

**INNOVATION AND SOCIAL CHANGE PROCESSES IN THE RURAL AREAS: INSIGHTS  
FROM AN ACTOR-CENTERED APPROACH**

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## Index

<b>1. Introduction .....</b>	<b>4</b>
1.1. Background and problem description.....	4
1.2. Scope of research .....	5
1.3. Overview .....	8
<b>2. Conceptual framework.....</b>	<b>9</b>
2.1. Rural areas and rural paradigms.....	9
2.2. A new perspective to understand rural areas: Actor-centred approach .....	10
2.3. New concepts to understand actor interaction in rural areas: ecosystems and entrepreneurial ecosystems .....	12
2.4. Innovation and innovative initiatives in the rural areas .....	14
2.4.1. Innovation.....	14
2.4.2. Innovative initiatives.....	15
<b>3. Analyzing innovation in the rural areas: An integrative review of innovations in the agricultural sector from an actor-centered approach .....</b>	<b>18</b>
3.1. Introduction .....	19
3.2. Methodology.....	21
3.2.1. Framing the objective .....	21
3.2.2. Executing the process .....	21
3.2.3. Presenting the results.....	24
3.3. Results.....	26
3.3.1. Decision-making process.....	26
3.3.2. Knowledge management processes .....	29
3.3.3. Governance mechanisms.....	31
3.4. Concluding remarks and future research agenda .....	34
<b>4. Analyzing social change in the rural areas: Case study.....</b>	<b>39</b>
4.1. Context.....	39
4.2. Local Actors Inclusion in Entrepreneurial Ecosystem for Social Change: a case study 39	
4.2.1. Introduction .....	40
4.2.2. Entrepreneurial Ecosystem and Social Change .....	41
4.2.3. Methodology.....	43
4.2.4. Analysis and Interpretations .....	44
4.2.5. Discussion.....	48
4.2.6. Conclusion.....	50
<b>5. Conclusions and reflections .....</b>	<b>51</b>
<b>6. References.....</b>	<b>53</b>
<b>7. Anex .....</b>	<b>71</b>

# 1. Introduction

## 1.1. Background and problem description

For decades, the world's population was predominately rural. Nowadays, more people live in cities than in rural areas, due to the intensification of agriculture and the unstoppable urbanization process that has reduced the political importance and power of rural areas (Abebe et al., 2013; Alexander et al., 2020). Rural areas worldwide face ongoing and increasingly complex threats such as rural depopulation, depletion of natural resources, climate change, globalization, among others (Adegbola et al., 2007; Alomia-Hinojosa et al., 2018). Globalization and the economic, financial, political and technological changes caused have pulverized borders, reduced distances and created homogenizations, altering identity and cultural diversity. This context has particularly affected rural areas due to their greater vulnerability and socioeconomic fragility, thus sharpening the differences between actors and territories according to their ability to adapt to global conditions marked by change and competitiveness. In that sense, old solutions like 'business as usual' or 'one size fits all' have proved to not be valid approaches for rural development. More feasible alternatives must be sought, promoted and sustained (Arora, 2012; Botha et al., 2014). Scholars, practitioners and civil society have pointed out the need to develop alternatives based on rural transformations pathways that require a multisectoral approach addressing social, environmental, cultural, economic and political issues. International initiatives, such as the 2030 Agenda<sup>1</sup> or regional policies such as the EU's common agricultural policy (CAP) and in particular the LEADER initiative are pointing in the same direction.

At global levels, many scholars have indicated that one of the most important transformation pathways in rural areas has been innovation processes that have become a core subject in the last 20 years (Chindime et al., 2016; Brown et al., 2017). Innovation is considered essential to enhance development and to identify sustainable pathways (Tapia, 2017). Innovation processes are embedded in stable socio-technical and institutional paradigms generating routines and conventions that legitimate only some innovations while excluding others (Sassenrath et al., 2008; Schut et al., 2015). Within this context, the innovation process in the rural areas has focused mainly on technology and industrialization as the primary paradigms for change (Sherwood and Larrea, 2001). This technology-driven innovation has been widely contested as it has offered advantages and disadvantages to rural areas in general and agricultural sector in particular. On the one hand, yields and productivity have generally been rising due to the efficiency and efficacy of the variety of new technological improvements (Chowdhury et al., 2015; Coutts et al., 2017). Although technology driven innovation had a positive effect in the rural areas, there are fields in social sciences questioning the overall effects behind innovation (Crivits et al., 2014).

On the other hand, technology-driven innovation has regularly created a variety of environmental and social side effects (Curry et al., 2012). Most of these social side effects are related to the competition of different stakeholders without considering the real beneficiaries of the innovation. Due to these side effects and the

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<sup>1</sup>

need to keep promoting innovation processes, many are of the view that agricultural systems should shift from an emphasis on the dominant paradigm of industrial agriculture toward more sustainable paradigms around the world (Pigford et al., 2018; Menary et al., 2019). In that sense, various scholars (Davies et al., 2018; Devaux et al., 2018; Faure et al., 2018) have pointed out that such a paradigm shift will require the focused engagement of different multi-stakeholders in the innovation process watered down in the last decades to favour understanding technologies.

At local levels, many scholars have indicated that another of the most important transformation pathways in rural areas has been social innovations processes that lead to social changes. A consensus has been growing on the urgency for acting through perspectives focused on social innovation involving behavioral and governance transformation (Wanzenböck et al., 2020). Rethinking governance, with the focus beyond the agricultural sector, is essential for meeting current and future challenges in rural areas. In this sense, the establishment of new governance mechanisms based on diverse multi-actor arrangements that can address long-term strategies has been considered to play a fundamental role in rural areas worldwide (High, 2007). Revitalizing territories, and supporting local empowerment are powerful tools to promote social change.

Social change in itself is inevitable. While the fact of an ever-changing world is evident, it is the factors that drive, and form change that have interested scholars the most. In modern societies, social collectives and agents of change have become the most critical determinants of social change processes. In that sense, it is worth looking into the concepts and frameworks surrounding them and how their work affects existing paradigms in rural areas and influences the sustain of new ones (Opp 2009, 36-37).

## 1.2. Scope of research

The world is living fast transformation processes connecting new actors and creating new networks worldwide to find solutions and face the upcoming challenges related to sustainable pathways. Most of the transformation processes are drive-by innovation. However, not all the innovations (e.g. social, technological) are generated in the same way. The innovation depends on the actors involved in these new networks. These networks are organized and perform differently according to different factors (e.g. location, policies...). Studies focus on innovation have usually undertaken in urban areas in management fields. Instead, studies of innovation in rural areas has been focused mostly on technological changes, and little is known about the people involved. Hence, there is the need to understand how the different realities and dynamics in rural areas affect the transformation processes from the actors' position and perspective. Accordingly, this research aims to understand how the transformation towards more sustainable pathways is emerging in rural areas, using an actor-centered approach. The research objectives are twofold:

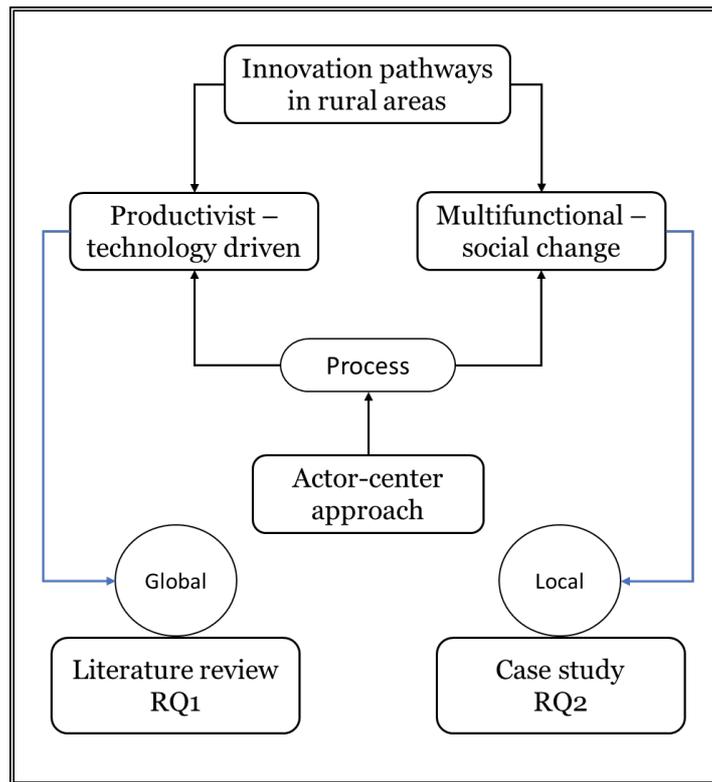
- To understand how the scientific literature has analyzed the innovation process in the rural areas from an actor-centered approach at global levels.
- To understand how the social change process can happen in the rural areas through a case study from a people-centered approach at local levels.

Based on the proposed objectives, the approach chosen for the research is the actor-centered approach (Long, 2007). This approach argues that policies or initiatives do not translate directly to the local level but are mediated by the patterns that actors follow. In this way, the actor-centered approach makes it possible to understand the links between actors, processes and social structures both globally and locally.

This thesis attempts to enrich the knowledge about innovation processes through the lenses of an actor-centered approach, as most of the literature on innovation processes focus on technology adoption. These studies mainly concentrate on identifying the steps to follow to adopt the innovation. Previous studies (Roger, 1995) suggest that the adoption of technology (innovation) should follow different stages: knowledge, persuasion, decision, implementation, confirmation. However, it was concluded that despite these stages, people do not adopt the innovation at the same time, or even people do not follow all steps. Thus, there is no adoption or is partial. Moreover, most of the studies focused on the outcome of innovation, and little is known about how innovation emerges. Finally, there is a need to unfold the innovation process, how innovation emerges and with whom. This thesis aims to provide insights into how people merge and interact during innovation creation.

