The Role of Family Farming in Socio-Economic Sustainability: An Exploratory Analysis of Rural Development in Southeast Spain

Emilio Galdeano-Gómez, Laura Piedra-Muñoz, María del Carmen García-Barranco, Yolanda Sorroche-del-Rey, Jesús Hernández-Rubio, and Javier Sánchez-García

1 Introduction

The significance of family farming in agricultural systems is becoming more apparent, serving as a vital link between economic, social, and environmental objectives (HLPE, 2013; Wuepper et al., 2020). Family farms stand at the heart of rural economies, rooted in their deep understanding of the local context and their ability to adapt. Their ambitions extend beyond profit, encompassing the well-being of the community and environmental preservation (Ikerd, 2013; Schwab do Nascimento et al., 2020; UPA, 2022).

The versatility of these farmers, evident in their provision of a range of products and services, is recognized in sustainable development strategies, including the rural

E. Galdeano-Gómez (✉) · L. Piedra-Muñoz · M. C. García-Barranco · Y. Sorroche-del-Rey · J. Hernández-Rubio · J. Sánchez-García
Mediterranean Research Center on Economics and Sustainable Development (CIMEDES), University of Almería, Almería, Spain
e-mail: galdeano@ual.es

L. Piedra-Muñoz
e-mail: lapiedra@ual.es

M. C. García-Barranco
e-mail: maricarmengarcia@ual.es

Y. Sorroche-del-Rey
e-mail: ysd813@ual.es

J. Hernández-Rubio
e-mail: jhernandez@ual.es

J. Sánchez-García
e-mail: jsg608@ual.es

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policies of the European Union, i.e., the concept of multifunctionality (Fuller et al., 2021; Mölders, 2013). While the environmental aspect often takes center stage, there is a pressing need for more research on their socio-economic achievements.

Sustainable development broadly aims for a long-term quality of life, balanced with cultural, social, and environmental harmony (Galdeano-Gómez et al., 2017; Suess-Reyes & Fuetsch, 2016). From a socio-economic perspective, family farms are indispensable in sustaining employment and economic resilience in rural regions, fostering entrepreneurial spirit and building intergenerational social capital (Piedra-Muñoz et al., 2016; Schwab do Nascimento et al., 2020). In other words, they play an important role in terms of business management and entrepreneurship in this economic context, for instance, as members of agricultural and livestock cooperatives or professional associations. In this way, these farmers and their networks can generate social capital and promote equity in social well-being, participation and cohesion across generations (Galdeano-Gómez et al., 2013; Holloway et al., 2021; Wu et al., 2023).

Traditional rural agriculture has typically been straightforward and low-tech, with structures that are not profitable and/or irrelevant on economic activity, but recent research underscores the significance of family farms, highlighting their economic influence and their role in preserving specific agricultural practices (see e.g., Suess-Reyes & Fuetsch, 2016; Fuller et al., 2021; Ge & Li, 2023). In diverse regions such as North America, Asia, and Europe, family-operated farms dominate the agricultural landscape, occupying extensive land areas and providing employment to millions, estimating over 80% of agricultural production and farmed land (UPA, 2022).

Despite their pivotal role, research on how family farming shapes regional socio-economic development remains scarce. Family-managed farms possess unique traits enabling them to achieve social and economic objectives (Ikerd, 2013; Piedra-Muñoz et al., 2016).

Our study is focused on the agri-food system of southeast Spain, a region steeped in a rich tradition of family farming. Production in this area is based on a small-scale family growing system that has evolved over six decades and is considerably endogenous, that is, there has been no external public planning nor political support (Galdeano-Gómez et al., 2017). We analyze how socio-cultural and economic factors related to family farms influence various indicators of socio-economic sustainability, such as demographic age distribution, income levels, employment rates, and cultural diversity.

This research work aims to illuminate the vital role of family farming in rural sustainability, contributing to the academic discourse on this subject by means of:

(i) Reviewing the involvement of the family component in rural sustainable development goals;
(ii) Exploring empirically the impact of factors related to the organization of the family farm and its multifunctional agrarian characteristics on reaching social and economic objectives.

