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Social Sustainability in Family Farms: The Case of Apples Production in South Tyrol

ABSTRACT

This article explores the interplay between family farming and social sustainability in South Tyrol's apple sector. Drawing on a mixed-method approach—including secondary data from Raiffeisen Verband, a survey of 116 farmers, and two in-depth case studies—the article reveals a nuanced picture of resilience and transformation in a region where over 90% of farms are family-run. Despite a 2% reduction in orchard area from 2012 to 2022, family farms remain central to the region's agricultural identity. Survey results show that 59% of farmers are satisfied with their income, and 66% have increased investments, indicating cautious optimism despite rising production costs and declining gross income per hectare. Social sustainability is reflected in strong family involvement, with 87% of farmers living with at least two family members and 77% relying on family labor. However, challenges persist: 42% report reduced time with children, and 59% have less personal time. Environmental awareness is growing, with 45% reducing chemical inputs and 20% converting to organic farming. Case studies highlight the emotional and cultural significance of farming, underscoring the need for policies that support generational renewal and agroecological transitions. The findings suggest that South Tyrol's family farming model offers valuable insights into sustainable rural development.

KEY-WORDS

FAMILY FARM, APPLE FARMING, SOUTH TYROL, SOCIAL SUSTAINABILITY

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1. Introduction

In this article the author intends to present the peculiar features and role of family farming entrenched in cooperatives in the South Tyrol apple sector in fostering social sustainability. The guiding hypothesis concerns the capacity of family farms in undertaking social sustainability. Our research questions therefore investigate how apple-producing family farming provides social sustainability. It should be noted that the province of Bolzano accounts for 35% of the Italian, 4.5% of the European and 0.3% of the global apple-growing area (Piccoli, Widmann and Fischer, 2024) and shows an exceptional resilience of smallholders and family farmers with an average farmland size of under two hectares. This is largely due to the strong role of farmers' cooperatives taking charge of the market-related and commercial work, as well as the particularly strong link between the economic and the cultural role of agriculture.

In South Tyrol, there is an interesting coexistence between the figure of the farmer and that of the peasant, which are not synonymous. On the one hand, the farmer is a professional in agricultural production recognized by public institutions; on the other hand, the peasant is based on autonomy, production diversification and the enhancement of local resources (Van der Ploeg, 2012). According to this view, the peasant is not simply a worker of the land but a social actor who builds alternative economic and cultural relationships, resisting the pressures of agribusiness and contributing to food sovereignty. The farmer, on the other hand, is often identified with the agricultural entrepreneur, the person who manages a profit-oriented production activity, sometimes distant from the logic of sustainability and without direct links with the local community. The tension between the two forms of agricultural approach (Constance and Loconto, 2024) in South Tyrol does not result in a clear division, but emerges as a complex reworking of the link between production, identity, culture and tradition (Piccoli and Viganó, 2025).

The connection between farming and peasantry with South Tyrol's identity and culture calls for considering agriculture much more than food production. At the same time, the hard work required by farmers and their families challenges the capacity of the system to provide livelihood and social sustainability. The aim of this paper is to investigate how apple-producing family farming provides social sustainability.

Following this introduction, which frames the research questions and contextualizes the dual identity of farmers and peasants in South Tyrol, the theoretical framework elaborates on the concepts of social sustainability, family farming, and cooperative dynamics. The subsequent section presents methodological remarks, detailing the mixed-method approach combining quantitative data, survey analysis, and qualitative case studies. The results section is divided into three parts: general trends in the apple sector, the socio-economic dimensions of family farming, and the specific contributions of cooperatives to innovation and sustainability. The paper concludes with a reflection on the implications of the findings, highlighting both the strengths and limitations of the cooperative model in addressing the challenges of sustainable agriculture.

2. Theoretical framework

2.1 Social sustainability

According to the UN definition, sustainability is the ability to meet one's own needs without compromising the ability of future generations to meet theirs. Initially, this understanding of the term was essentially restricted to material aspects, survival and physical well-being; only later did it come to include psychological, social and existential aspects as well. This led to the concept of social sustainability.

The agricultural sector is first and foremost called upon to meet the food needs of an increasing global population; however, the growing concern to ensure a natural and social environment that is liveable and, possibly, welcoming for future generations is increasingly shifting the focus from mere productivity to a more comprehensive and holistic view of farming. Farmers are now asked to produce economic value within the market system (economic sustainability), without harming the environment in its various components (environmental sustainability) and offering opportunities for decent work, fair incomes and positive relationships to all involved (social sustainability) at the same time, thus highlighting what can be called "shadow prices", i.e., the value of externalities (Sidhoum, 2018).

When considering sustainability, the entire production chain must be taken into account, from farmers, including family workers and permanent or seasonal employees, to transporters, processors, wholesalers, warehousemen, retailers and consumers (Desiderio et al., 2021). The agri-food production chain in its complexity tends to make us lose the perception of how much the farm itself is a socio-environmental system with multiple balances, functions and operations (Janker, Mand and Rist, 2019) that cannot be entirely explained by economic and productivist factors alone, especially when mountainous and marginal areas are taken into consideration (McCarthy, Meredith and Bonnin, 2022).

