PAPER

Title: Cropland management in rural Spain. A study of social innovations in agricultural cooperatives.

Authors and e-mails of them:
Piñeiro, Verónica[1] veronica.pineiro@uns.edu.ar;
Martinez-Gomez, Victor[2] vicmargo@esp.upv.es;
Meliá-Martí, Elena[3] emeliam@esp.upv.es;
Garcia-Alvarez-Coque, Jose-Maria[2] jmgarcia@upvnet.upv.es

Department:
[1]Dpto. Agronomía, Universidad Nacional del Sur (UNS), Bahía Blanca - Argentina - San Andrés 800 - (8000) Bahía Blanca, Argentina
[2]Group of International Economics and Development. Universitat Politècnica de València, Valencia, Spain Camino de Vera, s/n (46022) Valencia, Spain
[3]Centro de Investigación en Gestión de Empresas, CEGEA. Universitat Politècnica de València, Valencia. Camino de Vera, s/n (46022) Valencia, Spain

University:
[1] Universidad Nacional del Sur
[2,3] Universitat Politécnica de Valéncia

Subject area: *(please, indicate the subject area which corresponds to the paper)*
4- Sostenibilidad, medio ambiente y recursos naturales.
10- Economía del conocimiento, creatividad y geografía de la innovación

Abstract: Following an agricultural innovation systems approach, the joint cropland management (JCM) initiatives are considered a part of a holistic strategy that combines collective innovation, enabling technologies, and regional structural policies. Case studies allow to describe, understand, and classify the most successful JCM models. This taxonomic effort unveils alternative roadmaps to improve farm structures in agri-food cooperatives and helps to identify the incentives needed to promote the different alternatives. Our findings suggest that alternative pathways can be suggested for incorporating land into cooperatives' production planning. In the same vein, our results support policy formulation oriented to attract young professionals to farming.

Keywords: *cooperatives – cropland management – taxonomy – social innovation*

JEL codes: O13 - O35 - P13

Grant RTI2018-093791-B-C22 funded by MCIN/AEI/10.13039/501100011033 and by ERDF A way of making Europe.

Introduction

Joint cropland management (JCM) initiatives have emerged in agri-food cooperatives as a solution to the demographic challenge in rural areas. This strategy consists of joint cultivation of land plots carried out by agricultural cooperatives. JCM initiatives can improve efficiency and promote sustainable use of soil. This type of cooperative strategy combines social and organizational innovations and has proven effective for preventing land abandonment of small-scale land plots (Garcia-Alvarez-Coque, et al 2021; Piñeiro, et al 2021).[1]

Moreover, JCM can be observed as a business model that helps marketing cooperatives to concentrate production and respond to the demands of the value chain (Garcia-Alvarez-Coque et al. 2021; Mourdoukoutas and Papadimitriou, 2002). One significant advantage of JCM initiatives lies in the fact that they do not necessarily change the land ownership of cooperative members. This kind of arrangement reduces transaction costs and makes the strategy consistent with the new structural policies implemented in some Autonomous Communities such as Galicia and the Valencian Community[2]. Social capital, entrepreneurship, and the search for efficiency are concepts that help to understand why some cooperatives may undertake these organizational innovations (Cook and Plunkett, 2006; Hansmann, 1996; Tregear and Cooper, 2016).

1.2 Conditions for the grouping of farmland plots.

Following an agricultural innovation systems approach (Klerkx and Begemann, 2020), JCM initiatives can be considered as part of a holistic strategy that enhances social capital, enables the implementation of collective innovations (Burres and Cook, 2010), enabling

[1] To this end, the Operational Group for Social Innovation in Land Management (GO_INNOLAND) promoted by the National Rural Development Program, was created in 2020. https://goinnoland.wordpress.com/

[2] Law for the improvement of the agrarian territorial structure of Galicia (Law 4/2015, of June 17). https://www.boe.es/eli/es-ga/l/2015/06/17/4 and
Law on Agricultural Structures in the Valencian Community (Law 5/2019, of February 28) https://www.boe.es/eli/es-vc/l/2019/02/28/5

Código de campo cambiado

technologies (Mc Elroy, 2002; Phillips et al., 2015), and regional ecosystems' policies (Miles and Morrison, 2020).