2 Methodology

2.1 Description of Family Farming in Southeast Spain

In Spain, the structure of agricultural sector is woven largely by family-owned farms, representing a staggering 70% of the national farmland (UPA, 2022). A prime example of this agricultural model can be observed in the southeastern stretches, particularly along the coastal belts of Granada and Almeria provinces. Here, it can find over 15,000 small-scale family farms, each spanning an average of two and a half hectares. Predominantly horticultural, these farms have sowed the seeds for profound socioeconomic growth in the region over the past six decades. This progress was achieved with minimal to no governmental or Common Agricultural Policy (CAP) support in the more recent years (Galdeano-Gómez et al., 2017). The expansive family-oriented framework has anchored equitable local growth, marked by a uniform distribution of income and general well-being (Downward & Taylor, 2007; Piedra-Muñoz et al., 2016) (Fig. 1).

In this belt, the pulse of the regional economy beats with the rhythms of agriculture. Notably, the flow of provincial income and job prospects are directly tied to the agricultural seasons. This situation challenges the conventional economic view, which elevates industrialization as the beacon of development and relegates agriculture to an emblem of backwardness (Galdeano-Gómez et al., 2013). The family-farming ethos in this region is deeply rooted in its sociocultural basis. It nurtures generational

Fig. 1 Southeast Spain: location of family horticulture

Table 1 Production structure in southeast Spain and Spain (% of GDP)

Activities	1970		2020	
	Southeast Spain	Spain's National average	Southeast Spain	Spain's National average
Agriculture	29.1	12.8	24.2	4.1
Industry	13.8	30.9	14.1	19.4
Construction	9.2	7.8	9.3	9.8
Services	47.9	48.5	52.4	66.7

Source Galdeano-Gómez et al. (2017) and Cajamar (2022)

ties, ensuring that knowledge, traditions, and practices flow seamlessly across generations. The community spirit is vibrant, with many opting for collective platforms like cooperatives, emphasizing the close-knit social framework and networks underpinned by mutual trust and enduring commitments (Fuller et al., 2021; Wu et al., 2023; Wuepper et al., 2020).

Echoing characteristics identified in various global rural studies (Block & Spiegel, 2013; Schwab do Nascimento et al., 2020; Suess-Reyes & Fuetsch, 2016), these Spanish farm owners showcase a profound sense of belonging to their locale. Their roots run deep, enriched by longstanding personal bonds. Over the years, these connections have cemented both familial and regional ties, catalyzing the rural economic engine where they invest and engage (Wuepper et al., 2020). That is, these families of the farmers contribute by strengthening the local rural economy where they shop, spend money and participate in business activities (Galdeano-Gómez et al., 2017; Van der Ploeg, 2014).

The farming sector in this corner of Spain commands a robust 27% of employment and contributes 24% to the local GDP (Gross Domestic Product). An auxiliary boost comes from associated services and industries, accounting for 32% of the regional GDP (Cajamar, 2022) (Table 1).

The recent years have also witnessed a mosaic of cultures entering the farming tapestry, with a notable influx of foreign workers from countries like Morocco, Romania, and Ecuador, many of whom now helm their own agricultural ventures and are active cooperative members (García-Lorca et al., 2010).

2.2 Specifications of Socio-Economic Sustainability

To evaluate the influence of family farming on socioeconomic sustainability, we must navigate through a plethora of indicators, even when our lens is focused on a specific locale (Galdeano-Gómez et al., 2017; Gómez-Limón & Sánchez-Fernández, 2010). Building on the foundation laid by prior research, we have narrowed our focus to four pivotal indicators intertwined with family farming:

- Related to demographics of the farming community. This encompasses the **age structure of farmers**. It not only serves as a beacon for population stability and regional migratory patterns (Gómez-Limón & Sánchez-Fernández, 2010) but also speaks volumes about the legacy of agriculture passed down through generations (Tonts et al., 2012).
- Related to income metrics. The average **income** of a farm stand in relation to the GDP per capita, shedding light on financial equitability (Piedra-Muñoz et al., 2016). A comparative assessment with the GDP per capita of other Spanish regions provides deeper insights, especially concerning per capita social expenditure (Cajamar, 2022).
- Related to employment landscape. The **employment rate** holds paramount importance as it is a direct reflection of socioeconomic health in any rural vocation. Both the sheer number of jobs and the percentage of the population employed serve as crucial barometers (Galdeano-Gómez et al., 2013; Gómez-Limón & Sánchez-Fernández, 2010).
- Related to cultural heterogeneity of agriculture. This delves into the realm of **multiculturalism** within the farming sector, symbolizing sociocultural sustainability and cohesion (García-Lorca et al., 2010; Galdeano-Gómez et al., 2017). It is noteworthy to highlight the influx and integration of international workers and their families into the agrarian framework of southeastern Spain, adding diversity to its structures and organizations (Table 2).