Social sustainability has appeared in the general debate since the Millennium Summit in September 2000 (Lee and Jung, 2019), when it began to be viewed through three prevailing interpretative directions (Hale et al., 2019). In the first, it is understood in an instrumental way, as the series of social changes that make the achievement of social sustainability possible; in the second interpretative strand, almost opposite to the first, it is seen as the preservation of socio-cultural structures and social reproduction of local ancestral practices endangered by ongoing economic and environmental transformations; finally, in the third, some scholars link it to social justice and the reduction of inequalities as the ideal goal of human development. The concept of sustainability in general, and social sustainability in particular, is linked to the cultural values shared by a given community and cannot be understood univocally and uniformly in every part of the globe, thus influencing policies that should determine what social and human resources future communities will need in order to survive and function adequately (Bachev, 2021).

Social sustainability is rarely taken into account in the assessment of value production in

agriculture, so that highly variable and non-standardized indicators are identified with the effect of making comparisons very difficult (Keichinger and Thiollet Scholtus, 2017). Some research studies focus on the quality of the living and working environment, human rights and inclusion in the social context (Janker and Mann, 2020), while many others are more oriented towards seeing work aspects, both in terms of the psycho-physical and economic security of employees and collaborators, as the characterizing element of social sustainability (Bournaris and Manos, 2012; Gathorne-Hardy et al., 2016; Anastasova-Chopeva, 2019; Desiderio et al., 2021). Still others find a middle way, taking into account, for example, education and the opportunity for autonomy and professional growth in the agricultural environment, including the farm holders themselves (Torres et al., 2016). Finally, there are attempts to combine social and environmental aspects, recognizing the social value of a healthy environment, preservation of soil fertility and biodiversity, and landscape protection (Dillon, Hennessy and Hynes, 2010; Manara and Zabaniozou, 2014).

Some indicators, which may be useful in order to assess social sustainability in a broad and comprehensive manner, take into consideration both the condition of the individual farmer—whether a tenant farmer or a family helper or wage earner—and the relationship with the local community and needs of the various territorial stakeholders. These certainly include fairness in the treatment of workers in economic terms, but also in terms of time and the valorization of personal characteristics, respect for differences, belonging to networks and communities, as well as social cohesion, i.e., the absence of conflict around farming practices, quality of life and work-life balance, the possibility of participating in farms' internal decisions and participation in the democratic governance of the territory. To support these indicators, principles of social sustainability must be considered. These principles integrate and combine social and environmental aspects (Nicli, Elsen and Bernhard, 2020), seeing the empowerment of individuals, including the disadvantaged or marginalized, and communities, as an important value. Moreover, the promotion of ecological agricultural practices, the protection of natural, cultural and landscape resources, and human development through education are perceived as virtuous elements for the social system.

2.2 The value of family farming

Family farming is the most widespread method of running farms in the world. According to data published by FAO in 2021[1], five out of six farms are family-owned, and small family farms (under two hectares) produce 35% of the world's food, while covering only 12% of the globally cultivated land. In Europe, the family farm structure also accounts for about 90% of all farms, and in many areas of the continent agriculture is the main source of income for rural populations, while ensuring food security and food sovereignty even in urban areas (Beluhova-Uzunova, Hristov and Shishkova, 2021).

[1] See: https://www.fao.org/family-farming-engagement/en [Accessed: 12 December 2025].

Family farming is based on the stable availability of land, whether by private ownership or long-term lease, and the ability of that land to provide sufficient income to support the family without underemployment or exploitation. At an ideal level, therefore, a family farm should be a production unit that tends to be autonomous and sufficient to meet the economic needs of several people. In practice this rarely occurs. Already during the Green Revolution of the 1950s there was an awareness that it was very difficult to achieve this stability (Rohwer, 1951), and even today the living conditions and self-exploitation of labour in agriculture indicate that this balance is very hard to attain (Rossi, Piccoli and Feola, 2024).

The changes that have occurred in the economic and social system in recent decades have prompted a profound transformation of the agricultural and production system. The relative decrease in food prices and the rising costs of production and agricultural inputs have led many farming families to differentiate their incomes, systematically adding a second job outside the farm to mitigate the risks of economic instability (Wilkening, 2019). A second strategy adopted by farmers to make their family business sustainable is multifunctionality (Elsen and Uleri, 2023), which, in addition to economic sustainability, supports social sustainability with the preservation of local cultural traditions and increased attention to the ecosystem and environmental sustainability from an agroecological perspective (Quendler, Ikerd and Driouech, 2020).

The support of institutional actors and local stakeholders is essential to the diffusion of a virtuous and sustainable model. Support policies range from the strengthening of local networks to the incentivization of investments and the financing of research and innovation, including in non-technological areas (Zahaikevitch et al., 2022). In particular, it is useful to develop management and strategic and operational decision-making systems that create the best conditions for small family producers, since scenarios related to climate change and global market instability are challenges that are unlikely to be taken up by small-scale farms (Stradiotto Siqueira et al., 2021). The contribution of local organizations, whether public authorities, trade unions or cooperatives, is also relevant in supporting the generational transition (Uleri, Elsen and Piccoli, 2022), recognizing the emotional delicacy of the moment for farmers who experience a deep sense of belonging and self-identify with their farm (Holloway et al., 2021).

