category of Agricultural production of fruits, the aim was to inquire about the problems presented by the farmers in the production processes.

Based on the application of qualitative techniques such as focus groups and surveys, it was possible to establish that most farmers are affected in the harvesting processes, since the technology linked to this purpose is artisanal, that is, handmade by themselves, isolated from technological resources and high-end machinery, a situation that limits large-scale production, leading them to become small producers. Some opinions referred to in the focus group are the following:

Farmer1H: Particularly regarding the irrigation system in my crops, the technology I use is to say somehow obsolete, I simply own sprinkler systems, which are not enough to guarantee an adequate production...

Farmer15M: In my case, as a woman farmer, I have had to face problematic situations in peach production, because due to the lack of greenhouses during the frost season, crops have been lost, the truth is that in the municipality of Sotaquirá, being one of the largest deciduous production areas, we have not received any technological assistance from the governmental entities.

Farmer22H: I have been dedicated to the agricultural work of fruit production for more than twenty years, but during this time I have had to face different problems in the harvests due to lack of adequate technology, and the income I receive from production is not enough to acquire appropriate machinery for the production of each variety of fruit, this limits its quality...

Consequently, the feelings of the farmers involved in the study, allow establishing that in their agricultural work there is a lack of integration of technologies to favor the production of fruits on a larger scale and with the quality standards demanded by the market. This situation is consistent with the position of Romero (2001), who indicates that, in the agroindustry, agriculture should not go on one side and industry on the other, but should constitute a binomial that allows reaching adequate levels of productivity to satisfy the needs of the final consumer.

Therefore, the results that emerge from the analysis of this category show the urgent need to testify the agricultural work of the producers of deciduous crops in the municipality of Sotaquirá, Boyacá - Colombia, in such a way that this makes possible the opening of new markets for the commercialization of their harvests and therefore the obtaining of fair incomes for the work developed.

In addition to the problematic situations that derive from the lack of adequate technology for fruit production, farmers also state that they require the technical support of professional experts in the production of fruits such as peaches, plums, apples and pears, which are the deciduous fruits they mostly cultivate since weather conditions are sometimes unfavorable for the crops. Also, the management of pests that attack the fruit has become a problem that has led to the quality of the products being affected. From their opinions, they indicate that the knowledge they have is not adequate to solve these situations and that sometimes from the programs promoted by the regional government they have received training to prevent some negative situations that may affect their crops.

From their assessments, the producers involved in the study indicate that:

- **Farmer35M:** Well, some time ago ICA (Colombian Agricultural Institute) officials came and gave us adequate information to treat the different pests that attack the fruit, particularly peaches, including fungi belonging to the genus of monilias that lead to rotting, however, the assistance provided was given in a few visits, but I would like to have this support to ensure the quality of my crops…
- **Farmer26M:** I consider technical assistance to be fundamental because in the cultivation of deciduous crops we face different situations that can endanger crops and if they are not treated with the knowledge required, farmers can have significant economic losses...
- **Farmer17H:** In my experience, I have had to bear the costs of pest control on my own, but I would like to have support from the governmental entities that regulate agriculture in Colombia…

The arguments of the deciduous growers allow recognizing the needs they have in terms of pest management that affect their crops and the climatological situations that also affect them. Therefore, the lack of associativity that would allow them to overcome these difficulties is identified.

On the other hand, also the various factors that in one way or another affect the cultivation of fruits, sometimes have led farmers to lose their crops because the high costs they must incur exceed their income expectations. In this sense, they prefer to use the fruit as animal feed, or in the worst case, bury it. In their opinion, since they do not have an associative model adapted to their needs, this could be the cause that affects the production processes.

Another aspect that affects the cultivation of deciduous crops in the municipality of Sotaquirá, Boyacá, is related to the commercialization of harvests, since this generates significant expenses for farmers, since production is not only distributed in the regional market, but also at the national level, and in one way or another reduces profitability and increases production costs. Likewise, according to the farmers included in the study, one of the agents that most affect the commercialization processes is the involvement of intermediaries, since they take a large part of the profits. Some of the farmers' perceptions are as follows:

- **Farmer8H:** I particularly cultivate three deciduous fruits: peach, plum and apple, sometimes the production is large and significant, which is why I also have to make investments to put productivity

on the market, which has led me to look for intermediaries who have the contacts of potential buyers…

- **Farmer8H 19H:** Regarding the intervention of third parties, the payment I have to make to be able to sell the production is quite high, reaching the minimum profit margin and barely recovering the investment...