Table 2 Socio-economic sustainability indicators and measurements

Indicators	Description of the measurement
Age structure	Average age of the farmer
Income	Worker income (either hired or a family member) over the interprofessional minimum salary of the country[a]
Employment rate	Average number of workers per basic crop unit (either hired or a family member) over the national average[b]
Multiculturalism	Number of nationalities per family farm (either hired or family members)

[a]This measurement is the difference between the national minimum salary (965.00 euros per month) and the average salary for family workers (net income of the farm) on one hand, and the average salary for hired workers in the sector (1096.35 euros per month) on the other

[b]The average employment rate in Spanish agriculture is 0.93 workers/year per farm (Agricultural technical unit—"Unidad técnica agrícola" in Spanish). Yet, the rate for the horticultural sector in southeast Spain is 2.5 per farm. In the present study, this variable is measured as job per hectare (1.82 workers)

Source Own elaboration

2.3 Sample

Chosen by cluster sampling, a total of 58 family farms were surveyed during the 2021–2022 fruit and vegetables growing season. Our survey delved into three principal areas:

- Social dimension within family farm management: education level, age, family relationships, family business transition, participants in decision making, number of workers (whether family members or hired), sex and nationality.
- Economic nuances shaping these farms: income, size, crop specialization, innovativeness and influence of other companies in the agricultural and livestock sector.
- Environmental stewardship and practices: agroecological practices, environmental innovation, agroecological practices and efficiency management of natural resources.

Grouped according to the survey design described above, the results obtained are the following:

a. Social dimension. Men dominate ownership, accounting for nearly 89.62%, with women representing a small fraction at 10.38%. Each owner is an autonomous, licensed entrepreneur. A 90.37% of farms are managed by heads of family, while the remaining 9.63% involve the younger generation co-steering the farm alongside their parents. The average age of decision-makers stands at 44. Women have carved out a respectable role in decision-making processes, contributing to 37.28% of such decisions. Education-wise, 42.14% boast secondary education with vocational training, while 13.22% have reached university or higher. A mere 3.08% have no formal education. As we gaze into the future, a heartening 88% of owners wish to bequeath their legacy to kin. Employment dynamics reveal an average of five steady workers, predominantly male (79%), with hired hands constituting 66.04%. The tapestry of nationalities within these farms is rich, averaging around five per farm.
b. Economic aspects. With an average of 3.6 ha under cultivation per farm, the 2021–2022 season saw a high yield of 8.1 tons per hectare, fetching an average of €44,256.17 per hectare. Using a 5-point Likert scale, farmers evaluated their industry relationships. Local businesses, marketing cooperatives, and auxiliary industries received a favorable 4.6 rating. Financial institutions earned a decent 3.7, while academia and research collaborations were valued at 3.6. However, government support trailed behind with a mere 1.4. Many farms showed a penchant for specializing in select crops and major part, 84%, were either already embracing or keen on adopting technological advancements, particularly environmentally-centric ones.
c. Environmental issues. An elevate percentage, 96%, of the surveyed farms in Almeria lean into environmental and quality management protocols like UNE 155400, UNE-EN-ISO 14001, Integrated Pest Management (IPM) and GLOBAL GAP. These are not just green labels, but also they enhance on-farm working

conditions. Furthermore, the major part, 73.09%, of these farms incorporates at least one environmental badge. Water conservation is paramount: 80.5% of interviewees have optimized their water usage via enhanced distribution and irrigation mechanisms. Other eco-initiatives orbit around land rejuvenation, waste management, and energy optimization, often in synergy with research institutions.