2.3 The role of cooperatives in the apple farming sector

South Tyrol is characterized by a strong and enduring tradition of cooperation in agriculture as well as in other sectors of the economy. The strength and numerosity of cooperatives provide for economic solidity accompanied by widespread small ownership and greater economic democracy (Dahl, 2023). Farms are mostly family-run, except for those on church-owned land, which is leased to farmers. Corporations operating agricultural enterprises do not appear to be present.

Membership of agricultural cooperatives leads to proven and obvious benefits for members, including a positive impact on the price obtained, yield, access to inputs, income and other

performance indicators. However, these benefits are not evenly distributed among all members, and some evidence suggests that cooperatives can foster inefficient situations and do not always succeed in adequately involving all constituents in cooperative governance (Grashuis and Su, 2019). It seems, moreover, that the excessive orientation of cooperatives towards commercial functions limits their efficiency in providing useful services to cooperative members who could benefit more from a better targeted policy to support practical needs (Qu et al., 2020), including risk mitigation strategies and access to instruments for income stabilization (Rippo and Cerroni, 2023).

Democratic participation of members in cooperatives is often understood as the right/duty to vote at meetings. Members' participation is related to the benefits they expect and receive from their participation, but it can also be related to the role they play and perceived effectiveness of their participation (Juanjuan, Xiaohuan and Xuexi, 2017). It therefore becomes very important to allow and encourage active participation not only at general meetings but also in other, more consultative meetings. Member size is often a limitation to participation, with larger farms being more active than smaller ones. However, there is evidence that farm size negatively affects final product quality in an inverse relationship (Cai, Ma and Su, 2016) and that knowledge sharing is essential for market effectiveness and internal efficiency. Particularly in the fruit-growing sector, the governance of cooperatives is influenced not only by knowledge sharing but also by the methodology applied in knowledge generation and knowledge circulation (Saïsset and Codron, 2019). The South Tyrolean environment is particularly lively in promoting the multifunctionality of farms, which often combine agricultural production with agritourism activities and support for tourism, even when not conducted directly. Social vitality is evident not only through membership of cooperatives but also through associations, consortia, committees and other more or less structured forms of collaboration that contribute to the promotion of the area and all its cultural and economic components (Streifeneder, Hoffmann and Weiß, 2015).

2.4 The situation of South Tyrol

The 2020 report on sustainability in agriculture in South Tyrol (Tappeiner, Marsoner and Nedrist, 2021) presents an analysis of the conditions of social sustainability in the Province of Bolzano. This report aims to assess the conditions of respect for human and workers' rights, understood not only as fair remuneration but also as opportunities for personal development, training, fair treatment and a balance between working time and free time. Even focusing on the latter aspect alone, it can be seen that in agriculture almost 70% of workers systematically exceed 40 hours a week, a percentage twice as high as the provincial average. The research also shows how a significant role is played by seasonal workers, which numbered 15,307 in 2018, more than 90% of whom are foreign workers, and occasional family workers, who are not officially registered or are employed on an occasional basis. A further critical element can be detected in the incidence of occupational diseases, which in agriculture is almost double that of the general working population of South Tyrol.

According to the 2021 report on sustainability in agriculture (Tappeiner, Marsoner and Nedrist,

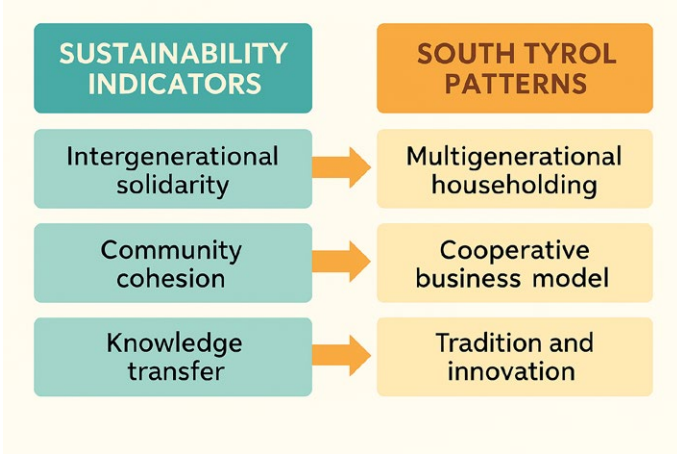
2021), even in South Tyrol family farms account for more than 90% of all farms, with a strong generational imbalance against young people (7% of farmers are under 35 years of age). Although there is an important flow of seasonal migrant workers at harvest time, 88.3% of working days are performed by family workers, estimated at over 54,000, 58% of whom work exclusively on the farm. The plots are mainly located in mountainous areas, given the geographic features of the territory of the Province of Bolzano, with considerable fragmentation of the plots. In 1954, the practice of the *Geschlossener Hoff* (closed farmstead) was reintroduced, and a progressive reunification of land parcels was promoted in order to guarantee farmers a sufficient amount of land and, consequently, income (De Meyer, 2014). The "closed farmstead" is a system whereby the entire property passes to a single descendant, who takes on the task of carrying on the farm and compensating the other heirs. The collective identity of South Tyroleans is profoundly linked to agricultural activity and the running of farms, so strongly recognized as a social value as to activate solidarity initiatives as well as massive economic incentives for the survival of even the smallest and most marginal farms (Tappeiner, Marsoner and Nedrist, 2021).