Gómez et al. (2020) found that bridging social capital and trust in innovative rural groups are critical determinants of successful innovation processes. In this vein, the study by Garcia-Alvarez-Coque et al. (2021) shows that social capital (Rothstein, 2005; Ostrom and Ahn, 2003; Tregear and Cooper, 2016), based on trust, is a key driver of JCM initiatives. These initiatives require long-term contracts, investments in land improvements, and other types of actions that require mutual trust between the involved agents (landowner, cooperative, professional farmer). Social capital reciprocally leads to greater confidence, which leads to favorable outcomes of the organization's strategy (Gómez et al., 2020). JCM strategies depend on the social and territorial context, which is usually influenced by the risk of land abandonment.

The abandonment of farmland is nowadays considered a significant problem in the Spanish agri-food economy. Several interrelated reasons lead farmers to abandon their production. The most frequent causes are the low profitability of production, aggravated by smallholdings' fragmentation. Elderly farmers' children choose to study and work in activities unrelated to the agricultural economy, so many farms do not find successors. Low profitability is also caused by the predominance of obsolete crop varieties in the fruit production, which do not achieve the quality required in the markets. In addition to these economic and social problems, land abandonment causes landscape degradation, increases the risk of fires in unattended plots, and spreads uncontrolled pests. This situation generates negative impacts on the environment and the landscape.

Furthermore, land cultivation is becoming not attractive for young professionals, who face critical entry barriers, such as the necessary investment in machinery and other capital costs, increased with land fragmentation.

JCM initiatives have emerged as a way of coping with some of the problems mentioned above. JCM initiatives can also help to take advantage of economies of scale, reduce the production cost in the grouped farms and the marketing costs generated by insufficient

volumes of produce marketed by the cooperative (Hansmann, 1996). According to the literature, Table 1 shows some theoretical drivers of JCM initiatives.

Table 1 – Social and economic drivers of the grouping of farmland plots in agri-food cooperatives

Conditions	Description
Social capital	Trust in the cooperative leadership
Economies of scale	Reduce marketing and production costs
Transaction costs	Homogeneous membership, homogeneity of interests, and capital
Governance	Leadership by the cooperative board, inclusion, and promotion of women and young members participation
Human capital	Existence of professional farmers, l cooperative staff and young farmers
Size	Number of members and cooperative turnover
Inter-cooperation	Participation in associations of cooperatives and other partnership frameworks
Product or process innovation	Crops renewal, new varieties, new products, new processes

Source: Own elaboration based on Piñeiro et al. (2021)

This study aims two objectives. Following two previous articles about JCM iniciatives in the Spanish Mediterranean region (Garcia-Alvarez-Coque et al. 2021; Piñeiro et al. 2021), the first part of our contribution aims at identifying some factors that can act as blockers of the grouping of plots by cooperatives. The second objective is to formulate a first taxonomy of JCM initiatives observed in agricultural regions in Spain, which includes their main objectives, activities and actors, with focus on the presence and absence of some of the conditions listed in Table 1. In this sense, our research questions refer to why cooperatives are involved in these initiatives, how they are developed, and which particularities of the JCM strategy are observed in the Spanish agricultural regions. The results provide alternative business models which draw on the observation of the experiences that supplied the basic data for this contribution.

1- Methodology

Based on the conceptual framework developed in previous contributions (Garcia-Alvarez-Coque et al., 2021; Piñeiro et al., 2021) and actual data from agricultural cooperatives, the drivers of the joint land management in cooperatives of Mediterranean Spain were identified. As a first step, we applied Qualitative Comparative Analysis (fsQCA) to identify configurations, including social and economic conditions, that block the adoption of JCM strategies. Later we propose a taxonomy of JCM models, leading to the conclusion that no unique JCM strategy exists.