2.4 Description of the Variables

Drawing from our previously outlined sample, we derived measurements for the following socioeconomic performance indicators: age structure, income, employment, and multiculturalism. We have neatly compiled the descriptive statistics in Table 3 for your reference, categorizing them as dependent variables.

Likewise, to deepen the exploratory analysis and the multifunctional nature of family farming, based on our previous section, we have identified several explanatory variables, segmented into social, economic and environmental areas. Here is a breakdown:

- Decision makers. Number of people that make decisions on the family farm.

Table 3 Descriptive statistics of the variables

Variable	Mean	SD	Minimum	Maximum
Age	43.57	11.4806	21	67
Income	11,082.38	10,229.07	− 7166.4	42,812.16
Employment	1.8204	1.3612	0.5308	7.2
Multiculturalism	3.7216	2.0942	3	8
Decision makers	2.0819	1.1071	1	4
Women	0.8155	0.6830	0	2
Education	3.2180	1.2073	1	5
Generation	1.9508	0.8322	1	4
Business transition	0.9165	0.3267	0	1
Scale	3.7140	2.8519	0.65	19
Specialization	1.8516	1.0023	1	4
Sec_sector	3.7620	0.8129	2.3500	5
R + D proactivity	3.4099	0.9055	1	5
Eco-certification[a]	93.351	22.203	18.403	149.863
Eco-innovation	3.7058	1.2013	2	5

[a]Thousand kilograms
Source Own elaboration

- Women. The number of women contributing to major decisions. For example, Farmar-Bowers (2010) and also Piedra-Muñoz et al. (2016) have highlighted the role female farmers can play in steering sustainable development strategies.
- Education. This gauges the average educational background of our decision-makers. We have graded each individual on a scale: 1 (none), 2 (primary), 3 (secondary), 4 (high school or vocational training), and 5 (tertiary).
- Generation. Number of generations that have nurtured the family farm. This also shows accumulated expertise and tradition.
- Family business transition. Fictitious variable which scores 1 if the farmer envisions the next generation helming the farm, and 0 if not.
- Scale. Refers to the farmed expanse, measured in hectares, giving an idea of the farm size.
- Specialization. Assessed by the diversity of crops. A lower score here suggests a more specialized agricultural approach.
- Sec_sector. On a scale of 1–5, this is the farmer evaluation of how marketing cooperatives and other secondary services fare.
- R + D proactivity. Measures how actively a farmer collaborates with research institutions and universities to innovate and elevate their farm's competitive edge, rated from 1 to 5.
- Eco-certification. Reflects the farm's commitment to sustainable practices, like Integrated Pest Management or other environmental quality certification. Calculations were done considering the production weightage across various crops.
- Eco-innovation. This variable measures the family farm's eco-consciousness regarding the efficient use of natural resources and its openness to environmental innovation. A score of 0–5 evaluates if the family farm had implemented any innovative solutions or new technology to reduce environmental footprints.

2.5 Specifications of the Empirical Model

Crafting models that bridge a selection of dependent variables (socio-economic performance indicators) with a group of explanatory variables (traits of multifunctionality in family farms) brings its own challenges, notably issues with ambiguity and imprecise specification (Harrel, 2015). This research, though rooted in a theoretical framework that connects specific family farming attributes with socio-economic benchmarks, requires the crafting of customized models following thorough statistical-econometric evaluations (for instance, see Tonts et al., 2012).

In this way, we proceed to an initial regression analysis, exploring the four equations linked to the socio-economic markers, while encompassing all explanatory variables. Therefore, we begin with a general model as follows:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \cdots + \varepsilon_i; \quad \varepsilon_i : N\left(0, \sigma^2\right) \tag{1}$$

where Y_i represents each one of the socioeconomic indicators *i*, X_{ji} is the value of each one of the explanatory variables and β_j is the parameter to be estimated based on the data obtained.

3 Results

Assuming that the residuals (ε_i) are normally distributed with consistent variance, Ordinary Least Squares (OLS) method stands out as the top choice for linearly estimating unknown parameters without any bias (Harrel, 2015). Initial checks, like the Breusch-Pagan test, confirmed no heteroskedasticity issues in Models 1 (related to age) and 2 (tied to income). However, we did find heteroskedasticity in Models 3 (linked to employment) and 4 (connected to multiculturalism). To tackle this, we used robust regression to find a reliable estimator that can handle the variance–covariance even when heteroskedasticity is present. It can see the results in Table 4.