Agricultural cooperatives are widespread in South Tyrol and play a significant role both commercially and innovatively. The cooperative culture is based on self-help, self-administration, personal responsibility and mutual promotion, as envisioned by Friedrich W. Raiffeisen (De Meyer, 2014). In the context of apple production, a significant effort has been made to reduce waste and losses throughout the supply chain, with particular attention to the harvest and post-harvest stage (Fischer and Tappeiner, 2022), and in-depth and sustained analyses are also conducted to monitor soil fertility for permanent crops (Della Chiesa et al., 2019). However, agricultural activity is not solely devoted to food production, but strongly connected to the identity and culture of a place, which the cooperative model preserves over time and which, in the apple production sector, has assumed a significant role in understanding tensions and conflicts (Miller and Blasi, 2019).

Cooperative experiences in South Tyrol, as in the rest of Italy, took off in the late 19th century. Part of the Austro-Hungarian Empire at the time, South Tyrol underwent a vast land reform, which, among other things, introduced the *Geschlossener Hof*, or the requirement to pass land ownership on to a single heir, thereby avoiding land fragmentation. This period, moreover, saw the establishment of cooperative credit banks and consumer cooperatives, which, on the one hand, support economic development and access to credit and basic requirements, and, on the other, are an engine of cultural and political emancipation. Soon afterwards, agricultural cooperatives also emerged, which today account for about 95% of all producers in the province (De Meyer, 2014). Cooperatives have also been essential in maintaining identity and cohesion within communities, in the belief that "only together is it possible to prosper". Thus, the driving principles that have generated the basic elements of agricultural cooperatives are trust, learning and mutual respect, which translate into: one head one vote, obligation to deliver the entirety of the harvest to the cooperative, and for the cooperative to accept the entirety of each member's harvest.

Figure 1 illustrates the direct relationship between sustainable indicators emerging from the literature related to social sustainability and the patterns highlighted in South Tyrol's agriculture reports.

Figure 1. Social sustainability indicators and South Tyrol's social patterns



Source: Author's own elaboration.

In this article the author highlights the relevance of these patterns in the South Tyrolean apple farming sector as well as the different ways in which social sustainability is bolstered by producers' cooperatives, by supporting the already diffused patterns. Criticalities still exist across all three patterns.

3. Methodological remarks

3.1 The South Tyrol context

South Tyrol is one of the world's largest apple-producing regions. Its production covers half of Italy's and one-tenth of Europe's, with more than one million tons equal to about five billion apples per year. It is also the largest producer of organic apples in Europe. Using the ancient custom of measuring production in railway wagons—which were once shipped to Vienna, the capital of the Austro-Hungarian Empire, to which South Tyrol belonged until the early 20th century—about 100,000 wagons (10,000 kilograms) are produced each year, which would occupy a hypothetical railway line measuring 2,600 km[2]. This impressive production capacity is coupled with a social structure strongly anchored in traditions, with small production units almost all of which are family-owned businesses with membership of agricultural cooperatives. Innovation, both technological and varietal, is strongly promoted by cooperatives and supported by local policy, enhancing the profitability of small producers.

[2] See: https://www.sustainapple.it/it/ [Accessed: 10 September 2024].

3.2 A mixed method approach

To investigate how family farming in apple production provides social sustainability we adopted a mixed method approach. Our first research sources are secondary quantitative data provided by Raiffeisen Verband (RV), the major federation of farmers' cooperatives in South Tyrol. Secondly, we based our analysis on a survey and, finally, we conducted two case studies with interviews, farm visits and document analysis.

Every year Raiffeisen Verband collects a vast amount of data related to the fruit sector and publishes a report with raw and processed data. RV involves 16 fruit producer cooperatives, covering about 95% of fruit produced in South Tyrol[3]. As the data are largely already processed, we have taken results as they are, as a first general framework for understanding the sector, without further analytical work.

In 2021 a survey was conducted as part of a master's degree thesis, involving 166 farmers from the South Tyrol-Trentino region, as summarized in Table 1. Quantitative data were collected and processed though descriptive statistics in SPSS. The results supported the definition of the framework within which we developed the qualitative analysis of the case studies.