The theoretical and conceptual framework of this thesis has a temporary approach view. This thesis uses three different qualitative techniques such as: content analysis, historical analysis and discourse analysis to understand and discuss trends and tendencies (Kristjanson et al., 2017; Taylor and Zilberman, 2017). Content analysis is a method that allows researchers to make sense of unstructured messages (e.g. text, videos) through an inductive, deductive, or abductive process, based on previous theories or research (Gheyle and Jacobs, 2017). Historical analysis is a method that allows researchers to examine evidence from the past, providing a chronological view of the facts, and establishing cause and effects between those facts (SAGE, 2008). Discourse analysis is a method that reveals the “code” of a discourse, considering the context of where the event takes place. Socio-cultural and political factors represent the context. Moreover, it considers how the relationship between the language, ideology and power relationships are conveyed in the message (Yazdannik et al., 2017). The analysis of the data includes an interpretation of the meanings and functions of local actors.

This research is composed of two studies. The first one focused on a literature review, which mainly analyzes innovation studies in the agricultural sector (detail explanation in section 3.2). The second one is a case study with interviews (detail explanation in section 4.3). Both studies are qualitative and were carried out using an actor-centered approach. The research concentrates on social dimensions, placing people at the centre of the research process. The first study aims to understand the process of innovation at global level, how innovation studies evolved around the globe. The second study seeks to understand the ecosystem genesis, which means how actors merge to innovate locally. Figure 1 shows the research framework used for this thesis.



**Figure 1.** Research framework

From the perspective of social sciences, it is necessary to focus on actors, who they are, what role they play in the innovation processes, how are actors involved at the global and local level. As we see, figure 1 shows the framework of this thesis. There are two main innovation pathways in rural areas. The first one productivist – technology-driven. That was the most popular approach in past years. It focused on how the innovation output is adopted, how the innovation affects adopters' performance and the differences between adopters and no adopters. However, this approach pays little attention to the complete effect or side effects induced by adopting the innovation output. There is a large body of literature about the adoption of innovation and how the innovation has improved the welfare in rural areas. However, there is a lack of information on how the innovation processes have stood out the actors' role. Hence section 3 aims to answer the following research question to advance the conceptual framework of actor-centre approach in innovation pathways around the globe:

Research question 1(RQ1): *What are the main processes and mechanisms sustaining actor-centered approaches to the management of resources to foster local innovation efforts in the agricultural sector?*

The innovation-driven by the multifunctional-social change is focused on a wide range of action. It is not only focused on the innovation output, is focused on how the innovation emerge. Moreover, this approach aims to unfold all the possible side effects that could have innovation, from conception until the delivery to final users or beneficiaries. The multifunctional-social change has realized that significant changes are only made when society is involved and empowered by the innovation process. This approach

acknowledges that sustainable innovation is only possible if a different segment of society works together. Hence section 4 aims to answer the following research question to advance the conceptual framework of the actor-centered approach in social innovation change in a case study:

Research question 2 (RQ2): *How do agents in a rural territory create an ecosystem and realize a social change?*

### 1.3. Overview

This thesis consists of six sections: Section 1 presents the introduction in which it is explained in detail the (1.1) background and problem description and (1.2) the scope of research. Section 2 shows the conceptual framework that consists of 4 subsections: (2.1) describes the evolution of the rural area concept and the rural paradigms. (2.2) defines the actor-centered approach. (2.3) exposes the notion of an ecosystem and get insights into an entrepreneurial ecosystem. (2.4) firstly characterizes innovation in general and technological and social innovation in particular (2.4.1) and secondly shows the main characteristics and how has been analyzed on of the most well-known initiatives to transform rural areas, the LEADER initiative. Section 3 presents the integrative review of innovation in the agricultural sector from an actor-centered approach. Section 4 offers firstly a briefly context description of the area where the case study is undertaken (4.1) and secondly presents the case study about the local actor's inclusion in entrepreneurial ecosystems for social change (4.2). Section 5 draws the conclusions. Section 6 shows an annex in which it is presented the interview protocol. Section 7 presents the list of references.

## 2. Conceptual framework

### 2.1. Rural areas and rural paradigms

Rural areas have traditionally been understood as geographical spaces, under the dichotomous urban-rural division (Bellamy et al., 1990; Isserman, 2005; Pinto-Correia et al., 2006). The rural represented the primary sector, mainly the agricultural activity. This view has been expanded over time, with fundamental contributions from sociology and rural sociology that have re-conceptualize rural areas not only as a geographical space, but also as the set of economic, social, environmental and organizational dynamics that take place (Marsden, 1998; Buller, 2000). Thus, various authors affirm that rural areas should be seen as territories that are socially built and can be identified and valued by the interactions of the society that inhabit them, with the resources at their disposal (Baca-Tavira, 2016; Galvao et al., 2020). This concept allows a better understanding of the historical processes that have shaped these rural areas, thus being able to inquire about the inertias and changes that have been taking place driven by both local and external actors. The articulation or disarticulation of these actors gives us one of the key elements to understand the development and the transformation of the rural areas. At a more global level, another key element to consider improving this understanding is to gaining insights into the evolution of the dominant paradigms in the rural areas in the latest decades.

A paradigm is "a universally recognized scientific achievement that, for a time, provides model problems and solutions for a community of practitioners" (Kuhn, 1996). A paradigm thus becomes a guiding principle of the basic rules with which we build our knowledge of the realities of the world and of our own human existence. In general, the paradigms also define the models of production systems that are progressively modified and improved according to the needs. Paradigms support specific sociotechnical regimes that shape rural policies, trajectories, and practices. Socio-technical regimes are defined as a "set of rules comprised in the coherent complex of scientific knowledge, engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling artifacts and relevant people, ways of defining problems —All of them embedded in institutions and infrastructures" (Rip and Kemp, 1998).

In the case of the rural areas, the dominant paradigm has traditionally been the industrial-productivist, characterized by agricultural intensification with yield production and monoculture. The dominant industrial-productivist paradigm views rural areas as agricultural infrastructure for industrial agriculture. The agricultural sector has a primordial role in the transformation of the rural areas. This paradigm perceives nature as a mere obstacle and the view that agricultural companies must follow a double logic (scale and specialization) and that they must be supported mostly by scientific development based on technological innovations (van der Ploeg and Marsden, 2008). One of the most well-known historical milestones of the industrial-productivist paradigm is the so-called Green Revolution (Parayil, 2003). The Green Revolution was based on intensively exploited new high-yield crop varieties, supported by irrigation, massive chemical fertilizers, pesticides, herbicides use, and heavy machinery. Even though the dire environmental consequences provoked, these practices have continued specially in the rural areas of the so-called under-develop countries. In the latest decades, this industrial-productivist paradigm has been put

into question as a reaction to its environmental and social repercussions (Schucksmith, 1993; Whitby, 1994; Ilbery and Bowler, 1998).

A second paradigm emerges seeking to overcome the limitations of the post-productivist paradigm by relocating rural activities at the center of the development process in the rural areas (van der Ploeg and Marsden, 2008) by integrating different production activities into society and nature (Wiskerke and van der Ploeg, 2004). The paradigm has been called as the sustainable rural development paradigm (Marsden, 2003). This paradigm understands rural development as a territorial process that redefines nature by re-emphasizing the role of agriculture as an important agent in sustaining rural economies and cultures (Marsden, 2003; Camarero and González, 2005; Aguilar, 2007; Aguilar et al. 2009). In that case agriculture is not understood in an industrial sense but as multifunctional agriculture. Multifunctional agriculture integrates new activities around agricultural production, attaching importance to the environmental and human sides, supporting social and biophysical aspects to adapt to, and mitigate, global changes (Nelson et al., 2013; Hassink et al., 2014; Pigford et al., 2018). In that sense, rural areas require ways to articulate agricultural and non-agricultural activities with multisectoral approaches. Multisectoral approaches at the same time need to use holistic perspectives in which the role, position or view of the multistakeholders must be considered.

## 2.2. A new perspective to understand rural areas: Actor-centred approach

In the previous section we have delved into the study of rural areas, their paradigms and their development as a multidimensional reality. Despite its multidimensional nature, studies in rural areas have traditionally been oriented to its analysis from structural perspectives mainly due to the predominance of the industrial-productivist paradigm (Murdoch, 1997). Structural perspectives tend to focus on conditions, contexts and factors, usually leaving the role of actors in the background. Thus, we find a great variety of studies that focus on different structural aspects from various branches of knowledge, two of which stand out fundamentally: (1) the economic approaches that delve into different aspects of productive activities, especially agricultural (Flor et al., 2016; Freeman et al., 2020) and more recently (2) the geographic approaches that focus on the field-city continuum inquiring about the disconnection or linkage of rural and urban areas (Berdegué et al., 2015; Colavizza et al., 2019).

Using sociological, anthropological and historical foundations, Long (2007) proposes a new actor-centered perspective that serves to understand transformation processes without denying the influence exerted by structural aspects. Even though the actor-centered approach was traditionally considered less relevant in global narrative and agendas favouring structuralist analysis, lately is gaining ground. Thus, in the academic field, the actor-centered approach has generated theoretical analysis (Aurenhammer, 2016; Terpe, 2020) and is also gaining traction at empirical levels (Sheafer et al., 2011; Hophmayer-Tokich, 2013; Chaudhry & Rubery, 2019). Also, for practitioners working in development field is becoming fundamental after the launching of the 2030 Agenda and the SDGs with the idea of "leave no one behind" as its central and transformative promise. In the next paragraphs, I'm going to get insights into the approach focusing on its possible contributions to understand the transformation processes in rural areas.

The actor-centered approach seeks to understand the processes through which a set of specific actors and their networks are committed to interpersonal and collective transformations. In Long's words, the approach focuses on "the organized practices of those who inhabit, experience, and transform the contours and details of the social landscape" (Long, 2007: 21). Also, he states that it is characterized as "a type of actor analysis that explains how the processes associated with different modes of human agency intersect to construct the results of emerging social forms" (Long, 2007: 27). The human agency attributes the ability to interpret social experience and act to the actor. Thus, actors are not simple categories or passive recipients of an intervention but are both individual and collective active subjects with their own identity, endowed with resources or attributes with variable interests, preferences and modes of interaction such as conflict, negotiation and the exchange with the various local actors, as well as with the institutional framework.