The fsQCA offers a set-theoretic approach to causality analysis regarding conditions and an outcome (Ragin, 2008). The analysis was made with fsQCA3.1b[3] software (Ragin, 2016). Taking the "non-clustering of plots" as the outcome to be explored in agricultural cooperatives, we implemented the fsQCA based on the presence of conditions calibrated from a direct survey to a sample of cooperatives. For the fsQCA we used the same database used by Garcia-Alvarez-Coque et al. (2021) and Piñeiro et al. (2021). It consists of a survey to agri-food marketing cooperatives that was sent online and answered anonymously by cooperatives' managers during January 2019. Forty-nine responses were obtained, of which 35 were selected because they had filled out all the questions necessary for our analysis. In spite of the small number of cases, the sample offers a diverse set of agri-food cooperatives mainly targeted to the marketing of Mediterranean permanent products (olives, fruit and citrus), with different farm sizes and characteristics of the membership. The conditions selected for the analysis refer to social and economic drivers of JCM. The mix of possible causal configurations that lead to the outcome is formed by the following conditions:

SIZE: it is measured by a combination of turnover and the average number of employees.

PLURALISTIC GOVERNANCE: the proportion of women and young people on the board of directors,

[3] https://www.socsci.uci.edu/~cragin/fsQCA/software.shtml

YOUTH IN THE SOCIAL BASE: the proportion of cooperative members under 40 years of age.

INNOVATIVE ORIENTATION: related to the promotion of new crops (varieties or species), organic or processed products, and sustainable products and processes; and,

COOPERATION+: participation of the cooperative in federative cooperatives or other partnership formulas.

Details of the variables are included in Piñeiro et al. (2021). In contrast of the outcome chosen in the quoted article, in the present study the outcome variable is a fuzzy variable called NO_GROUPING and is based on the set of cooperatives surveyed that have not actually engaged in common land management strategies. Therefore, we want to explain what blocks JCM initiatives. In short, we are defining a set of cooperatives that exhibit specific attributes and the outcome through the following general configuration:

Model: NO_GROUPING = f (COOPERATION+, YOUNG MEMBERS, GOVERNANCE, INNOVATIVE, SIZE)

The recipes for NO_GROUPING strategies were selected based on consistency and coverage measures, according to Legewie (2013).

We complemented the fsQCA with our taxonomy of JCM initiatives. This classification is illustrated by a case study approach and semi-structured survey to selected cooperatives. For that, seven cooperatives that carry out joint land management were evaluated.

2- Results

3-1 Blockers for the JCM initiatives

The fsQCA explains the characteristics that lead cooperatives not to engage in a joint land management strategy. The sufficient causal conditions produced by the intermediate solutions led to three configurations (Table 2). All these configurations describe recipes or combinations of attributes that, jointly considered, define the characteristics of cooperatives, which emerge where the grouping of farmland plots is blocked.

Table 2. FsQCA results describing the outcome "not adopting a JCM strategy"

Model: NO_GROUPING = f(INTERCOOPERATION, YOUNG MEMBERS, GOVERNANCE, INNOVATIVE, SIZE)			
Solution	Intermediate		
solution coverage	0.3		
solution consistency	0.93		
Conditions	Recipes (over consistency cut-off)		
	i	ii	iii
COOPERATION+	○	●	●
YOUNG MEMBERS	○	●	
GOVERNANCE	○	○	○
INNOVATIVENESS	○	●	●
SIZE			●
Consistency	0.2	0.1	0.1
Raw coverage	0.13	0.03	0.03
Unique coverage	0.95	1	0.92

Note: Frequency cut-off = 1; Consistency cut-off = 0.91. Black circles '●' indicate the presence of conditions, white circles "○ndicate the absence or negation of conditions, and blank cells indicate irrelevant conditions. Source: Own elaboration from survey data.

Results in Table 2 show that several combinations of conditions lead cooperatives not to get involved in plots' grouping strategies. In other words, these recipes could be seen as blockers for JCM initiatives. The first configuration (recipe i) is the absence of all the identified drivers, regardless of the size. A second blocking configuration (recipes ii and iii) includes the absence of plural governance despite other drivers.