- **Farmer8H 26M:** If the situation continues with the payment of expenses for the commercialization of the fruits, I have thought about retiring from the agricultural activity and looking for another work alternative...

The feelings of the farmers allow recognizing that, in the processes of marketing crops, they must face unexpected situations to be able to put their products on the market and given the need to market them promptly due to the conditions of lifetime leads them to look for intermediary agents who collaborate with this purpose. Faced with this situation, Borker and Nastle (2018) refer that intermediaries take advantage of the difficulties of producers to seek in them an economic opportunity in their favor, making themselves seen as indispensable subjects for the commercialization processes.

On the other hand, putting products on the market implies other expenses for producers, including transportation, commissions, packaging, and freight, among others. In addition to this, sometimes farmers, faced with the need to sell their crops, must significantly reduce their selling costs, which means that they no longer receive a fair income for the work they have done.

Consequently, the growers' arguments show that there is a need to integrate associative models that allow them to have greater control over the production and marketing processes of their crops, and also to permeate other markets since the synergy of efforts and cooperation between producers can bring about representative improvements in the economic growth of the region and the farmers.

Regarding the need to link associative models in the productive agricultural activity of deciduous crops in the municipality of Sotaquirá, from the producers' point of view, it is a task that cannot be postponed to obtain higher levels of welfare in their work. Some opinions on this matter are the following:

- **Farmer20M:** I recognize that the majority of producers in the municipality of Sotaquirá do not have the necessary knowledge to organize ourselves in such a way that the production and commercialization of fruits is beneficial for the community….

- **Farmer4H:** I believe that it would be very beneficial to receive support to establish a model that allows us to associate and carry out specific tasks, in addition to committing ourselves, since we can all benefit from it…

- **Farmer16H:** Farmers in the municipality would feel comfortable receiving support from people who can guide us in the associative processes …

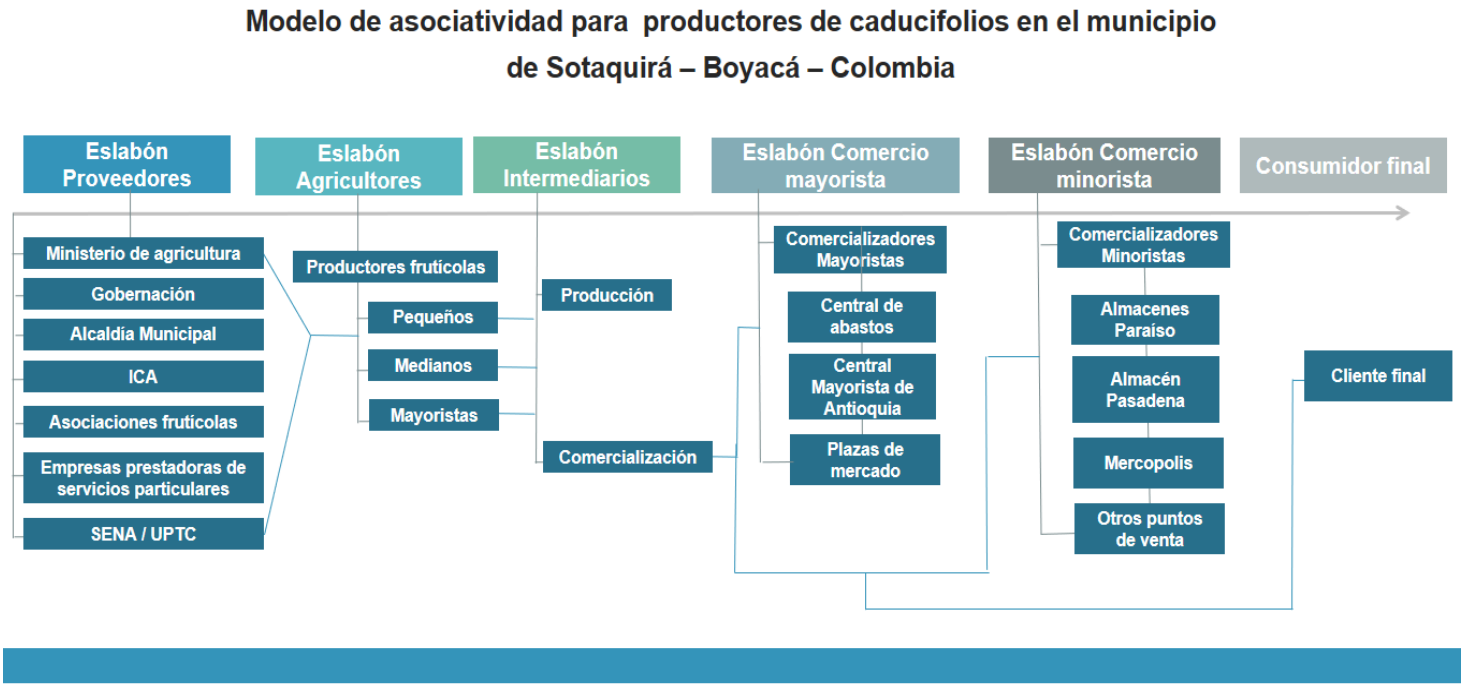
Consequently, the references of the farmers involved in the study allow identifying the lack of organization in the processes inherent to the production and commercialization of deciduous trees.