Table 1. Survey sample composition

Category	**Count**
Total contacts	166
German speakers	115
Italian speakers	49
Speakers of other languages	2
Farm managers	111
Partners of farm managers	15
Female (gender)	31
Male (gender)	133
Other (gender)	2
Age < 24	3
Age 25-64	146
Age > 64	17
High school diploma	76
University degree	27
Apprenticeship/vocational school	35

Source: Author's own elaboration on primary data.

[3] See https://www.raiffeisenverband.it/it/ [Accessed: 12 December 2025].

Two case studies were developed to get a more detailed understanding of the family farming experience related to cooperatives. We conducted in-depth interviews with two farmers lasting approximately two hours each. The interviewees were selected directly by the apple cooperatives' consortia as exemplar of a young male farmer and a female farmer in bringing innovation within tradition. The interviews, one held in Italian and one in German, were recorded with a digital recorder and subsequently transcribed with the support of AI-based software; the name of the interviewees have been anonymized using pseudonyms. In addition to this, the study included informal conversations with three key informants of the apple cooperatives consortia, two farm visits and document analysis, specifically using websites and social media. All the data have been analysed through a thematic analysis approach to identify the key themes and connection between them (Alhojailan and Ibrahim, 2012). The timespan of the research was from spring to autumn 2024.

4. Results

4.1 General trend in the apple sector

Over the decade 2012-2022 the apple sector saw a general albeit moderate decline. During those 10 years cooperative membership went down from 6,612 to 5,767 members (-12%), while the area covered by apple orchards decreased by about 2%: across the province of Bolzano, for example, apple farms covered 16,495 hectares of land in 2012 and 16,133 in 2022. Apple production per hectare fell slightly, by 2.9 tons, and overall production in South Tyrol decreased from 869,919 tons in 2012 to 819,371 in 2022.

Due to a general decrease in apple profitability, cooperatives paid their members a decreasing amount of money, which fell from EUR 456.99 million in 2012 to EUR 375.25 million in 2022. While the gross market price paid remained more or less stable (EUR cent 90.50/kg for table apples in 2012 to EUR cent 91.40/kg in 2022), as did the gross amount paid to farmers (EUR cent 56.69/kg in 2012 and EUR cent 50.95/kg in 2022), costs grew exponentially from EUR cent 30.48/kg in 2012 to EUR cent 43.33/kg in 2022. The gross income per hectare decreased from EUR 27,701 per year, on an average basis, to EUR 22,787 in 2022.

Social sustainability can be understood, in an instrumental way, as a series of social changes that make the achievement of sustainability possible, but also as the preservation of socio-cultural habits of local ancestral practices endangered by ongoing economic and environmental transformations, and even as the reduction of inequalities. The concept of sustainability in general, and social sustainability in particular, is linked to the cultural values shared by a given community and cannot be understood univocally and uniformly across the globe.

Economic and social changes in recent decades have transformed the agricultural and production system. The relative decrease in final food prices and the rising costs of production and agricultural inputs have prompted many farming families to diversify their sources of income, for instance by

adding a second job outside the farm or adopting multifunctionality, such as agritourism. This, in addition to economic sustainability, supports social sustainability with the preservation of local cultural traditions and increased attention to the ecosystem and environmental sustainability from an agroecological perspective.

4.2 Family farming in apple production in South Tyrol

4.2.1 Family framework

For an in-depth understanding of the situation, the first useful information concerns the marital status of our 166 apple farmers: the vast majority of them are married (80.7%), while a modest percentage are single (16.9%), and a tiny fraction are divorced or separated (1.2%) and widowed (1.2%). Children are a significant feature of families, as shown in Table 2, where 41.6% of participants stated they have no children, while 43.4% have one or two children, and 15% have three or more. This could be linked to the fact that 19.3% of farmers do not have a successor, 34.3% state they have one and 46.4% are not sure, as summarized in Table 3. At the same time, 42.3% of those with children say they have reduced the amount of time spent with them in recent years, while for 37.1% of farmers it remains unchanged. While multi-generational householding is a reality in several farms, the quality of this co-habitation and collaboration seems to be threatened by the hard work involved. The support of cooperatives in this respect mainly consists of reducing the marketing effort, leaving more time for private life.

Generally speaking, free time for farmers is always an illusion, more and more so in recent years, as 59% of respondents said they have experienced a slight or significant reduction in time for themselves and, in parallel, their partner's involvement in farm activities has increased, slightly or significantly, in 43% of cases, and has decreased in just 4.8% of cases. The family seems to be a source of satisfaction for apple farmers, as 82.4% of them state they are satisfied or very satisfied by their family, while 14.5% of them are neither satisfied nor dissatisfied. Families appear to be quite numerous and industrious on the farms: 87.3% of farmers live on the farm with at least two family members, while the 50th percentile is four. At the same time, 77.1% of those interviewed can count on the workforce of at least two family members, which is also the median.

Table 2. How many children under 20 years old live with you on the farm?

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	0	69	41.6	41.6	41.6
	1 or 2	72	43.4	43.4	84.9
	3 or more	25	15.1	15.1	100.0
	Total	166	100.0	100.0	

Source: Author's own elaboration on primary data.

Table 3. Do you have a successor who will take charge of the farm's activities in the future?