However, it is worth noting that no conditions can be considered critical for the outcome's presence or absence (Table 3). Necessity consistency ratios for all single conditions are below the 0.9 consistency threshold proposed by Schneider and Wagemann (2012). The presence or absence of any of these conditions alone is not crucial for the outcome. This

result suggests that a single condition does not determine failure in grouping land plots. A combination of them determines failure, probably determined by the social and territorial context of the cooperative.

However, some elements deserve to be highlighted. A non-pluralistic governance limits the JCM initiatives since it appears in all the recipes. It is striking that once the governance does not appear pluralistic, other conditions that normally favor innovation (size, cooperation+, young farmers, innovativeness) do not support JCM initiatives. Consequently, governance seems to be critical irrespective of other characteristics.

On the other hand, the combined absence of the analyzed characteristics (innovation, plural government, youth, and participation in federative structures), visible in recipe i, also leads to the blocking of the JCM initiatives. This result is likely linked to a cooperative profile that is not prone to incorporating innovations in its production or management structures.

Table 3 - Analysis of Necessary Conditions for cooperatives not adopting a JCM strategy

Outcome variable: NO_GROUPING		
Conditions tested:	Consistency	Coverage
SIZE	0.70	0.48
~SIZE	0.54	0.66
INNOVATIVE	0.65	0.45
~INNOVATIVE	0.57	0.65
GOVERNANCE	0.6	0.35
~GOVERNANCE	0.4	0.67
YOUNG MEMBERS	0.5	0.7
~YOUNG MEMBERS	0.65	0.41
COOPERATION+	0.68	0.43
~COOPERATION+	0.43	0.6

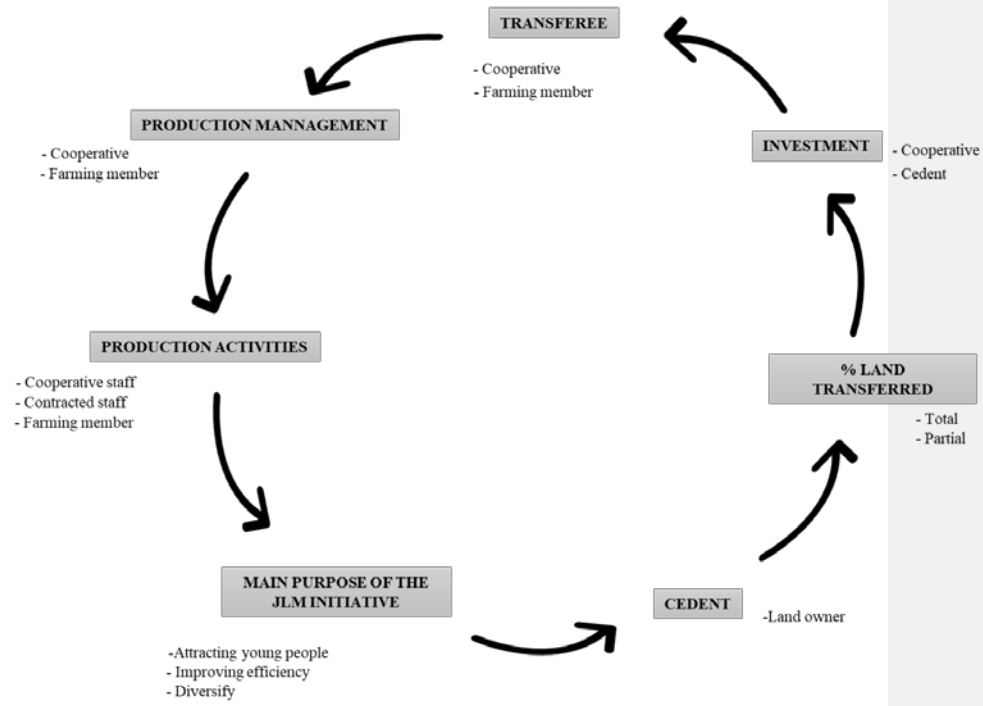
~ means "absence" of the condition
Source: own elaboration from survey data

3-2 Taxonomy of JCM initiatives

Forming a JCM can be guided by different objectives. These include, among others, increasing the production marketed by the cooperative, expand the cooperative's supply, improving product quality, attracting young people, preventing abandoned land, managing the land of elderly members, avoiding land concentration by corporate firms, keeping land into production, or easing the management of land owned by holders who are not professional farmers.