Specifically, through their arguments, they have expressed the urgent need to design a model adjusted to their needs, which is strategic and allows them to effectively control each of the processes that are part of the production chain.

- **Planning Stage**

In this phase of the study, once the problems affecting the production and marketing of deciduous trees in the municipality of Sotaquirá, Boyacá, Colombia, had been determined, a model of associativity was designed within the framework of the proposal for production chains. Since the study was oriented towards design, research and participatory action, the sample subjects participated dynamically in the design of the model. The proposed model, shown in Figure 2, includes six links aimed at continuous improvement in the activities involved in agricultural work.

Figure 2 Proposed production chain model to strengthen deciduous production and marketing activities.



The proposed production chain model is based on an analysis of the positive and negative situations that affect the production and marketing of deciduous crops. Therefore, its design is based on many theoretical references that have shown positive results and allow the associative process to be directed toward helping farmers overcome the difficulties they face in their work. Specifically, the model has been directed to strengthen the first five links to guarantee the satisfaction of the final consumers or customers and thus build their loyalty. The aspects to be innovated in each link are detailed below.

- **Supplier Link:** In this link, it is intended to link different entities that contribute to providing knowledge to growers to specifically overcome problems related to the technical part, pest control and particularly the supply of inputs necessary for fruit production, since one of the negative

situations recurrently expressed by farmers linked to the study is the absence of technical support and lack of suppliers of basic inputs for crops.

- **Farmers Link:** This link seeks to integrate all fruit farmers in the municipality of Sotaquirá, Boyacá - Colombia, regardless of whether they are small, medium or large producers, the ideal is to motivate them to see in the associativity model an opportunity for continuous improvement in the field of production and marketing. In addition, to give them a proactive role that leads them to empower themselves to see their work reflected in the improvement of their income. Likewise, by involving all the farmers in the model, it is intended that they will be integrated into the different links, fulfilling specific tasks.

- **Intermediaries link:** Through the production chain model, the aim is to innovate the control of intermediaries who contribute to the productivity processes and particularly the commercialization of deciduous crops, restricting their actions so that the income from agricultural productivity does not stay in their pockets, but reaches the producers and allows them to have better economic possibilities.
- **Wholesale trade link:** This link is focused on coordinating marketing activities on a larger scale; therefore, the producers that are part of it must organize themselves to permeate the wholesale centers so that the crops are sold in the shortest possible time, because if this is not achieved, they could be damaged, leading to losses for the farmers.
- **Retail trade link:** The link directed to retail or local trade is aimed at opening new markets in chain stores and private customers to bring production to end consumers. In this sense, the farmers who are part of this link must attract as many clients as possible so that the harvests can be evacuated from the storage place.
- **Final consumer link:** Specifically, this link in the proposed production chain seeks to guarantee customer satisfaction. Therefore, one of the functions that farmers must perform is to carry out satisfaction surveys to identify possible situations that need to be improved.