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Yes	57	34.3	34.3	34.3
	No	32	19.3	19.3	53.6
	Not sure	77	46.4	46.4	100.0
	Total	166	100.0	100.0	

Source: Author's own elaboration on primary data.

4.2.2 Economic sustainability

The aim of every farm enterprise is to produce income. The economic dimension of family farming in apple production, clearly summarized in Table 4, is a fundamental element of the picture we are drawing. According to the results of the survey, 59.1% of apple farmers are satisfied with the income satiation of their business, while 28.9% are neither satisfied nor dissatisfied, and a minority of 19 out of 166 farmers are unhappy with their earnings.

Table 4. Farmers' level of satisfaction with their income

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Very dissatisfied (1)	4	2.4	2.4	2.4
	Dissatisfied (2)	15	9.0	9.1	11.6
	Neither satisfied nor dissatisfied (3)	48	28.9	29.3	40.9
	Satisfied (4)	93	56.0	56.7	97.6
	Very satisfied (5)	4	2.4	2.4	100.0
	Total	164	98.8	100.0	
Missing	System	2	1.2		
Total		166	100.0		

Source: Author's elaboration on primary data.

Compared to 2017, agricultural income has increased in 35.4% of cases, has not changed in 37.3% and has decreased in 27.3%. Farm sales account for at least 50% of the household income in 83.4% of cases, and for more than half of the respondents it accounts for at least 80% of the family's total income.

The trend in the monetary value of apple production seems to have been inconsistent in recent years, with 35.6% of farmers reporting stagnation, 24.8% a decrease and the remaining 39.6% an

increase in production value. This can be compared to the quantity of production, where quantity has not changed in 41% of cases, has increased in 40.4% and has decreased in only 18.6%. The apple market is predominantly governed by cooperatives, which offer a higher and more stable value for the product, even though they are unable to prevent all market shocks.

Financial investments are a significant part of business strategy. Family farmers in the apple sector seem to have confidence in the potential of good investments: 66.1% of the respondents have increased investments in recent years, while only 8.5% have reduced them. 91.7% of respondents are satisfied or, at least not dissatisfied, with their investments. The sources of investment funding are, in fact, largely generated by the farm itself (62% of cases fund their investments with farming income), while 28.9% use bank loans or savings, and 9% raise money through income generated outside the farm.

4.2.3 Social sustainability

Farming is not just about food production; it has to do, first and foremost, with issues of identity, tradition, family values and land care. The meaning of being a farmer has been investigated more extensively in the qualitative part of this study. Here we can refer to the responses to the question: *To what extent do you agree with the following statement "At our farm, we feel like real farmers"*? 27.1% of farmers strongly agree with the statement, 45.8% agree, 22.3% neither agree nor disagree, 3.6% disagree and 1.2% strongly disagree.

Land care takes various forms, including measures to increase biodiversity (adopted by 49.4% of respondents) and for conserving wildlife habitats (by 39.8%), or measures to protect/propagate native plants (by 22.9%). 45.5% of farmers state they have decreased or significantly decreased the amount of agricultural chemical inputs (e.g., mineral fertilizers, pesticides, herbicides and fungicides) that they use on their farm. The reasons leading to this decision are linked to the drive towards greater farm sustainability (44 respondents), environmental concerns (27 respondents), cost reduction and no further need for chemicals (22 and 15 respondents respectively), human health concerns (11 farmers) and tourism-related pressures (8 respondents). In addition to these 60 farmers, there are a further 33 who converted their farms to organic production (20% of the total sample). In this case again, the reasons are wide-ranging, from farm sustainability (27 out of 33) to environmental concerns (20), human health concerns (15), access to the market and profitability (10 and 12 respectively) and a desire to adhere to family values (19). Knowledge transfer in this context is highly controversial, where cooperatives tend to foster high technology and productivism, while traditional knowledge seems to be marginalized.

Another key aspect of social sustainability is linked to local community and neighbourhood. According to the survey results, interaction with the local community seems to be quite stable, with 92.1% of respondents stating that their interactions neither decreased nor increased or slightly increased or decreased. The same situation appears with respect to conflicts with neighbours (91.3%). Farmers are generally satisfied with their relations with neighbours and the local community (62.5%

of respondents) or very satisfied (12.5%), while a minority (3.1%) are dissatisfied or very dissatisfied. Relations are described as "good friendship" by 34.8% of the farmers involved, and in 54.9% of cases as "exchange of work experience and/or information". A minority of 3 out of 164 farmers talk about conflictual relations and nine farmers say they have no such relations.

Family farming in the apple sector is still mainly a family business when it comes to farm labour. 75.2% of respondents state they have no external employees on a permanent basis, and a further 20.4% employ only one or two workers. Less than 5% of farms have three or more salaried staff.

4.3 Cooperatives supporting family farmers in South Tyrol

4.3.1 The role of cooperatives in fostering innovation and sustainability

Tackling the challenge of sustainability has become imperative under the pressure—unprecedented in geographic scale and intensity—of climate, environmental and social changes. The need to be more attentive to the impacts of production on nature and agroecosystems also affects South Tyrol's fruit and vegetable sector. For this reason, a permanent framework[4] was formed in 2019 to develop a joint strategy to promote sustainability in local apple growing.