For the JCM initiatives to achieve these objectives, different activities or main actors are needed. The activities are: who gives the land, who invests, who manages it, and who carries out the production. The actors may be the same or different (Figure 1). In general, the person who transfers the land cannot take charge of its management and production for various reasons (advanced age, alternative jobs, others) or because he/she does not have the necessary capital for land upgrading with higher productivity (machinery, plantings, etc.). In many JCM initiatives, investment in new plantings is, to a variable extent, carried out by the cooperative. In many cases, cooperative's technical staff is in charge of the management and decisions regarding the production portfolio. Finally, farm production can be carried out by professional farmers who are already members of the cooperative, by the cooperative own staff, by contracted staff, by non-member farmers to whom the plots are let for their cultivation, or by farmers who own the plots themselves.

Figure 1- Actor and functions of Joint Cropland Models



As we can see, the JCM models can be characterized by the objectives they seek and by who carries out the different activities. In turn, a combination of goals and modalities of organization of the main activities can be observed in the JCMs analyzed.

Model 1: Multi-stakeholder collaboration focused on the incorporation of young professional farmers.

Objectives:

Recovery of abandoned land or land susceptible to abandonment + Incorporation of young people

Strategy to achieve the JLM objectives:

Investment by the cooperative. + Cultivation of more profitable crops + Support to professional farmers

A core objective of this model is the incorporation of young farmers (or not so young but with entrepreneurial attitudes), offering them the possibility of managing land supplied by cooperative members who are retiring or who cannot continue with their productive activity for different reasons. This model involves three types of actors who represent the owners of the land, the cooperative itself, and the person who cultivates the land, who may or may not be the landowner, and may or may not be a member of the associative entity.

One of the patterns presented in this type of JCM initiatives is that the cooperative invests in the structural and productive upgrading of their members' farms. Initially, these farms were at risk of abandonment or are owned by elderly farmers who have no successors to carry on the activity. In these cases, the cooperative bears the plot's productive and structural reconversion costs, including new plantings and irrigation facilities, to adapt land to the type and quality of production consistent to the firm's marketing strategy. The landowners do not lose their property but let them in exchange for a rent or by taking a part of the sales' value, according to a contract. The term is variable and depends on the necessary improvements to be made. It can be from 3 to 25 years, depending on the payback time necessary to recover the investment.

In this model, at the same time or immediately after the cooperative reaches an agreement with the landowner, a professional farmer among its members is asked to take charge of and the farm management, and then benefitting of a part of the value. Priority is given to young and fulltime farmers or those already trained or in process of professionalization. This farmer is supported by the cooperative's technical staff.

Examples of this type of initiative can be seen in the UNIO, cooperative of Reus, Catalonia (Almond project). This model is also present in cooperatives in Navarra and Mallorca.

Model 2: Vertical integration focused on putting land into production and increasing the cooperative's production volume.

***Objectives**:*

Recovery of abandoned land or land susceptible to abandonment + Increase cooperative income

Strategy to achieve the JLM objectives:

Management of the production and quality by the cooperative+ Investment by the cooperative and/or members.

A variety of the previous model takes place when the production tasks are carried out by a professional staff that works following the direct guidelines of the entity's managers.

As an example of this modality, in the Rural San Vicent de Benaguacil cooperative, two alternatives are proposed to put land into production and improve its profitability. The first is called "direct reconversion" and implies that the investment for productive upgrading is a landowner's responsibility, but the cooperative co-finances50% of the capital cost. The second modality is based on a contract to transfer land to the cooperative itself, which will be in charge of the investments necessary for the upgrading and start-up of production. Sometimes the cooperative combines land let by landowners with land owned by the cooperative itself.