In our analysis, Model 1 shows that as a farmer gets older, there's a positive relationship with several factors: their level of education, women in leadership roles, wanting to keep the farm in the family, the variety of crops (though more specialization tends to show a negative trend), a push towards innovation, efficiency in the secondary sector, the amount of certified produce, and a focus on using natural resources sustainably. In contrast, the variables corresponding to greater scale, more generations involved, and more people making decisions seem to have a negative impact. This model captures 34% of the variance, with major contributions from efficiency in the secondary sector, generational aspects, plans for keeping the business in the family, educational levels, and a push for competitive innovation. Women in leadership and a focus on environmental innovation also play crucial roles.

For Model 2, income seems to go up when women are in charge, the farmer is well-educated, the family is heavily involved in the farm, innovation is a priority, there is a strong link in the production processes, there are efforts towards environmental innovation, and the secondary sector is efficient. However, income drops when there is less crop specialization, more generations involved, more decision-makers, and somewhat surprisingly, when there's an intention to pass the farm to the next generation. This last point, though, does not have much of an impact. This model explains 45% of the variance, with significant factors being environmental certifications, farm size, the number of decision-makers, crop specialization, efficiency in the secondary sector, and education.

Model 3 points out that more workers per hectare on family farms are associated with fewer decision-makers, more quality certifications for crops, and a positive view of the secondary sector, even though it is only moderately significant. On the other hand, larger farms, more women making decisions, plans for business succession, and longer generational history of farm ownership all tend to decrease the number of workers per hectare. This model has a slightly lower fit, explaining 28% of the variance.

Table 4 Model estimations

Independent variables	Model 1. Dependent variable: age	Model 2. Dependent variable: income	Model 3. Dependent variable: employment	Model 4. Dependent variable: multiculturalism
Decision makers	− 0.08374 (2.5170) P > |t| 0.974	− 3.5849 ** (2.3306) P > |t| 0.013	− 0.2097* (0.1746) P > |t| 0.073	0.1327 (0.2643) P > |t| 0.618
Women	1.6311* (1.3936) P > |t| 0.061	0.8115 (3.6239) P > |t| 0.524	− 0.4285 (0.3526) P > |t| 0.231	0.1511 (0.3707) P > |t| 0.685
Education	1.4988** (1.2711) P > |t| 0.024	0.7568 * (1.3279) P > |t| 0.057	− 0.0224 (0.1564) P > |t| 0.887	0.3763* (0.1596) P > |t| 0.023
Generation	− 4.7597* (1.9699) P > |t| 0.020	− 0.3295 (1.8161) P > |t| 0.857	− 0.1596 (0.2110) P > |t| 0.453	0.0034 (0.1835) P > |t| 0.985
Business transition	7.0059** (5.9656) P > |t| 0.027	− 1.3148 (5.8023) P > |t| 0.822	− 1.2593 (1.4112) P > |t| 0.377	0.2288 (0.5051) P > |t| 0.653
Scale	− 0.0409 (0.4559) P > |t| 0.929	1.1281** (0.4203) P > |t| 0.010	− 0.1233** (0.0500) P > |t| 0.018	0.6098*** (0.0721) P > |t| 0.000
Specialization	2.1994 (1.8111) P > |t| 0.231	− 2.2852** (1.7282) P > |t| 0.019	− 0.0681 (0.2140) P > |t| 0.752	0.0921 (0.2568) P > |t| 0.722
Sec_sector	6.2589*** (1.5187) P > |t| 0.000	1.1939* (1.7415) P > |t| 0.049	0.0643 (0.2153) P > |t| 0.767	0.1021 (0.1648) P > |t| 0.539
R + D proactivity	0.4607** (1.6916) P > |t| 0.042	0.9666 (1.5693) P > |t| 0.054	− 0.0085 (0.1926) P > |t| 0.965	− 0.0492 (0.1668) P > |t|0.769
Eco-certification	0.1115* (0.6058) P > |t| 0.065	1.6544*** (1.052) P > |t| 0.003	1.5006** (1.2306) P > |t| 0.008	− 1.10e-06 (6.01e-06) P > |t| 0.855
Eco-innovation	0.06618* (0.1217) P > |t| 0.059	0.38402 (1.5693) P > |t| 0.141	0.1003 (0.1275) P > |t| 0.436	− 0.0313 (0.1272) P > |t| 0.807
Constant	28.6821 (11.3079) P > |t| 0.015	− 6.9317 (11.0316) P > |t| 0.533	3.5467 (1.5849) P > |t| 0.030	− 0.2355 (0.9543) P > |t| 0.806
R^2	0.3402	0.4515	0.2826	0.8216
F	0.0505	0.0029	0.1579	0.0000