The various actors make up the knowledge and, through their actions, determine the construction of meaning, routinely organize individual or collective thought and action. The actors are those recipients of the programs and projects such as farmers, peasants, entrepreneurs but also researchers, extension workers and authorities of all levels of government, thus questioning the linear, simple and deterministic interventions that have traditionally dominated the transformations of the rural areas. In this sense, it is necessary to reverse the historical trends of political centralism in decision-making, which have repeatedly ignored the social configurations and knowledge of the communities that inhabit social spaces in rural areas.

The social spaces of rural areas are by definition heterogeneous. In these spaces, different visions, cultural and rationalities converge, fundamental for the formation of actors. These actors must assume leading roles to articulate local development through inclusive mechanisms based on the explicit recognition of this heterogeneity and cultural diversity. Thus, the orientation to the actor starts from recognizing the multiple realities, often conflictive and even incompatible, of the various actors that come into contact in the development processes. With this approach specifically thought from the different perspectives and articulated possibilities, new horizons are sought so that the various social actors are increasingly recognized and valued. The presence of actors in these spaces implies joint visions and articulated functions, where communication flows from top to bottom and vice versa. In this sense, it is not only about letting them express themselves and act but also that they plan together, so development is generated from the actors and comes from outside or vertically.

In summary, the actor-centered approach seeks to analyze the interconnections between the experiences of individuals, groups, the economy, politics and their processes and actions, and the mediations that occur through cultural practices. Thus, it recognizes that many cultural changes are the result of pressure exerted by external forces. However, the actions undertaken by social actors are not a reflection of political and economic structures at the macro level but rather derive from daily activities, from the actions of the actors and the social processes that they generate, and that in turn create the transformation of political and economic structures. Thus, the processes of social change arise as a result of the interactions of the actors in the rural areas, whether they are present or absent.

### 2.3. New concepts to understand actor interaction in rural areas: ecosystems and entrepreneurial ecosystems

The interaction of multi-stakeholders in rural areas has been traditionally approached by studying their networks or partnerships (Daniel et al., 2018). However, the need in a globalized world to understand these interactions from more holistic perspectives, considering the influence exerted by the environment, has opened the path for using a new concept, the ecosystem. The metaphor of ‘ecosystem’ started to gain momentum in social sciences at the beginning of the ‘90s, based on the need to analyze highly complex problems through a systemic view. A systemic view was at the base of life sciences, especially in biology, in which the ecosystems adequately explained how several agents interacted, the environmental context influenced and their reciprocity. Reasoning on that terms, Moore (1993) analyzed how companies co-evolve as part of business ecosystems cutting across various industries instead of focusing only on a single sector. Moore seminal work using the ecosystem in business disciplines showed helpful systemic thinking for generating valuable insights into both individual and collective action and opened a new path for different social sciences streams such as management and development (Acs et al., 2017). Since then, the literature related to the ecosystem has been on the rise. Business, innovation, digital and entrepreneurial ecosystems have been the most studied hitherto (Jacobides et al. 2018 en Boukenn). A commonly feature of all these ecosystems archetypes is their ability to support the formation of social capital between networks of stakeholders. As well, of high importance for the analysis of ecosystems is the geographical context that changes depending on the territory and shapes the conditions of the areas for transformation. As of now, there only exist few studies in rural areas (Roundy et al., 2019). However, under the new paradigm of sustainable rural development and the crucial role play by the different activities in multifunctional agriculture, some authors have defined the multi-stakeholders involved in these activities as entrepreneurs (Roundy et al., 2018), paving the way to analyze entrepreneurial ecosystems in rural areas and how they affect social change.

The analysis of the entrepreneurial activity had been neglected or overlooked in the innovation or business ecosystem studies (Hakala et al., 2020). Consequently, the literature expanded with entrepreneurial ecosystems (EE) as a new concept. EE introduce a systemic view in order to complement the limited traditional individual view of entrepreneurship with its collective and contextual dimensions (Cavallo et al., 2018, Stam et al., 2019; Alves, 2020). There is growing literature analyzing EE from a conceptual lens. Yet, EE have not uniform or commonly accepted definition, being open to different interpretations (Roundy et al., 2018; Catner et al., 2021), where the scale of analysis, actors and processes it is still fuzzy (Miles, 2018). The lack of conceptual convergence considered to allow more breadth and multi-disciplinarity (Audretsch et al., 2019). Thus, there are a diversity of views of what constitute an EE, standing out three of them: structural, actor, evolutionary.

Some scholars have defined EE from a structural-oriented view, attending to the set of core factors that make up an EE (Isenberg, 2010; Audretsch & Belitisk, 2016; Spiegel, 2017). For instance, Isenberg, 2010 referred to EE as “a set of individual elements such as leadership, culture, capital markets and open-minded customers combining in complex ways”. Spiegel in 2017 broaden the definition by pointing that “EE are

the combination of social, political, cultural and economic elements in a region". Many empirical studies are linked with this structural approach of the EE, focusing on different levels and elements of the EE. Some scholars have contributed at international levels by testing multidimensional factor frameworks that shape EEs condition, highlighting the factors that enhance or hinder their activity to achieve aggregate and consistent perspectives across countries (Acs, 2018; Hechavarría & Ingram, 2019; Pita et al., 2021). Besides these contributions, traditionally the empirical analysis of EE had been mainly concentrated on regional levels (Carayannis et al., 2017; Erina et al., 2017; Stam et al., 2019; Keith, 2021), focused on top start-ups areas or on high growth entrepreneurial regions in developed countries (Alves et al., 2020, Bichler et al., 2021). Thus, there is a plethora of studies comparing factors across different UE regions (Content et al., 2019; Audretsch et al., 2020). However, these broad analyses had tended to overlook that EE are deeply embedded in their local context and these contexts can be very heterogeneous (Alves et al., 2020). This void has been covered with studies at local levels. Mainly they have analyzed the factors in cities in developed countries where ecosystems could thrive (Spiegel, 2017) or could find difficulties (Bendickson, 2017). The influence of this factors model centered in cities has been questioned in emerging economies (Alves et al., 2020; Audretsch, 2021), small towns (Roundy et al., 2018) and rural areas (Miles et al., 2018), where leadership play a central role to adapt to the specific circumstances. Four aspects stood out from this view: (1) the focus on economic outcomes (rates, performance, resilience), (2) the importance of the context (3) a macro-perspective to better conceptualize and map the determinants of EE and (4) the long laundry list of factors that lack understanding of cause and effect (Stam, 2014).

There was a called of attention to get more insights into social aspects (Bounken, 2018). Thus, other scholars, have focused on a more actor-oriented view attending to social aspects by analyzing the characteristics, the relationships and interactions of the different actors (Salmaador and Bueno, 2005; Cohen, 2006; Regele & Neck, 2012; Mason & Brown, 2014; Roundy et al., 2018). Thus, at conceptual levels some authors have emphasized those aspects such as Mason & Brown 2014, pointing the importance of the role play by the informal relations, Regele & Neck, 2012 indicating the relevance of some events on actors' interactions or Scott, 2021 marking that EE rely centrally on networks. At empirical level, some studies have concentrated on different social aspects such as the role of embeddedness in EE placed in rural areas (Bichler et al., 2020) or the role networks play in EE focusing on all the ecosystem actors (Neumeyer et al., 2019) or on traditionally neglected groups such as women (McAdam et al., 2019; Neumeyer et al., 2019) or migrants (Schafer et al., 2018). Those studies have contributed to understand the role, situation and position of different actors in EE, contributing to acknowledge the diversity of actors. As well, the multiple forms of governance mechanisms that can shape an EE have been analyzed in deep (Colombo, 2019; Cunningham, 2020). EE can be top-down or bottom-up and traditionally this bottom-up perspective (top start-ups areas or on high growth entrepreneurial regions) has prevailed. However, relying mainly on actor-oriented view specially on their characterization waters down the idea that social relationships evolve (Scott, 2021).

In both structural-oriented and actor-oriented approach, it is possible to corroborate Brown & Manson, 2017 statement that "EEs are a highly varied, multi-actor and multi-scalar phenomenon". Other scholars, as Audretsch X and Catner et al., 2020, have added that EEs need also to be conceptualized as multitemporal.

This evolutionary-oriented view has allowed responding to the recurrent criticism about the predominant static analysis of the topic, providing a sense of how historical context, culture and the institutional setting impact EEs (Mack, 2020). Thus, at empirical levels, some scholars have contributed by analyzing the evolutionary dynamics of EE concentrating on its different phases. There is a general agreement on considering four or five phases of the EE lifecycle: emergence, growth, maturity, decline and renewal (Catner et al., 2020). Scholars has mainly analyzed the inherent dynamics in EEs of the different phases integrating a variety of aspects such as behavioral and governance characteristics (Scott et al., 2021), learning (Pugh et al., 2021), and structural characteristics of EE (Mack & Mayer, 2020).

The joint of the three main views identified in a holistic one has been considered by some authors key to getting insights into social change processes (Stam, 2014; Roundy et al., 2018). The impact of change is almost always measured with regards to statistic indicators. If at all, social change is measured as social capital and knowledge (spillovers and learnings). Other understandings could enhance knowledge about ecosystems and social change.

## 2.4. Innovation and innovative initiatives in the rural areas

### 2.4.1. Innovation

Innovation is widely used in different contexts as a theoretical concept for change. In general, innovation has been defined as “the introduction of new things, ideas or ways of doing something” (Jonathan, 1995). It differs from the term invention, which refers to the process of “producing or designing something that has not existed before” (Jonatahn, 1995), because it describes “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003). The novelty of innovation refers to an individual or group rather than its newness as a whole (Rogers, 2003). Douthwaite et al. (2009) added that innovation is “a process by which invention is put to use”.