The strategy was developed through a participatory process to which representatives of numerous stakeholders were invited in order to identify priority issues for the sector with a bottom-up approach. The basis of this work is the United Nations document entitled *Transforming our world: the 2030 Agenda for Sustainable Development* which establishes the 2030 Agenda, to which the South Tyrolean strategy closely refers. This process resulted in a vision that focuses on three fields of action and nine goals that take into account the multiplicity of contexts and plurality of stakeholders, as well as giving scope to the thousands of small producers in the area.

The first field of action seeks to make South Tyrolean apple-growing a globally successful model in terms of economic results, innovation and professionalism. To do this, it sets three sub-goals to be pursued. The first is to make sustainability structural within family farms, where multiple generations linked to their land collaborate by integrating agriculture into the broader culture and economy. The second is to achieve a supra-regional circular economy, regarding, on the one hand, the use of organic waste (for composting, but also as a raw material) and, on the other, inorganic materials (such as plastic sheeting, metals and others, designed to be recyclable and reusable for as long as possible). The third is to direct innovation so that it serves the future through the ability to increasingly reduce inputs (for instance by using disease-resistant varieties selected to be productive with as few interventions as possible).

The second field of action aims to ensure a healthy diet for all. The quality of food is closely linked to the protection of health, which is not always within everyone's reach due to both economic and

[4] See: https://www.apfelwelt.it/it/sustainapple-939.html [Accessed: 12 December 2025].

cultural issues. In Italy the saying "an apple a day keeps the doctor away" is very popular, testifying to the strong awareness of the benefits that regular consumption of this fruit can bring to human health. Therefore, the first specific goal is to offer people quality products, given that South Tyrol produces roughly half of Italy's apples and one-tenth of Europe's, while also being the largest producer of organic apples in Europe. Secondly, the goal is to promote healthy living through the consumption of apples since it contributes to maintaining good health and raising people's awareness of this concept. The last goal is to strengthen the family dimension of apple farms and the well-being of communities. Behind every apple there are people working in the supply chain from field to table: protecting their quality of life, including those who live around the cultivated fields, is an ambitious goal. Throughout the production chain, importance is given to integration, inclusion, gender equality, diversity and valuing especially the most disadvantaged members of the community.

The third field of action is the search for a partnership with nature, no longer considered inert matter to be dominated, but an active player in the production process. The very concept of sustainability is closely linked to the search for a balance with natural resources and nature's ability to regenerate what humans consume for their existence. Thus, a first goal is to learn not to harm the climate and to act to prevent climate change, reducing energy consumption and climate-changing emissions as much as possible while enhancing practices that bind CO2 to the soil through the reuse of waste as a basis for composting. This is linked to the second objective, which is to ensure plant health without producing harmful impacts on the ecosystem. Although still insufficient, great efforts have been made in the direction of integrated pest management, which employs firstly both preventive and reactive natural strategies, secondly substances permitted in organic agriculture, and only lastly synthetic chemicals. This approach pursues the third goal, i.e., to enhance the historical, cultural, and emotional connection to the land. The South Tyrolean landscape has developed over the years through the work of farmers, and their contribution is crucial to preserving and restoring biodiversity both inside and outside the cultivated fields.

To advance the "South Tyrol Model" through a combination of tradition, innovation and sustainability, it is essential to create opportunities to present that model, but also to create synergies with non-agricultural sectors, in particular with tourism and the cultural sector. The circular economy is central to sustainability, so it is crucial to develop it synergistically, not forgetting how it can serve economic diversification and biodiversity protection. Healthy and fertile soils increase production and keep plants healthy, reducing the use of toxic substances and promoting ecosystem balance: this is why work on soils is vital for the sustainability strategy of the apple sector in South Tyrol.

4.3.2 Cooperative membership from the point of view of farmers: the cases of G. Hof and M. Hof

Mark (pseudonym) is the owner of G. Hof farm, transferred to him through a generational transition from his parents. The farm was started by Marks' paternal grandfather and took over by Mark's father at the very young age of 17-18, due to his grandfather's untimely death. Since the size of the land was small, his father, in addition to tending his own land, also worked for

others in the area. Things changed when he met his wife, Mark's mother, who also had a farm on which she produced wine that was also exported to Germany and Switzerland. On the farm they produce apples that are delivered to the VOG cooperative and grapes that are delivered to the Terenzio cooperative winery. The family lives in a multi-generational household and the economic sustainability of the family is strictly connected to the cooperatives of which they are members.