Note Standard errors in parentheses. Level of significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$
Source Own elaboration

Model 4 suggests that almost all factors positively influence multiculturalism, except for environmental certifications, innovations, and a push for R + D, though these have limited significance. So, larger farms with knowledgeable decision-makers tend to have a more diverse workforce. The fit of this model is high, explaining 82% of the variance.

Digging deeper with a secondary analysis focused on empirical models, our goal was to estimate parameters that align more closely with the unique characteristics of family farms in Southeast Spain. We looked at four models:

$$\begin{aligned}\text{Age} = f(&\text{women},\ \text{education},\ \text{generation},\ \text{business transition},\\ &\text{sec\_sector},\ R+D\ \text{proactivity},\ \text{eco - certification},\ \text{eco - innovation})\end{aligned} \quad (2)$$

$$\begin{aligned}\text{Income} = f(&\text{dec\_makers},\ \text{education},\ \text{scale},\ \text{specialization},\\ &\text{sec\_sector},\ R+D\ \text{proactivity},\ \text{eco - certification})\end{aligned} \quad (3)$$

$$\begin{aligned}\text{Employment} = f(&\text{decision makers},\ \text{women},\ \text{generation},\\ &\text{business transition},\ \text{scale},\ \text{specialization},\ \text{eco - certification})\end{aligned} \quad (4)$$

$$\begin{aligned}\text{Multiculturalism} = f(&\text{decision makers},\ \text{education},\ \text{scale},\ \text{specialization},\\ &\text{sec\_sector},\ R+D\ \text{proactivity})\end{aligned} \quad (5)$$

The results are shown in Table 5.

From our findings, several factors influence the average age of farmers. A higher level of education, plans for the next generation to take over, and a strong inclination towards innovation stand out. Interestingly, efficiency in the secondary sector is also a big deal. The generational aspect is a bit tricky, possibly because many of the farmers we talked to still run the farms with their children. Women in decision-making roles and a commitment to the environment, including certifications and initiatives for sustainable resource use, also have a positive influence.

Looking at average income on family farms, the size of the farm is a major player, suggesting that economies of scale might be worth exploring. The certifications for their produce are also key, as well as how specialized their crops are and their connections with product marketing and secondary sector businesses. However, having more decision-makers seems to spread the earnings thin, especially as more family members get involved in running the farm. On the bright side, steps towards competitiveness and the farmer's education level boost income.

For employment, environmental certifications seem to bring in more specialized skills and uphold traditional practices, although this trend decreases as the farm gets bigger. Family dynamics, including participation from family members, women in leadership, and the number of decision-makers, as well as plans for succession, seem to lessen the need for additional employees. This might be because family members end up doing more of the work themselves.