Innovation processes have been approached from different disciplines and theoretical approaches in rural areas. However, most of the studies have focused on some particular aspect of the phenomenon, prioritizing mainly the analysis of linear models and a conception in terms of technological determinism through economic studies of technological change (Flor et al., 2016; Freeman et al., 2020). In that sense, the agriculture sector in the rural areas has evolved very quickly in technical terms, becoming at the same time more dehumanized, as the focus has been on technology-driven innovation to promote their transformation.

Technology-driven innovations have a very extensive literature and can be thought of as (1) an optimum stable input with fixed features or (2) heterogeneous, socially integrated and power-related hardware, where its roles and effects are not set, but in different contexts or social groups may be interpreted differently (Hermans et al., 2013; Garb and Friedlander, 2014; Akullo et al., 2018; Alexander et al., 2020). Agricultural technology innovation ranges from engineering and/or biological new or improved single inputs or practices to package and information-intensive innovation where management capacity is needed to adopt and adapt them successfully.

As in the rural areas, the industrial agriculture paradigm still prevails, having yet to take a multifunctional approach to agriculture (Foran et al., 2014; Wigboldus et al., 2016). Therefore, the development and diffusion of innovations are primarily seen as a linear top-down process, largely supply-driven, generated by science and transferred to end-users (Islam et al., 2013). As Thompson et al. (2007, p. 41) stated “Years of field experience has shown that innovations for improving rural areas need to address not only the technical challenges confronting small farmers and local resource managers, but also key socio-cultural and political-economic dimensions such as gender roles and relations, power relations, community organisations and institutional arrangements, collective action, property rights and land tenure, policy processes and governance regimes”. In that sense, over the last two decades, a subtle shift from technology-oriented perspectives to systems-oriented approaches to innovation has occurred. Innovation is no longer just about adopting new technologies but a complex, interactive process in which there is a large amount of co-evolution of scientific, technological and societal systems embedded in a specific context that determines how actors behave and interact (Hall et al., 2003; Knickel et al., 2009; Klerkx et al., 2012; World Bank, 2006). The linear representation of innovation still prevails, but systemic approaches emphasize the needs of the demand side and the active involvement of the stakeholders (Edquist and Hommen, 1999; Oudshoorn and Pinch, 2003). Hence, several stakeholders are increasingly seen as relevant to the generation of innovation, including research staff, development agencies; NGOs; private companies; entrepreneurs, artisans and farmers themselves (Biggs, 1990). The grouping of actors has its own agenda, and these agendas may often be conflicting and contested. This situation requires efforts to create effective linkages (Geels, 2004) and engage in negotiation and joint social learning to shape innovation.

For rural areas to be effectively inserted in the globalized context, not only technological but also social innovation must be promoted. According to Bock (2012) the concept of social innovation arises from the criticism of traditional theories of innovation focused on material or technological innovations, scientific knowledge and economic rationality. Social innovation is a complex and multidimensional concept as any new or useful solution - more efficient, effective, sustainable or fair - to a social problem, through which the benefits are mainly directed to society. Thus, social innovation could be understood as finding new ways to satisfy social needs, for example producing the behavioral changes necessary to solve problems, empowering citizens and generating new social relationships and new models of collaboration. In this sense, social innovation is bidirectional, that is, innovative in itself and useful to enable society to innovate (European Commission, 2020). The success and thus the sustain of innovations in rural areas is highly related to the translation of people needs into feasibly policies. It is necessary to establish agreements or rely on policies or initiatives to produce innovation that takes advantage of specific resources and territorial social capital through strategies linked to local knowledge. In this way, it will be possible to alleviate the inertial territorial decline of rural areas and progress towards social changes for both the individual and the groups.

#### 2.4.2. Innovative initiatives

The European Union worked extensively on the concept of social innovation related to regional policy, thus, innovation would manifest itself in three aspects: the diversification of local economies; the

intensification of interactions between the local and global contexts, and the deepening of relationships between local agents, focused on achieving new internal or local synergies. Many authors agree that in the European Union the release of the communication “The Future of the Rural World” in 1988, paved the way for the transformation of the rural areas. In the communication, three novel elements were presented: a) overcoming the sectoral vision of the rural world and starting to consider it as a territory, b) expanding the objectives of agriculture, incorporating social demands such as environmental and heritage conservation, c) integrating agricultural development in a multisectoral approach aimed at economic diversification. In this way, the dominant view based on the industrial-productivist paradigm change to a new one, based on sustainable development from a new territorial perspective. Territorial and social cohesion had been considered as fundamental to face globalization processes in the rural areas of the European Union and the reduction of territorial gaps and strengthening rural-urban links must be approached. In that sense, a proper institutional architecture must be sustained to boost the change.

The European initiative LEADER<sup>2</sup> program was created in 1991. At that time, it was considered a very innovative initiative (Osti, 2002; Shucksmith, 2002) due to the LEADER program aimed to back rural development projects set up at local levels to revive rural areas and generate employment. In the LEADER methodology<sup>3</sup>, we find innovative principles of the program for the rural areas such as the bottom-up elaboration and implementation of integrated and multisector actions, the explicit references to innovation, networking and cooperation in the actions and their articulation through the creation of local public-private partnerships based on the territories called Local Action Groups (LAGs). Since its creation, the LEADER program has evolved along every programming period and specifically in the 2007-2013 period has introduced major changes mainly related to its fund mechanisms and its position in the European Policy (Esparcia, 2015; Navarro, 2015). These changes have weakened the original principles of LEADER, by increasing the bureaucracy and reducing the available funds and with them affecting the experimental nature of the initiative (Navarro, 2015). The elements of success and failure of the LEADER program have been extensively studied not only under the umbrella of European, national and regional institutions but also in academic literature. Academic literature has pointed out the overly economic emphasis of the institutional evaluations (Shortall, 2005, Dargan, 2008); however, it has faced itself obstacles to embed LEADER into a specific analytical framework (Osti, 2002; Neumier, 2011), leading to fragmentation and difficulties to make comparisons and generalizations.

At a theoretical level, the academic literature has been questioning the inconsistencies between the methodological principles of the LEADER initiative and how they have been actually putting into practice. Particularly, the rhetoric behind concepts such as the bottom-up approach (High, 2007; Aagard, 2009; Bosworth et al., 2015) and innovation (Dargan, 2008; Neumier, 2011) has been widely discussed. Social capital has been one of the most frequently studied topics not only from a theoretical perspective based on Putnam’s or Bourdieu’s concept but also from its practical implications such as the dilemma of

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<sup>2</sup> LEADER came from the French acronym for ‘Liaison Entre Actions de Développement de l’Économie Rurale’, meaning ‘Links between the rural economy and development actions’.

<sup>3</sup>

participation ([Shucksmith, 2002](#); [Lee, 2005](#)) and the inclusion/exclusion of certain social groups ([Couso et al., 2006](#)) in LAGs. At empirical levels, the inclusion/exclusion issues have been analyzed as well from a governance perspective focusing on aspects such as the legitimacy and clientelism in LAGs ([Shortall et al., 2008](#)). Also, questions related to power and institutional learning has been encompassed ([Wellbrock and Knierim, 2014](#); [Esparcia, 2015](#)). We can observe by revisiting the academic literature some patterns. The LEADER methodology in general and the LAGs in particular have raised interest for analyzing its performance specially from sociological and institutional approaches (more intangible basis). To date, expert knowledge from LEADER managers or other related professionals (decision-makers) have been the most widely represented while the opinion of the LAG's member has been informed in few studies. This pattern is changing lately due to the current tendency to value hybridation, combining expert knowledge and tacit knowledge, in order to not inhibit the understanding of the whole process. Thus, transformations in rural areas cannot explain solely as a consequence of the advancement of decentralization processes through political initiatives, but as a result of a more complex set of factors arising from the territories themselves, with the mobilization and action of local, public and private actors ([Albuquerque, 2008](#)).

### 3. Analyzing innovation in the rural areas: An integrative review of innovations in the agricultural sector from an actor-centered approach

**Abstract:** This paper aims to improve the understanding of the individuals' roles and the importance of their social contexts in shaping innovation processes in the agricultural sector. Extant literature reviews on innovation in this sector place great emphasis on the drivers of technological changes. Despite this, some literature reviews have started devoting attention to the cognitive processes of individual farmers and their social contexts when justifying the different rates and frequencies of innovation adoption in the agricultural sector. However, there is still a fragmented view on how local social systems impact the innovation process in agriculture. By drawing on the actor-centered approach, we present an integrative review of the most relevant papers published in the last 20 years. Three macro categories emerge which describe the main processes affecting individuals' capabilities to mobilize and manage local resources for innovation. These macro categories are: decision-making processes, knowledge management processes and governance mechanisms in local social systems. These categories are broken up into six themes, which we critically assess to take stock of past developments and suggest novel avenues for research.

**Keywords:** agricultural sector, innovation, integrative review, research agenda, decision-making, knowledge management, governance mechanisms, actor-centered approach

### 3.1. Introduction

All over the world, population growth, urban development, new consumer demands, globalization, depletion of natural resources and climate change are leading to significant changes in farming practices (Lamprinou et al., 2014; Tsinigo and Behrman, 2017; Alomia-Hinojosa et al., 2018), where the innovation process plays a key role (e.g., Wright, 2012; Mutenje et al., 2016; Pant, 2016; Roberts and Geels, 2019). The last decade has seen a flurry of publications (Prost et al., 2018) examining diverse aspects and topics related to the innovation process in the agricultural sector from the perspective of value chains (Devaux et al., 2018), transition process and sustainability (El Bilali, 2018), innovation systems and knowledge communities (Touzard et al., 2015), and constraint-based innovation (Molina-Maturano et al., 2019).