The model designed seeks to significantly improve the productive chains of the deciduous crops growers in the municipality of Sotaquirá - Boyacá, through associativity based on solidarity economy, oriented from the inclusion of all producers, in order to generate opportunities to link to new markets and thus contribute to their agro-industrial, economic and social progress. In addition, this model is intended to provide tools to respond to the demands of the global world, and thus ensure sustainability in the market, but above all to improve their economic situation and vindicate the profession of farmers.

- Reflection/Discussion Stage

In the development of the research, it was possible to identify the absence of associativity on the part of deciduous producers in the municipality of Sotaquirá, Boyacá - Colombia. This situation in one way or another affects their economic progress and that of the region, and by not having guarantees that favor the production and commercialization processes, has led to a significant number of farmers having to abandon the work they have done for many years, which is the livelihood for their families. These findings are consistent with what was referred to by Suárez and Suárez (2017) who make it clear that the lack of design

of strategies and associative models are the main factor that mostly affects the progress of farmers, as many processes are affected by not having a comprehensive planning and organization.

One of the limitations evidenced in the study is the lack of information or an updated database of farmers in the municipality. This situation is widespread in the department of both associations and producers, which leads to the need to build a system that allows access to information and thus is able to convene producers to achieve cohesion in the guild.

Another negative aspect, specifically identified in the peach crop is related to the technological component since there is a lack of linking technologies that strengthen the productive part and guarantee excellent harvests. Regarding marketing, it was established that there is a high level of intermediation, which means that the price paid to the producer is increasingly lower than the existing market price. Therefore, as indicated by Ducuara (2017), the implementation of associative models framed in productive chains can allow taking advantage of market opportunities and counteract the weaknesses presented by individual growers.

Faced with the negative situations that arise in the production chain of farmers linked to the study. After participating in the process of designing an associative model, most of them agree that having a higher level of collective action and trust in the work that comes from the established model will allow all producers to have access to resources to solve production limitations, in addition to fostering cohesion and belonging. Likewise, it is expected that with the proposed design in each of the links, there will be absolute control of each process and a detailed review of them, so that the harmony of the system prevails from the balanced work in each subsystem.

However, once the design of the associativity model was completed, through a focus group, the farmers stated that it would be pertinent to integrate a link oriented to the transformation of the fruits, since the estimated time for these to be preserved in good conditions is not long, therefore, with a processing plant, products could be generated that would also have a place in the market.

Consequently, the producers see the design and implementation of the model in which they participated as hope for improving the negative aspects that are present, particularly in the production and marketing link. They also believe that by auditing each process within the production chain, they will be able to receive fair profits for their work and that the money will not remain in the hands of intermediaries.

CONCLUSIONS

The conclusions of the study are directed to the fulfillment of the proposed objectives, in this sense, it is concluded:

Regarding the first objective, it is evident that the lack of associativity of farmers producing deciduous fruits in the municipality of Sotaquirá, Boyacá - Colombia, has not allowed their crops to meet the quality standards demanded by the market, since the lack of professional technical support has led them to use artisanal techniques in the production processes, also the lack of knowledge to treat the various pests that attack the fruits has sometimes caused the crops to go to total loss. Likewise, the action of intermediaries has not allowed farmers to receive fair remuneration for their work.

These negative aspects confirm that if and only if it is possible to improve the processes of production and marketing of fruits if a model is implemented that serves to self-regulate each process of the production chain.

Regarding the second objective, it became evident that the involvement of the producers and the fact of giving them a proactive role in the design of the associative model allowed them to empower themselves to dignify their agricultural work and seek relevant strategies to strengthen it and thus guarantee the continuity of the work they have done practically all their lives.

From this perspective, when it comes to implementing or proposing an associative model, it is pertinent to motivate the subjects involved, starting with training and reinforcement, in the detailed recognition of the strategic activities to be followed in each link, so that each person is involved in the processes that have the greatest skills and strengths. For this reason, it is not advisable to implement an associative model without the consent of the participants.

Finally, from the third objective, based on the analysis of the discourse of the sample subjects, associativity should always be framed within the principles of the solidarity economy, so that in the production chain, the actors who are part of it obtain fair benefits for the work performed; and above all, that the common good prevails and not the private good, since this is what can lead to uncertainty among producers and sometimes to their reluctance to consolidate organizations to support the production and marketing processes.

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