Table 5 Estimations of the definitive models

Independent variables	Model 1. Dependent variable: age	Model 2. Dependent variable: income	Model 3. Dependent variable: employment	Model 4. Dependent variable: multiculturalism
Decision makers		− 3.1416** (1.2971) P > |t| 0.019	− 0.1749* (0.1640) P > |t| 0.092	0.2172* (0.1575) P > |t| 0.074
Women	1.1830* (1.2049) P > |t| 0.057		− 0.3762* (0.3340) P > |t| 0.066	
Education	1.5085** (1.2039) P > |t| 0.021	0.6819* (1.2518) P > |t| 0.068		0.3540** (0.1632) P > |t| 0.035
Generation	− 3.9785** (1.7896) P > |t| 0.031		− 0.1852 (0.2023) P > |t| 0.365	
Business transition	8.3671** (5.7774) P > |t| 0.017		− 1.2739 (1.3279) P > |t| 0.142	
Scale		1.1295*** (0.3982) P > |t| 0.007	− 0.1291** (0.0474) P > |t| 0.009	0.6135*** (0.0635) P > |t| 0.000
Specialization		− 2.5236** (1.5339) P > |t| 0.017	− 0.1071 (0.1206) P > |t| 0.379	0.1560* (0.1763) P > |t| 0.053
Sec_sector	6.7060*** (1.4100) P > |t| 0.000	1.3655** (1.6351) P > |t| 0.040		0.1091** (0.1585) P > |t| 0.041
I + D_proactivity	0.8374** (1.5978) P > |t| 0.036	0.8054* (1.4281) P > |t| 0.057		0.0534 (0.1646) P > |t| 0.747
Eco-certification	0.1112* (0.6013) P > |t| 0.067	0.1624*** (0.0480) P > |t| 0.001	2.7407*** (1.1706) P > |t| 0.002	
Eco-innovation	0.0863* (0.0116) P > |t| 0.074			
Constant	30.1513 (10.3409) P > |t| 0.005	− 7.6948 (9.9346) P > |t| 0.442	3.6202 (1.4121) P > |t| 0.014	0.0316 (0.9737) P > |t| 0.974
R^2	0.3260	0.4480	0.2790	0.8195
F	0.0068	0.0001	0.0505	0.0000

Note Standard errors in parentheses. Level of significance: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$
Source Own elaboration

On the multiculturalism front, bigger and less specialized farms attract a more diverse workforce. Farms run by well-educated people and those with more decision-makers also see more diversity. The secondary sector again plays a role, possibly offering jobs to people from different backgrounds, especially in secondary and marketing companies.

4 Discussion and Conclusions

Over recent years, the dialogue surrounding sustainable development has been notably intensified within rural policy planning. More pronouncedly, the agrarian sphere, especially the structure of family-owned farms, is being viewed as a potential pillar in forwarding sustainable agendas (Fuller et al., 2021; HLPE, 2013). Family farms, distinct from other institutional setups, uniquely champion multifunctionality. Their operations cater to market-driven products while concurrently fostering non-market outcomes, emphasizing ecological conservation. Yet, there is an underrepresented dimension to this conversation—the socioeconomic advantages of family farming. Their intrinsic understanding of local agriculture, adaptability, and generational knowledge transfer stand as pivotal assets to rural economies (Wuepper et al., 2020). The interplay between multifunctionality and sustainability within the family farm discourse suggests an intertwined relationship between their innate capabilities and the broader objectives of sustainable development. This connection, however, requires empirical validation, emphasizing region-specific nuances in rural sectors. Our study endeavors to bridge this gap, delving into these dynamics using southeast Spain's agricultural framework as a template, examining indicators such as farmer age, family and worker income, employment dynamics, and multiculturalism.

The study discerned several multifaceted determinants shaping family farms:

- Multicultural Elements: Noteworthy multicultural attributes are discerned (Cajamar, 2022), buoyed by educational prowess and decision-making breadth. Economic dynamics, farm scalability, and auxiliary industries introduce a rich tapestry of foreign workforce affiliations, fostering multiculturalism (Piedra-Muñoz et al., 2016).
- Farmer age. Predominantly shaped by the sector's vitality (Cajamar, 2022), factors like innovative inclination, regional agrifood influence, and educational reach of farmers emerge as decisive. Elements rooted in family lineage, particularly the prominence of women and generational farm inheritance, also weigh in (Holloway et al., 2021). Proactive environmental initiatives further catalyze a youthful farmer demographic (Gómez-Limón & Sánchez-Fernández, 2010; Suess-Reyes & Fuetsch, 2016).
- Income dynamics. Economic scales, specialized output, and ecologically certified products drive farm incomes, echoing past sectoral insights (Valera et al., 2014). Pivotal too are farmer education and an innovative drive aimed at bolstering

competitiveness, aligning with evolving agricultural practices (Galdeano-Gómez et al., 2017).