Notwithstanding the heterogeneity of such perspectives, three approaches to the innovation process in the agricultural sector emerge. A linear vision of the innovation process represents the stance of the first approach, traditional knowledge transfer (also known as technology supply push or pipeline model), that sees innovation as the outcome of scientific research (Mwaseba et al., 2006; Spielman et al., 2008; Faure et al., 2018). To address the shortcomings of science's central role, in a subsequent step, innovation has considered the interactive processes of developing and implementing a new idea, technique, know-how, or institution (Poncet et al., 2010). Under this logic emerges the second approach, farming system, considered as a learning process that consists of collecting, integrating, and evaluating novel information, through which farmers acquire skills to apply the innovation to their circumstances (Pannell et al., 2006; Alexander et al., 2020; Deffontaines et al., 2020). These two approaches have been marked by a strong technological and institutional determinism. Eventually, empirical research started increasingly revolving around a systemic thinking, emerging a third approach, innovation systems, which examines mostly the macro-level perspectives and attaching more importance not only to institutional roles, but also to social interactions among different stakeholders (Lamprinou et al., 2014; Kebebe et al., 2015; Turner et al., 2016).

In fact, despite innovation has been conceived as a continuously evolving process, composed by complex and intertwined set of events including many different activities, decisions, individual behaviors and social systems (Damanpour, 1991), in the agricultural sector it has been more recently understood as the individual and collective processes of technological, socio-organizational, political, and institutional transition impacting multiple actors at multiple levels (Röling, 2009; Klerkx et al., 2010; Hounkonnou, 2012; Kilelu et al., 2013).

Along these lines of reasoning, some other scholars have started underlining the relevance of a actor-centered approach to the analysis and development of innovation processes in agricultural sector (see Korten, 1987; Meyer et al., 2013; Holmes and Potvin, 2014; Figueroa, 2015; Adelman and Verkuyten, 2020; Marchezini, 2020), recalling the systemic nature of technological innovation transforming the world of the innovator and invention alike and whose diffusion depends on the interaction between the system seen as the "whole" and the elements such as people contained in the "whole" (see also Spies, 2014).

However, despite this approach has become a subject of some interest in these studies, there is still the tendency to consider new artifacts —such as tractors, fertilizer hybrid seed, and so on—as technology, per se” neglecting to explicitly connect the design and management of technological innovation to the development of socio-cognitive processes removing obstructions to the acceptance and usage of new technologies by individuals and being bonded in local conditions, practices, competencies and culture.

Anchored in Schumpeter’s (1942, 1950) work which referred to the “creative destruction” implications of technological innovation and Schumacher (1973) proposing “actor-centered” technology, which he calls “appropriate technology, we use the term actor-centered approach to mean an approach emphasizing the need to boost institutional and social capacity supportive of greater local control, accountability, initiative, and resilience. We place high priority on socio-cognitive processes underlying the democratization of the innovation process where people are encouraged to mobilize and manage their own local resources, and with institutions playing an enabling role.

Where such a decentralized, self-organizing approaches to the management of development resources are seriously undertaken, they generally result in more efficient and productive resource management, a reduction in dependence on external resources, increased equity, increased local initiative and accountability, and a strengthening of economic discipline.

Finally, there is a growing interest in putting people at the center of the innovation processes as the worldwide 2030 Agenda for Sustainable Development<sup>4</sup> explicitly emphasizes that scaling up innovation in the agricultural sector requires more than new technologies; rather, it requires that multiple stakeholders adopt more effective knowledge management practices and develop a better understanding of pathways. Governments – working with academia, civil society, farmer organizations and the private sector – must create conditions that will enable the innovation process to flourish, linking these various actors, fostering the capacity of farmers and other stakeholders, and providing incentives for the innovation process.

The growing social interest on the actor-centered approach as frame to analyse innovation in agriculture suggests that the process of democratization of the innovation process is a relevant phenomenon that needs to be conceptualized and theorized on its own. Therefore, while innovation and the capability to establish a decentralized system of control giving people both the opportunity and the incentives to mobile local resouces in the service of themselves and of their communités are unquestionably related, research on the actor-centered approach on the analysis of innovation processes introduces an additional theoretic and empirical question: *What are the main processes and mechanisms sustaining actor-centered approaches to the management of resources to foster local innovation efforts in the agricultural sector?* This relevant question is not currently raised, managed, and answered, mirroring the current status of the research in the innovation literature in agricultural sector.

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<sup>4</sup> <https://sustainabledevelopment.un.org/post2015/transformingourworld>

Accordingly, the aim of this study is to take stock of the literature on innovation in the agricultural sector, evaluate it in order to detect the main processes involved in the realization of the actor-centered approach to innovation, and outline avenues for future research.

### 3.2. Methodology

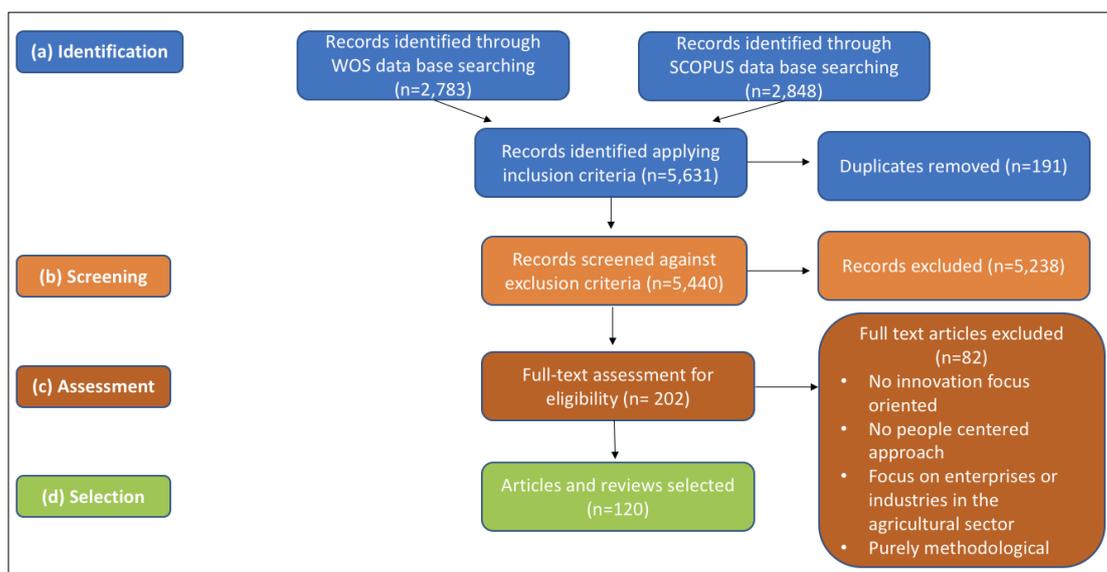
The conceptualization is grounded on an integrative review of extant literature (Elsbach and Van Knippenberg, 2020). Integrative reviews offer new insights (theoretical and/or conceptual) that arise from a synthesis and/or critique of extant research. Our view is in line with what Post et al. (2020, p. 354) report namely, ‘articles that review a body of work contribute to theory when they do not merely report on previous literature but, rather, analyse and synthesize the research to generate new ways of conceiving of a given field or phenomenon’. The resulting reflective mode contributes to research by first, providing a holistic perspective on the topic in question and second, organizing the existing body of knowledge in meaningful ways. To track and bring clarity to the integrative process, we follow Tranfield et al.’s (2003) generic principles in order to (1) frame the objective, (2) execute the process, and (3) present the results.

#### 3.2.1. Framing the objective

Since major emphasis is placed on the implications of democratizing the innovation processes, giving people operating in the agricultural sector a central role and shedding light on the way they can mobilise resources and take advantage in order to innovate, we frame the overall objective by recalling the main research question: *What are the main processes and mechanisms sustaining actor-centered approaches to the management of resources to foster local innovation efforts in the agricultural sector?*

#### 3.2.2. Executing the process

In the second step, we develop our literature search strategy consisting of four actions: (a) identification, (b) screening, (c) assessment, and (d) selection. Figure 1 summarizes the literature search strategy.



**Figure 1.** Literature search strategy

We rely on two major bibliographical databases, Web of Science<sup>5</sup> and Scopus<sup>6</sup>, because of their wide coverage of relevant literature and advanced bibliometric features (Gavel and Iselid, 2008; Falagas et al., 2008).

Concerning the identification action (a), we aim to gain insights into the agricultural innovation process; looking only for documents that contain the word ‘agriculture’ would provide a narrow view as there are many overlaps. Thus, we also selected a highly related term such as ‘rural’ in order to collect relevant articles that may have been missing. Hence, we searched first, for all documents indexed in Web of Science containing the Boolean queries “innovat\* AND agri\*” and “innovat\* AND rural\*” in the topic search, setting as inclusion criteria: articles or reviews published in English and in peer-reviewed journals ranked in both agriculture and business economics domains and published from 2000 to 2020. This led to 2,783 contributions.

A second search for the aforementioned two strings was conducted via the Scopus search engine through the “title, abstract, keywords” feature, adding as inclusion criteria: articles or reviews published in English and in peer-reviewed journals ranked in agricultural and biological sciences; business, management & account and economics, econometrics & finance domains published from 2000 to 2020. This second search yielded 2,848 contributions. Therefore, 5,631 contributions in total were retrieved. Omitting duplicates (191), we got 5,440 contributions. The 5,440 were then screened (action b) by checking titles and abstracts and reviewed against the exclusion criteria. We excluded contributions that were not ranked in Q1/Q2 journals in the Journal Citation Reports. We retained 202 contributions. Finally, the selected contributions were assessed (i.e. action c). We read the contributions and checked whether they could be related to the research objective and excluded those that: were not clearly innovation-oriented, did not use put emphasis on the socio-cognitive processes sustaining a variety individuals in the adoption, creation and/or usage of innovations and therefore not mirroring the actor-centered approach, had industries and enterprises as main unit of analysis, and showed mainly methodological contributions. Accordingly, 120 contributions were retained (i.e. action d). The remaining 120 contributions were recorded in a data sheet that was instrumental to perform an additional quality control stage.

**Table 1.** Summary and classification of the core 120 contributions

<b>Journal</b>	<b>Ranking JCR</b>	<b>Type of study</b>	<b>Type of approach</b>	<b>Type of analysis</b>	<b>Analized countries</b>
(37) Agricultural Systems	Q1	(36) Article	(34) Empirical	(16) Quantitative	Ethiopia (2), Italy (2), Malawi (2), Mexico, The Netherlands, Benin, Australia, China, United Kingdom, Chile, Ireland, Sierra Leone, Canada, Nigeria, Niger, Rwanda, Uganda, R.D. Congo, Mozambique.