The generational transition, managed by Mark's father who is still quite young, has breathed new life into the company, as Mark has brought the entrepreneurship and desire to innovate that complements his father's experience and tradition. Mark's choice to become a farmer matured naturally since his childhood, when he went to the countryside with his father and loved spending a lot of time outdoors. Another factor that influenced him was the possibility of being autonomous in the management of his time, with the flexible schedule of the different seasons and being able to alternate work in the field with other more bureaucratic tasks in the office and at the PC. Of course, the connection to the family business was also important, with the chance to carry on what his father and grandfather started. A farmer's work is challenging, varied, with constant contact with nature and the seasons but increasingly requiring an open mind and the ability to adapt to climate, regulatory and technological changes. Yet it is stimulating and satisfying: to be able to see at the end of the year the result of so much effort, a good harvest, high quality apples or a good wine is gratifying and demonstrates the value of what has been done.

Though managing the farm largely autonomously, Mark always consults with his father, with whom he has a very good relationship. The generational transition has also been very peaceful and smooth, with no critical issues. Certainly, one limitation of farming is often working alone, with little interaction with colleagues and collaborators. Organizations such as Bauerbund and Beratusring help mitigate this situation by supporting small farmers, creating networks for them and providing advice and support.

Mark is a member of the Young Farmers Association, through which events are organized for members' self-training as well as to raise public awareness and promote public knowledge about agricultural practices. Farmers' commitment to preserving the environment is achieved through the reduction of chemical inputs and treatments, but economic sustainability requires being reliable partners to the cooperatives and international intermediaries that market South Tyrol's apples worldwide. Cooperatives are key partners of this farm, as they place all the farm produce on the market and support Mark in strategic decisions.

A second example of family farm in South Tyrol is M. Hof, run by Maia's husband, Lorenz (both pseudonyms). The farm was founded in late 19th century, and is now held by the fifth generation of the same family. The farm was passed down from Lorenz's grandfather directly to Lorenz after his father died at a very young age. At the age of just 22, Lorenz took over the house where he grew up, while his mother lived with her parents-in-law. Maia also comes from the same village and grew up on a farm five minutes away.

Farm work allows Maia to do the housework and look after the children. It is also important to Maia to make and develop her own products. Maia handles the bureaucratic side of the office

herself, while her husband is mainly responsible for the field. Farming, she says, is the best job you can choose, as long as there is passion in it. It is hard work and requires many sacrifices at certain times of the year, but it also offers a great deal of freedom and the opportunity to be your own boss as well as the satisfaction of seeing the results of your work. It also requires a lot of flexibility and creativity, you start the day with a plan in mind, 90% of which changes throughout the day.

Protecting and caring for the soil and the landscape is an honour, she says. In the public debate, too little thought is given to how important the work of farmers is in maintaining and preserving the landscape, from the valley floor right up to the mountain pastures: "*Everyone thinks it's normal because the farmers take care of it. What we call our landscape, what we see when we look out of the window, is made by us farmers here in South Tyrol*". There is a lot of work behind it, which is hardly noticed.

The whole family is always involved in the farming activities, everyone does their bit, including the elderly mother-in-law who cooks for everyone and other relatives who help with the harvest. Although the working hours are intensive and there is potentially always work to be done on the farm, Maia manages to schedule time for herself and her children. Participation in the activities of local associations and the cooperative is highly valued.

5. Final remarks

The social value of family farming goes far beyond income generation, being deeply embedded in the local identity and culture of South Tyrol. The challenges faced by farmers and their families range from economic-financial aspects such as market fluctuations to climate change, requiring great dedication and resilience. In all of this, cooperatives provide essential support, on the one hand, by monitoring the market at the collective level, and, on the other, by offering training and constant updating to help farmers become internationally competitive.

In this, South Tyrolean agriculture is highly distinctive, with its very low incidence of large companies and corporations. Farms are not only small in size but also maintain family ownership, in which several people from different generations co-inhabit and collaborate in management. This situation can be read as a case of "social biodiversity" in the Italian agricultural business environment. The business model is based on cooperatives that collect the produce and distribute it to large national and international players.

The very strong focus on productivity and the adoption of technological innovations in agriculture, such as digitization and bioengineering, may not necessarily be the only way, nor the best way forward. In this respect, South Tyrolean cooperatives and policymakers could initiate a useful process of reflection, starting with what Constance and Loconto (2024) highlighted with respect to the future of agriculture in terms of sustainable intensification and agroecology. Family farming is naturally oriented toward the latter, with the prevalence of farmers over contractors and an orientation toward self-consumption. The strong presence of cooperatives turns the tables,

putting local producers in the position of being small but at the same time producing exclusively for the market. While this provides a good income, it also poses major threats to the ecosystem and human health. A change of direction could enable South Tyrol to fully embody the ideal of a green region, giving full recognition to Maia's claim regarding the key role of farmers in shaping the landscape.

This study has important limitations, given the small number of producers involved and the short time in which it was conducted. However, it opens possible future scenarios for further studies, such as comparisons with other regions with weaker cooperation, reasons for not being members of cooperatives, and how to foster cooperative development based on the ideas of those not adhering to fruits cooperatives. In particular, the decision not to be a member of a cooperative could be explained by the distinction between farmer and peasant, with the latter feeling undermined by the power of cooperatives and consortia, an idea still strongly intertwined with the cultural identity and mindset of South Tyroleans.

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