In the region of Valencia, other cooperatives, with their own particularities, can be framed within this modality, as it is the case of the Viver and Coopego cooperatives. In Viver (Castellón), the cooperative become a producer, by managing the common land through single technical management and by incorporating young member farmers into the cooperative's staff. With similar objectives, Coopego, in Alacant province, has also engaged in a JCM initiative by upgrading abandoned plots or plots at risk of abandonment. This initiative focuses on product, organizational and marketing innovations. These innovations require updated production calendars, environmentally friendly production techniques, certification of good practices, creation of a land bank, and intensive networking for productive tasks.

These alternatives encourage common technical criteria established by the cooperative (e.g., varieties grown, harvesting time, crop protection treatments, and others). The

cooperative undertakes joint management of the grouped plots and puts them into sustainable production.

Model 3: Horizontal integration focused on community land management.

Objectives:

Recovery of abandoned land or land susceptible to abandonment + Increase in the production scale

Strategy to achieve the JLM objectives:

Integral management of the farm by the cooperative + Intercooperation + Investment by the cooperative

The third model is found in cooperatives, mostly engaged into production activities, that jointly exploit the land of their members, but not necessarily undertake the marketing stage. In this model, the landowners let the land to the cooperative, which is responsible for making the necessary investments (irrigation, restructuring, etc.) to bring the land into production. The cooperative itself is in charge of the planning and integral management of the plot. The main objective of this model is to generate economies of scale, improve the profitability of the plot and avoid its abandonment. Another particularity of this model is that cooperative's members usually allocate the marketing of the products to other first or second-degree cooperatives.

Onda cooperative, in Comunitat Valenciana, is an example of this model. This cooperative is dedicated to the joint management of land of its members, who, for various reasons, are unable to exploit it. The cooperative mainly manages citrus fruit in a region where smallholdings and land-use competition by industrial activities exist.

Another example, in this case specialized in cereal production, is the Santísimo Cristo del Amparo cooperative, in Castilla-La Mancha. The grouping of members land of this cooperative allows for greater efficiency in agricultural operations. It is also responsible for the integral management of the plots through qualified staff.

Model 4: Functional and/or productive diversification focused on diversification

Objectives:

Increase in profitability + Support to professional farmers

Strategy to achieve the JLM objectives:

New production and added value.

We found an example of this model in the cooperatives grouped in the Alcamancha (second degree) cooperative. This initiative covers the entire value chain of a new production, such as the cultivation of lavender, in the Mancha Alta region (province of Cuenca, Spain).

The JCM initiative aims at incorporating a complementary activity in its members' farms, which were mainly dedicated to the monoculture of cereals. This new production increases the added value per area unit and requires more intensive labor input. It also brings the possibility of developing rural tourism. This initiative involves product, process, and marketing innovation**s.**

Summary of models

Table 4 shows the main characteristics shared by the different JCM initiatives surveyed according to their links with each model. We note, however, that some characteristics and objectives are shared by all models. The selection of the JCM strategy largely depends on the regional and social context. However, all models share common characteristics and visions, all enhancing the role of cooperatives as agents of territorial cohesion and development. These social innovation models propose alternatives for all stakeholders, including those who want to produce and those who are not in a position to manage their farms but want to keep the land in production. What it is clear that we cannot propose an unique business model for all situations. We hope that the taxonomy proposed is an entry point for defining the cooperative's strategy and the previous steps for a JCM in a particular context.

Table 4 - Main characteristics of each model

Characteristics	**JCM models**

	Multi stakeholder collaboration	Vertical integration	Horizontal Integration	Functional and/or productive diversification
Product				
Regional traditional products		**	***	
New varieties and/or products	**			***
Objectives				
Recovery of land abandoned or possible to be abandoned	***	***	***	
Young farmers' incorporation	**	*		
Increase in farm profitability	*	*	*	***
Reduction of smallholdings' fragmentation	*	*	***	
Increase cooperative income		***		
Land ownership				
Member	*	*	*	**
Cooperative		*		
Farm management				
Professional Farmer	**			*
Cooperative		*	**	
Capital costs				
By the cooperative	**	**	**	*
The landowner provides a part of the investment.		*		*
Planning and technical support				
The cooperative carries out the planning	**	***	**	
The cooperative provides technical support	*		*	*
Marketing				
By the cooperative itself	**	***		**
By another cooperative			**	

*** characteristic strongly associated with the model
** characteristic frequently present in the model
* characteristic occasionally present in the model

Regardless of the models, Table 5 shows examples of promoters and possible blockers of common management initiatives.