<sup>5</sup> <https://clarivate.com/webofsciencegroup/solutions/web-of-science/>

<sup>6</sup> <https://www.scopus.com/home.uri>

				(18) Qualitative	Ghana (3), Kenya (2), The Netherlands (2), Rwanda (2), United Kingdom (2), Burkina Faso, Cameroon, Senegal, Martinique, Tunisia, Australia, Belgium, Argelia, Bolivia, Ethiopia, Peru, Uganda, France, Burundi, R.D. Congo, Zimbabwe, China, Benin.
		(1) Review	(2) Theoretical	Qualitative	Benin, Ghana, Mali
					n/a
(13) Outlook on Agriculture	Q2	(13) Article	(10) Empirical	(8) Qualitative	(2) Quantitative Malawi, Tanzania New Zealand (3), Ghana, Benin, England, Belgium, Malawi, Nigeria, Zimbabwe, India, The Netherlands
			(3) Theoretical	Qualitative	Belgium, Benin, Ghana
(12) Agriculture and Human Values	Q1	(12) Article	(11) Empirical	(7) Quantitative	Ethiopia (2), Kenya, Ghana, Lao, Nicaragua, El Salvador, Thailand, Honduras
				(4) Qualitative	Vietnam, Togo, United States of America, China
			(1) Theoretical	Qualitative	n/a
				(2) Quantitative	Bangladesh, Japan
(9) International Journal of Agricultural Sustainability	Q1	(9) Article	(9) Empirical	(7) Qualitative	Burkina Faso (3), Benin (3), Uganda (2), Ghana (2), Kenya (2), Nepal, Indonesia, Malawi, Mozambique, Zambia, Ethiopia, Nigeria, Benin, Tanzania, Sudan, Rwanda, Cameroon, Swaziland, Mali
(8) Agricultural Economics	Q1	(8) Article	(8) Empirical	(8) Quantitative	Ethiopia (2), Benin, Turkey, Australia, Sri Lanka, Kenya, India
(7) Renewable Agriculture and Food Systems	Q1	(7) Article	(7) Empirical	(4) Quantitative	Ghana (2), Nigeria, United States of America
				(3) Qualitative	Cuba (2), Australia
(7) Njas-Wageningen Journal of Life Sciences	Q1	(7) Article	(7) Empirical	(1) Quantitative	Ghana
				(6) Qualitative	Ghana (3), Myanmar, Benin, New Zealand
(6) Journal of Sustainable Agriculture	Q1	(6) Article	(6) Empirical	(4) Quantitative	India, Malawi, Brazil, Spain
				(2) Qualitative	Kenya, United States of America
(4) Experimental Agriculture	Q1	(4) Article	(4) Empirical	(4) Qualitative	Uganda (2), Burundi (2), Rwanda (2), DR Congo (2), Kenya (2), Nicaragua, Uganda, Ethiopia, India, Burkina Faso
(3) Precision Agriculture	Q1	(2) Article	(2) Empirical	(2) Quantitative	Germany (2), Greece (2), Spain, United Kingdom, The Netherlands, Serbia, France, Czech Republic, Denmark
		(1) Review	Theoretical	Qualitative	n/a

(2) Australian Journal of Agricultural and Resource Economics	Q2	(2) Article	(2) Empirical	(2) Quantitative	New Zealand, United Kingdom
(2) Agroforestry Systems	Q2	(2) Article	(2) Empirical	(2) Quantitative	Indonesia, Cameroon
(2) Crop protection	Q1	(2) Article	(1) Empirical (1) Theoretical	Quantitative Qualitative	Tanzania (2), Kenya, Uganda, Ethiopia, Benin
(1) American Journal of Alternative Agriculture	Q1	Article	Empirical	Quantitative	Canada
(1) American Journal of Agricultural Economics	Q1	Article	Empirical	Quantitative	Greece
(1) California Agriculture	Q1	Article	Empirical	Quantitative	United States of America
(1) Agronomy	Q1	Article	Empirical	Quantitative	Uganda
(1) European Review of Agricultural Economics	Q2	Article	Empirical	Quantitative	DR Congo, Rwanda and Uganda
(1) Australian Journal of Experimental Agriculture	Q1	Review	Theoretical	Qualitative	Australia
(1) Field Crops Research	Q1	Article	Empirical	Qualitative	Australia
(1) Livestock Science	Q1	Article	Empirical	Quantitative	Mexico

The number of publications has gradually increased from the 2000 to 2020. Table 1 shows that the topic has been covered by 21 different journals (17 categorized as Q1 and 4 categorized as Q2 in the Journal Citation Reports<sup>7</sup>), most of them ranked in the agriculture multidisciplinary research area.

The most important journals, according to the number of publications selected are: *Agricultural Systems*, *Outlook on Agriculture*, and *Agricultural and Human Values*. The sample contains 117 articles and 3 reviews. Approximately 9% of the contributions are theoretical and 91% are empirical. Among the empirical documents, 53% are qualitative and 47% are quantitative.

In terms of geographical distribution, 43% originated in Africa, 17% were carried out in Europe, 13% in America and Asia, 8% came from Oceania, and the remaining 4% were comparative studies between regions and non-region-oriented studies. For country-specific patterns, Ghana represented the highest number (n = 7) of studies, while Ethiopia and New Zealand each represented six studies; 25 studies covered more than one country.

### 3.2.3. Presenting the results

In order to present the results, an inductive qualitative content analysis was applied by following [Mayring's \(2003\)](#), [Creswell's \(2017\)](#), and [Post et al.'s \(2020\)](#) suggestions.

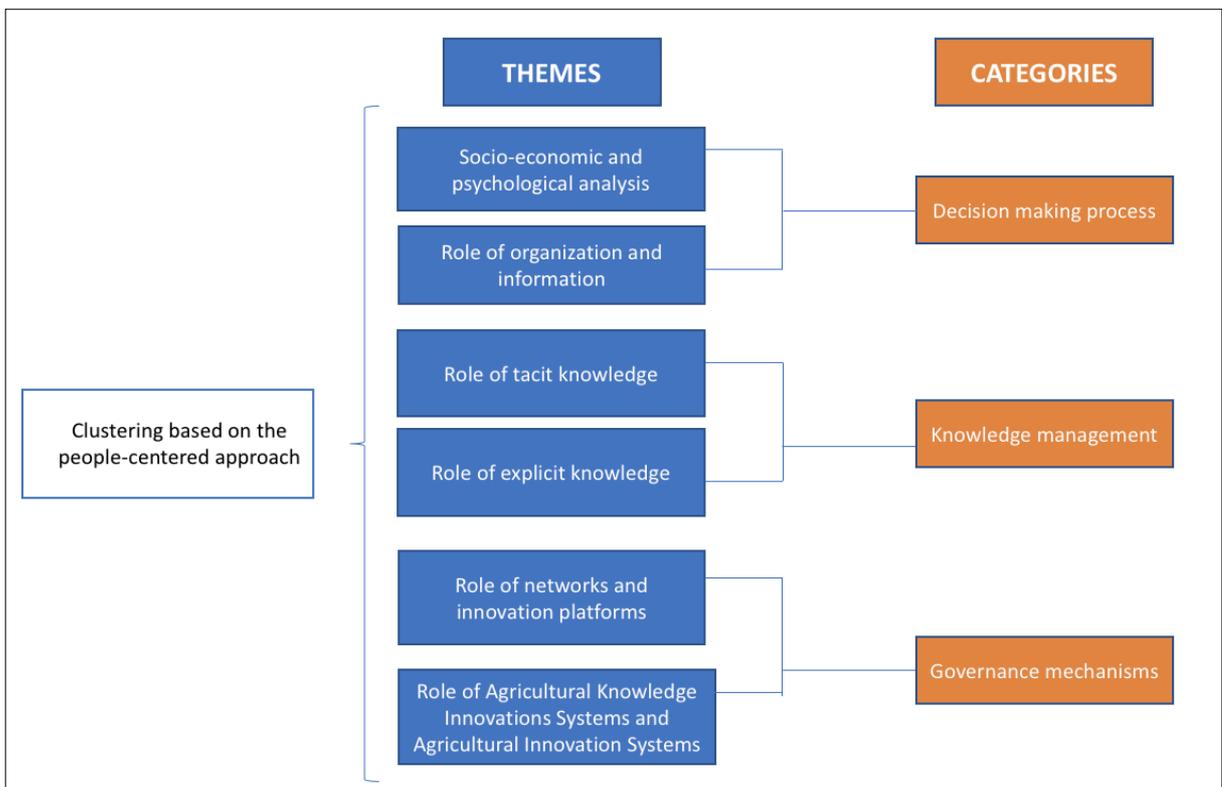
Keeping in mind our main research question, for each of the selected articles, we all discussed around the following key questions: what is the purpose of the article? What is the research question? Why is this research important and which gaps does it address? Which key definitions have been used? What are the key units of analysis? What is the theory used and tested? What is the nature of collected and analysed

<sup>7</sup> <https://clarivate.com/webofsciencgroup/solutions/journal-citation-reports/>

data? What are the key findings and implications? This was instrumental to decipher the main emerging themes; then, we created a thematically focused table of summarized information followed by the list of references that were somewhat connected to each theme. A second round of in-depth reading was performed in order to identify the red thread connecting multiple sources under the umbrella of a common theme. We carried out this second step by providing an answer to the following questions: what do the analysed contributions have in common? What is it that makes them different one another? Which key themes do emerge? This was instrumental to avoid thematic overlapping and consolidate the table of summarized information.

Second, by clustering the emerging themes, we established the main categories, using an iterative method to define, check, and evaluate them (see Figure 2). The decision over the categories was made by performing semi-structured brainstorming sessions among the three or four researchers. Hence, the six identified themes were classified into three main categories describing the main social-cognitive processes underlying the innovation processes enacted by individuals within their social systems: (i) the decision-making processes; (ii) knowledge management processes; (iii) governance mechanisms.