- Employment rate. Larger farms reflect reduced employment metrics, yet environmentally certified crops necessitate heightened manual labor (Cajamar, 2022). Heightened family participation, particularly female involvement, inversely affects external employment, with core farm operations shouldered predominantly by the familial nucleus.
- Multicultural elements. Noteworthy multicultural attributes are discerned (Cajamar, 2022), buoyed by educational prowess and decision-making breadth. Economic dynamics, farm scalability, and auxiliary industries introduce a rich tapestry of foreign workforce affiliations, fostering multiculturalism (Piedra-Muñoz et al., 2016).

Conclusively, our findings underline the juxtaposition of economic scalability with innovative vibrancy, ecological leanings, educational progression, and generational farm continuity in positively impacting the agrarian landscape's age profile, income spectrum, employment distribution, and multicultural essence in the agricultural area studied.

Notably, our study possesses certain constraints and overcoming them would imply carrying out future lines of research. Our lens predominantly focuses on southeast Spain's agricultural sector, characterized by petite family farms with minimal external European policy influences. Thus, extrapolating these findings across varied international terrains and farming categories warrants exploration. While our data orbits socioeconomic progression, a comprehensive sustainability perspective remains to be charted. The cross-sectional data offers a snapshot, urging a longitudinal perspective to gauge enduring relational dynamics.

Broadly, our research illuminates the socioeconomic sustainability ramifications of family farming traits, offering pivotal insights for rural agrarian frameworks underpinned by family-driven agriculture.

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Emilio Galdeano-Gómez (male) is Full Professor in Economics at Universidad de Almería. His research topics are innovation, environmental economics, supply chain networks, internationalization, and exports. He has participated in 36 R&D projects and contracts, with national and

international companies and institutions. He has more than 50 papers published in SSCI journals (his work has 1742 cites and his H index is 26), such as Business Strategy and the Environment, Supply Chain Management: An International Journal, Journal of Business Economics and Management, World Economy, Environment and Resource Economics, Ecological Economics, and Research Policy.

Laura Piedra-Muñoz (female) works as a Full Professor in the Department of Economics and Business at the University of Almería in Spain. She has been an invited professor in Georgia State University (USA) in 2006 and the University of Manchester (United Kingdom) in 2022. She has 24 years of experience in studies on environmental economics, sustainable development and agricultural economics. She has participated in 28 R&D projects and contracts, with national and international companies and institutions. She has published 38 scientific articles in international peer-reviewed journals (h > 19; > 776 citations). She is the Editor-in-Chief of the International Journal of Migration Studies (RIEM, ISSN: 2173–1950) since 2013.

María del Carmen García-Barranco (female) holds a PhD in Economics, Business and Law (2020) and is an acting substitute lecturer in the Department of Economics and Business Studies at the University of Almeria (Business Organisation). Her area of expertise is supply chain applied to the agribusiness and tourism sectors. She is the author of several articles in high impact academic journals, books and book chapters related to this line of research.

Yolanda Sorroche-del-Rey (female) has undergraduate degree in Business Administration and Management and master's degree in Teaching Compulsory Secondary and Pre-university Education at the University of Almería (Spain). She is currently researching for her PhD in Economics. Research experience and interests are topics related to the interactions between environmental performance, international trade and business productivity, specifically in the agri-food sector. She has published one article in the journal Business Strategy and the Environment, which is indexed in the first decile (D1) of the Journal Citation Report.

Jesús Hernández-Rubio (male) holds a PhD degree in Economics by the University of Almeria, Spain, where he currently serves as an interim professor of Business Administration in the Department of Economics and Business. He has published in journals in Economics and Finance and participated in two R&D projects and contracts. His research interests include food safety, agribusiness, biotechnometrics and organizational behavior.

Javier Sánchez-García (male) holds a PhD degree in Economics from the University of Almeria, Spain, where he currently serves as an interim professor of Econometrics in the Department of Economics and Business. He has published in top SSCI journals in Economics and Finance, such as Finance Research Letters and the International Journal of Finance and Economics. He has participated in two R&D projects and contracts. His research interest includes time series econometrics, financial stability and macroeconomics.