3- Concluding remarks

The combination of social innovation initiatives, more respectful farming techniques, quality certifications, greater professionalization of agriculture, social networking, and business collaboration can trigger rural development leading to create job opportunities and to revitalize rural areas. Increasing numbers of cooperatives are undertaking this initiative.

Understanding the possible models of JCM and determining their main characteristics will help to define alternative roadmaps to promote joint management projects and to identify the necessary incentives. What we can observe from our interviews is that JCM are a reality in diverse agricultural regions and not just a theoretical will. However, we propose a taxonomy to underline that there is not a one-fits-all solution for all cooperatives concerned with land abandonment or with the succession challenge.

We can see that there are alternative ways to incorporate the land into cooperative production planning. In the same vein, describing, understanding, and classifying the most successful JCM models can support policies aimed at attracting young professionals to agriculture.

Table 5 – Conditions that determine JCM initiatives and examples of blockers and enhancers found in the studied cases.

Conditions	Enhancing JCM	Blocking JCM
Social capital	The cooperative invests and brings the land into production. Landowners trust in the cooperative leadership The cooperative holds information meetings with members who have uncultivated land or no possible successor. The cooperative and the landowner invest in bringing the farm into production. The cooperative introduces a new, more profitable crop and takes care of its processing and distribution. The cooperative holds information meetings with members who have uncultivated land or no possible successor.	Lack of trust in the management and/or board of the cooperative Cooperative members do not have enough information about the initiative.
Economies of scale	The cooperative markets higher volumes and performs quality and production management. Farm profitability increases due to increased acreage, reduced marketing costs, better agronomic management, more productive and demanded varieties, new and more profitable crops. Reduce production cost by increasing farms size Reduce marketing costs by increasing cooperative income	Cooperatives with a small number and mostly young members do not achieve economies of scale to undertake the initiative.
Transaction costs	The cooperative carries out the integral management of the product Ownership of land is not transferred Most of the cooperative's members are close to retirement and have no farm relief	The heterogeneity of members affects the costs and effectiveness of collective governance
Governance	Cooperative promotion of the women and young members participation The main objective is the recovery of land that has been abandoned or is likely to be abandoned The board does not lead any joint land management initiatives.	No actions are taken to incorporate and integrate women and young people as members or as part of the board of directors. The cooperative only acts as a marketer and is not involved in the production or management of the production process. The board does not lead any joint land management initiatives.

continues table 5

Conditions	Enhancing JCM	Blocking JCM
Human capital	The cooperative has a crop management section with its staff or through contracts with professional farmers. Priority is given to young professional farmers to manage communally managed land.	The cooperative has no young farmers among its members interested in managing more crop area
Size	The cooperative has many members and incomes, but many are elderly and have no successor on the farm.	A small cooperative that does not have sufficient members or resources to engage in the activity. Large cooperatives may have higher transaction costs to address JCM initiatives.
Inter-cooperation	The cooperative oversees the JCM and delegates the marketing to other cooperatives. Second-grade cooperatives promote JCM initiatives to support member cooperatives Cooperatives participate in federative cooperatives or other partnership formulas	The cooperative does not engage in collaborative actions with other cooperatives
Product or process innovation	The cooperative holds information meetings with members who have uncultivated land or no possible successor. The cooperative adds value to the production by managing quality and production processes. To scale up and commercially implement valuable product innovations (e.g., new varieties) or process innovations (e.g., organic or zero-waste farming),	No product or process innovations

4- References

Burress, M. J., & Cook, M. L. (2010). *A primer on collective entrepreneurship: A preliminary taxonomy*. Columbia. University of Missouri, Department of Agricultural Economics, Working Paper. AEWP 2009-4

Cook, M.L., & Plunkett, B. (2006). Collective Entrepreneurship: An Emerging Phenomenon in Producer-Owned Organizations. *J. Agric. Appl. Econ. 38*, 421–428. https://doi.org/10.1017/s1074070800022458

Garcia-Alvarez-Coque, J-M, Martinez-Gomez, V., Tudela-Marco, L. (2021) Multi-actor arrangements for farmland management in Eastern Spain, *Land Use Policy*, 105738, ISSN 0264-8377, https://doi.org/10.1016/j.landusepol.2021.105738.