Without claiming that these are the only streams in research, we believe that these paths are major avenues in the current literature base to understand the innovation process in the agricultural sector from a actor-centered approach. Through the analysis of these processes, main insights on how addressing institutional processes supportive of individual capabilities to mobilize and manage local resources for innovation in agricultural sector can be drawn.



**Figure 2.** Content analysis chart

### 3.3. Results

This section provides a comprehensive analysis and discussion of the main contributions characterizing each theme in each category (see Figure 2). We introduce the discussion on each category with a subsection outlining the emerging general trends and we end up with a table summarizing the main takeaways.

#### 3.3.1. Decision-making process

The first emerging category (see Figure 2) pertains to the decision-making processes and is described by two emerging themes: socio-economic and psychological analysis, and the role of organization and information. The general trends of the category introduce the two themes.

##### 3.3.1.1. *General trends*

This core theme in the literature deals with understanding the fundamental and complex decisions stakeholders have to make when adopting innovations (see Makkonen et al., 2016; Hunecke et al., 2017; Tsinigo and Behrman, 2017; Bonisoli et al., 2018; Arulnathan et al., 2020). Studies are mostly empirical, based on a micro-level perspective with the farmer traditionally as the principal unit of analysis. For a long time, researchers have been trying to understand the decision-making process and finding explanations to the farmers' low uptake of agricultural innovations, especially in developing countries. There is a vast literature investigating farmers' decision-making process under binary logics (adoption vs non-adoption decisions) especially in Africa (Wandel and Smithers, 2000; Thangata and Alavalapati, 2003; Herath and Takeya, 2003). Thus, traditionally there is a lack of better understanding about the different stages or discontinuities (e.g., partial adoption, dis-adoption, abandonment) in the innovation process (Mwaseba et al., 2006; Alexander et al., 2020). All these studies have been in line with the linear approach of the innovation process in the agricultural sector; however, since the approaches of the innovation process has been evolving, we find lately more studies focusing on multiple set of actors. The importance of local circumstances gained ground in multilevel studies especially, which apply systemic perspectives and participatory tools (Goldberger, 2008; Abebe et al., 2013; Kamara et al., 2019). These studies show a partial change from the linear approach to a more systemic and endogenous one and apply a variety of different theories.

##### 3.3.1.2. *The socio-economic and psychological analysis in the decision-making process*

To gain insights into the decision-making process most of the studies have taken a socioeconomic orientation. From a theoretical perspective some reviews (Sumberg, 2005; Pannell et al., 2006; Tey and Brindal, 2012) have revealed the most important aspects farmers face during the decision-making process: prerequisites conditions, constraints in context and future directions. Empirical studies revolved mainly around perception queries undertaken under different point of views. Some authors have studied perception according to the individual farmers' experiences regarding the innovation process (Goldberger et al., 2015; Alomia-Hinojosa et al., 2018; Alexander et al., 2020), promotion of the innovations (Masangano and Miles,

2004; Parra et al., 2007; Mbosso et al., 2015), level of risk aversion (Ghadim et al., 2005; Koundouri et al., 2006) and the gender-based disparities (Ogunlana, 2004; Murage et al., 2015). Murage et al., 2015 has carried out in four different African countries one of the few comparative analysis that we found (Probst et al., 2012; Kernecker et al., 2020). These comparative studies along with studies using systemic approaches (Cafer and Rikoon, 2018; Alexander et al., 2020) or even acknowledging the relevant role of institutions (Nederlof and Dangbégnon, 2007; Totin et al., 2012; Orr, 2018), are the few notable exceptions of empirical studies that have been able to unravel the farmers' constraints rooted beyond individual levels. The reason is that the linear approach of innovation has traditionally dominated the analysis, embodied through the extended use of the 'adoption and diffusion of innovations' theory proposed by Rogers (2003). As the results have always been very limited, considering the local engagement through participatory approaches with farmers (Wandel and Smithers, 2000; Thangata and Alavalapati, 2003; Alomia-Hinojosa et al., 2018) or with agricultural professionals (Wheeler, 2008; Lubell and McRoberts, 2018) have been applied to better understand changing attitudes and behaviours. Behaviours have received less attention than perception, although we find studies about motivations related to risk attitudes (Greiner et al., 2009) and different profiles of farmers according to their attitudes facing the innovation process (Cavallo et al., 2014)

Understanding farmers' behaviours from a different psychological stance is gaining ground on decision-making studies to the extent in which farmer mental health status has been investigated (Hounsome et al., 2006). Hence, some studies have started to consider that cognitive and socio-psychological factors can affect farmer's decision. In a step forward, some authors have applied different theories from the field of social psychology to gain more insights through empirical studies worldwide. 'Theory of reasoned action' (TRA) (Fishbein and Ajzen, 1975) and 'Theory of planned behaviour' (TPB) (Ajzen, 1991) have been used to identify not only farmer's perceptions (Martinez-Garcia et al., 2013; Meijer et al., 2014; Hyland et al., 2018) but also the perception of agricultural professionals (i.e. extension officers, researchers, scientists and academics) (Kamara et al., 2019). Beyond the TRA and TPB theories, which have been criticized for being reductionists (Meijer et al., 2014), other theories such as 'Value Orientation Theory' (Schwartz, 1992), that are considered to lead to more generalizations, have been applied for instance to analyse the motivations to adapt farmers' behaviour in Ireland (Hammond et al., 2017).

More generalizable findings, that can contribute to a broader integration and conceptualization, have been a longstanding objective in socio-economic and psychological oriented decision-making studies. Given the complexity of the process and heterogeneity of circumstances, some studies have categorized farmers into structural sets according to specific criteria (Cavallo et al., 2014; Hammond et al., 2017; Tsinigo and Behrman, 2017; Hyland et al., 2018). However, in some cases, addressing the 'average farmer' could bring less success than expected due to their high heterogeneity (Nederlof and Dangbégnon, 2007; Hammond et al., 2017). In this respect, there is always an open debate on how to face the decision-making process, whether actions should point to develop categories in order to promote innovations to a specific group of farmers (Hyland et al., 2018) or it could be better to develop farmers' skills and go beyond targeted groups (Burton et al., 2003).

### 3.3.1.3. *The role of organization and information in the decision-making process*

When the decision-making process is faced by organizational or information-oriented perspectives, we move on to studies that are either collective or individual. They seek to understand how their relationships influence decision-making, being more in line with visions such as the farming system approach. There is a wide consensus on the fundamental role play by networks in farmers' decision-making process due to their influence to facilitate adoption throughout time. Some studies have identified and analyzed individual networks to assess if their influence is more related to behavioural aspects (Matuschke and Qaim, 2009) or to structural aspects (Brown and Roper, 2017). As well, the importance of structural aspects has been encompassed through the analysis of different groups of farmers (Aguilar-Gallegos et al., 2015) to understand their decision-making process using Social Network Analysis, showing graphically relationships and clarifying this kind of decision-making studies. From organizational perspectives, also the Theory of Social Capital has been interpreted to deeper understanding farmers' decision about innovation process. Studies have been focused mainly on how individual's access to social capital influence their decision-making process in a single country (Wossen et al., 2015; Micheels and Nolan, 2016; Hunecke et al., 2017). However, we can also find a comparative study among regions in Africa (Van Rijn et al., 2012). These studies have remarked that social capital has not always a positive effect as it depends on different levels of risk aversion (Wossen et al., 2015) and trust (Van Rijn et al., 2012; Hunecke et al., 2017).

Information has been always considered to be positive for decision-making process. However, the assumption of innovation linear approach that all farmers got homogenous information is not often plausible (Llewellyn, 2007; Kabunga et al., 2012). Neither is realistic to consider that the household head is the sole decision maker disregarding the influence of intra-household spill-over effect of education (Asfaw and Admassie, 2004). Furthermore, the communication behavior of farmers (Boz and Akbay, 2005; Kutter et al., 2011), their engagement with extension systems (Llewellyn, 2007; Abebe et al., 2013), and the information sources that determine the content all do matter (Adegbola and Gardebroke, 2007; Goldberger, 2008; Freeman and Qin, 2020). Improving access and quality of information mitigates uncertainty, enhances learning behavior, reduces the possibly costly period of waiting, and diminishes the risk of a costly wrong decision (Masangano and Miles, 2004; Llewellyn, 2007; Matuschke and Quim, 2009). Newsletters, technical literature, meetings, study tours, exhibitions, and trade shows have been considered important for fostering decision-making (Masangano and Miles, 2004; Llewellyn, 2007; Kutter et al., 2009; Ngutu and Recke, 2006; Menary et al., 2019). Such activities entailing communication, education and persuasion can create the set of conditions required for adoption to occur (Pannell et al., 2006; Goldberger, 2008), especially among women or traditionally under-represented groups. Moreover, they were successful when the information was delivered by researchers and extension professionals based on a local social network (Aguilar et al., 2015; Brown and Roper, 2017; Kamara et al., 2019).

Decision-making studies, no matter their orientation, arises the relevance of not only adopt innovations but the challenge and need to maintain them along time. It seems that really matters which knowledge it is being created and who is involved in this process

Table 2 summarizes the arguments of the last two sections.