Gómez, W.A., Aranda-Camacho, Y., Barrientos Fuentes, J.C. (2020). Analytical model to assess the functionality of small farmers' organizations. *Agricultural and Resource Economics, 20(1)*, 7-35. https://doi.org/10.7201/earn.2020.01.01

Hansmann, H. (1996). *The ownership of enterprise.* Harvard University Press. London.372 p

King, B., Fielke, S., Bayne, K., Klerkx, L., & Nettle, R. (2019). Navigating shades of social capital and trust to leverage opportunities for rural innovation. *Journal of Rural Studies*, *68*, 123-134.

Klerkx, L., Begemann, S. (2020). Supporting food systems transformation: The what, why, who, where and how of mission-oriented agricultural innovation systems. *Agricultural Systems, Volume 184*,102901, https://doi.org/10.1016/j.agsy.2020.102901.

Legewie, N. (2013). An introduction to applied data analysis with qualitative comparative analysis. *In Forum: Qualitative Social Research 14 (3)* https://doi.org/10.17169/fqs-14.3.1961

Mc Elroy, M. (2002). *Social innovation capital*. J. Intellect. Cap. 3, 1469–1930. https://doi.org/10.1108/14691930210412827

Morgan, M., & Morrison, M. (2020). An effectual leadership perspective for developing rural entrepreneurial ecosystems. *Small Business Economics 54.4*: 933-949.

Mourdoukoutas, P., & Papademetriou, S. (2002). *Nurturing Entrepreneurship: Institutions and Policies*. Quorum Books, Westport, C. 188 p

Ostrom, E., Ahn, T.K. (2003). *Foundations of Social Capital*, Books, Edward Elgar Publishing, 590 p.

Phillips, W., Lee, H., Ghobadian, A., O'Regan, N., James, P., (2015). Social Innovation and Social Entrepreneurship: A Systematic Review. *Gr. Organ. Manag. 40*, 428-461. https://doi.org/10.1177/1059601114560063

Piñeiro, V., Martinez-Gomez, V., Melia-Marti, E., Garcia-Alvarez-Coque, J.M. (2021) Drivers of joint cropland management strategies in agri-food cooperatives. *J. Rural Stud., 84*, pp. 162-173, 10.1016/j.jrurstud.2021.04.003

Ragin, Ch. (2008). *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. University of Chicago Press: Chicago and London. 224 p.

Ragin, Ch., & Sean, D. (2016). *Fuzzy-Set/Qualitative Comparative Analysis 3.0*. Irvine, California: Department of Sociology, University of California

Rothstein, B. (2005). *Social traps and the problem of trust, Social Traps and the Problem of Trust*. Cambridge University Press. https://doi.org/10.1017/CBO9780511490323

Tregear, A., Cooper, S. (2016). Embeddedness, social capital and learning in rural areas: The case of producer cooperatives. *J. Rural Stud. 44*, 101–110. https://doi.org/10.1016/j.jrurstud.2016.01.011.

Con formato: Inglés (Reino Unido)

Con formato: Inglés (Reino Unido)

Código de campo cambiado

Con formato: Inglés (Reino Unido)

Acknowledgements

Survey work and participation of profs. Garcia-Alvarez-Coque and Martínez-Gómez received the support of the Ministry of Science, Spain and the European Regional Development Fund, European Commission. Project "Strengthening innovation policy in the agri-food sector" (RTI2018-093791-B-C22). In-depth surveys to cooperatives were supported by the Operational Group GO_INNOLAND, funded by the Rural Development Program (Spain), MAPA and EARDF.

Código de campo cambiado