**Table 2.** Characterizing decision-making in the innovation process

Level of analysis	Main analytical orientation	Research focus	Representative references
<b>Microlevel approach (individual)</b>	Socioeconomic oriented	Perception	Masangano and Miles, 2004; Ogunlana, 2004; Koundouri et al., 2006; Goldberger et al., 2015; Murage et al., 2015; Alomia-Hinojosa et al., 2018; Alexander et al., 2020
		Behaviour	Greiner et al., 2009; Cavallo et al., 2014
	Psychological oriented	Farmer's perception	Martinez-Garcia et al., 2013; Hyland et al., 2018
		Farmer's behaviour	Hammond et al., 2017
	Organizational oriented	Role of social capital	Wossen et al., 2015; Micheels and Nolan, 2016; Hunecke et al., 2017
		Role of social networks	Matuschke and Qaim, 2009; Brown and Roper, 2017
	Information oriented	Role of information dissemination	Adegbola and Gardebroek, 2007; Kabunga et al., 2012
Communication behavior		Boz and Akbay, 2005	
<b>Macrolevel approach (multistakeholders)</b>	Socioeconomic oriented	Perception	Wheeler, 2008; Cafer and Rikoon, 2018; Lubell and McRoberts, 2018; Kernecker et al., 2020
		Role of institutions	Nederlof and Dangbégnon, 2007; Totin et al., 2012; Orr, 2018
	Psychological oriented	Agricultural professionals' perception	Kamara et al., 2019
	Organizational oriented	Role of social capital	Van Rijn et al., 2012
		Role of social networks	Aguilar-Gallegos et al., 2015
	Information oriented	Role of information dissemination	Goldberger, 2008; Llewellyn, 2007; Abebe et al., 2013
		Communication behaviour	Kutter et al., 2011

### 3.3.2. Knowledge management processes

The second emerging category (see Figure 2) pertains to the knowledge management processes and is described by two emerging themes: the role of tacit knowledge and of explicit knowledge. The general trends of the category introduce the two themes.

#### 3.3.2.1. General trends

The knowledge management category seeks to understand how different stakeholders handle different sources and varieties of knowledge, and the connections among them. This category has been especially well investigated in the global south, Africa, America and Asia. The validity of both the linear and the farming system approach of innovation have been widely discussed. Recognizing that farmers hold valuable knowledge has sparked a gradual shift from top-down to more bottom-up approaches to agricultural innovation. However, even though participatory methods have produced hybrid knowledge, which are the result of amalgamations of previous approaches, scientific knowledge is still privileged over farmers' knowledge. Farmers and scientists have been the principal units of analysis in studies that concentrate on both microlevel and macrolevel. This field occasionally – although rarely – uses theories that extensively interact with the theory of social capital.

### *3.3.2.2. The role of tacit knowledge*

Farmers' tacit knowledge is still often overlooked, and their contribution is frequently ignored. However, in a few studies from developing countries, the role of farmers' local knowledge has become an increasingly relevant source of knowledge for the innovation process. Some authors have considered the performance of local experiments a valid way of creating knowledge and contributing to the innovation process (Bentley, 2006; Kroma, 2006; Leitgeb et al., 2014). Others point out the need for interaction between science and this tacit knowledge, in order to increase the speed of the innovation process (Oliveira et al., 2012; Tambo and Wunscher, 2015). Besides the recognition of farmers' agency and capacity for innovation, building and strengthening this capacity for innovation has been also discussed. The importance of social learning through informal networks (Wu and Pretty, 2004; Kroma, 2006), communities of practice (Dolinska and D'Aquino, 2016) and the use of social referents as expert farmers and opinion leaders (Martini et al., 2017) has been studied. As most social referents are men, the need for gender equity to reach effectively women has been emphasized. All the aforementioned studies reveal that the innovation linear approach and its traditional way of producing and transferring knowledge is being questioned.

### *3.3.2.3. The role of explicit knowledge*

Understanding the learning process is key to facilitating the exchange of knowledge, bridging tacit and explicit knowledge and proposing more feasible changes (Sherwood and Larrea, 2001; Eastwood et al., 2012; Deffontaines et al. 2020). Accordingly, some studies have analyzed the role of agricultural professionals (Eastwood et al., 2012; Deffontaines et al., 2020), while others have concentrated on the role of farmers as leaders of the innovation process (Sherwood and Larrea, 2001; Leitgeb et al., 2011). Beyond understanding the learning process, strengthening local innovative capacity has been a recurrent topic. In developing countries, farmers' capacity for learning new farming methods, as shown in cases such as Farmer Field School and Farmer Field Fora, has been proved to be suitable for provoking new thoughts and exposing both men and women to new ideas (Ngutu and Recke, 2006; Chowdhury et al., 2015; Tambo and Wunscher, 2018). However, the lack of spill over to those who are not directly involved raises questions about lack of inclusiveness and effectiveness; these questions reiterate the need for more structural interventions, like educative actions (Spielman et al., 2008).

One of the main sources of explicit knowledge has always been research. Traditional practices in research have led to deterministic, reductionist and techno-centric actuations in the innovation process (Flor et al., 2016; Coutts et al., 2017; Prost et al., 2018). Thus, even though there are still some studies in which the linear approach of innovation dominates (Sumberg et al., 2003; Naouri, et al., 2020), there has been some reframing of agricultural research. The reframe has been mainly in line with the farming system's approach to innovations. Studies have tried to shed light on the different models of research used in developing countries through multiple case studies (Faure et al. 2018) and the different research approaches of scientist and farmers through both empirical and theoretical studies to optimize collaboration between them (Hoffmann et al., 2007; Prost et al., 2018). Collaboration is not the same as participation, however: the latter involves the engagement of farmers as decision makers and knowledgeable practioners (Flor et al., 2016), whereas the former omits this vital step. Determining the most effective ways concerning forms and levels

of participation has raised tensions around participatory research (Sumberg et al., 2003). Accordingly, many studies have shown this opposition of the participatory research through the limited participation of farmers (Arora, 2012; Lamb et al., 2016; Flor et al., 2017). Similarly, scholars have pointed out that the power relations that provoke a lack of equity criteria to select the participants does undermine the innovation process (Arora, 2012; Friederichsen et al., 2013; Lamb et al., 2016). To tackle these issues, some authors have used Social Network Analysis (Lamb et al., 2016), while other have remarked on the need to incorporate the knowledge and values not only of the farmers, but also of the rest of the stakeholders that might be involved (Klerkx et al., 2012; Coutts et al., 2017).

Knowledge management studies, regardless of the type of knowledge, highlight the importance of the relationships between farmers and scientists and the crucial role played by power relations, but they still hinder the study of other actors' relationships and interactions in depth.

Table 3 summarizes the arguments of the last two sections.

**Table 3.** Characterizing decision-making in the innovation process

Level of analysis	Type of knowledge	Research focus	Representative references
<b>Microlevel approach (individual)</b>	Tacit knowledge	Capacity building and strengthening	Dolinska and D'Aquino, 2016; Martini et al., 2017
		Revaluing of local knowledge and local actors	Bentley, 2006; Oliveira et al., 2012; Leitgeb et al., 2014; Tambo and Wunscher, 2015
	Explicit knowledge	Capacity building and strengthening	Ngutu and Recke, 2006; Chowdhury et al., 2015; Tambo and Wunscher, 2018
		Understanding the learning process	Sherwood and Larrea, 2001; Deffontaines et al. 2020
<b>Macrolevel approach (multistakeholders)</b>	Tacit knowledge	Capacity building and strengthening	Kroma, 2006
	Explicit knowledge	Capacity building and strengthening	Spielman et al., 2008
		Research and participation	Sumberg et al., 2003; Hoffmann et al., 2007; Klerkx et al., 2012; Flor et al., 2016; Lamb et al., 2016; Faure et al. 2018
		Understanding the learning process	Leitgeb et al., 2011; Eastwood et al., 2012

### 3.3.3. Governance mechanisms

The third emerging category (see Figure 2) pertains to the governance mechanisms and is described by two emerging themes: the role of networks and innovation platforms, and the role of agricultural knowledge innovation systems as well as agricultural innovation systems. The general trends of the category introduce the two themes.

#### 3.3.3.1. General trends

As the innovation process become increasingly complex, it tends not to fit within farming systems and/or threaten higher-order goals, being fundamental the role play by governance and its mechanisms to identify

the needs and potential for change and to make change happen. As a consequence, innovation turns into a matter of interactive collaboration or collective action between different partners establishing diverse formal or informal multi-actor arrangements (Hermans et al., 2013). Multi-actor configurations are important to create interfaces to spur the innovation process and overcome systemic rigidity. Such arrangements have been captured using different nomenclatures, such as networks, innovation platforms (IPs), agricultural innovation knowledge systems (AKIS) and agricultural innovation systems (AIS). Networks have been mainly applied as an analytical concept, while IPs, AKIS and AIS have been mostly employed as intervention approaches and as action collaboration mechanism.

Overall, governance mechanisms is a category which has been mainly investigated in Africa, where especially IPs and AIS have been widely diffused. Networks, however have been studied all over the world and AKIS have arised more interest in European contexts. Even though it could seem that all these multi-actor arrangements try to face the innovation process from a systemic approach, the linear approach still persists in many interventions. The field is characterized by mainly macrolevel analysis, the scarce use of theories but a wealth of different analytical tools.

### *3.3.3.2. Role of networks and innovation platforms*

Networks have been extensively examined as an organizational mechanism with a view to accomplishing individual and collective goals within the framework of innovation processes. The study of networks range from those that depict the elements conforming to the structural dimension of networks such as its composition and configuration (Spielman et al., 2011) to those that add the analysis of the networks ties (Isaac, 2012; Nelson et al., 2014). Some of those studies indicate how innovation can occur both through weak-tie networks and strong cohesive networks (Spielman et al., 2011; Nelson et al., 2014), as a further confirmation that social capital not always have a positive effect in the innovation process. Beyond the structural analysis, others authors have explored the networks characteristics (Lambrecht et al., 2018) and the role of power (Crivits et al., 2014) that can lead to suces active networks. Success hinges on achieving inclusive networks that need adaptive capacity to re-interpret contexts and spaces incorporating less favorably conected actors (Klerkx et al., 2010; Rockenbauch et al., 2019). That is always a long and complicated process as diverse actors have inherent differences and interests.

The role and functions of these actors have been analyzed in depth in IPs, social spaces of interaction among different stakeholders that seek innovative solutions, studies through comparative analysis among countries from a managerial (Klerkx et al., 2013; Van Paessen et al., 2014) or an institutional lens (Wellbrock and Knierim; 2014). Case studies have also revolved around the institutional identity of actors (Houkonnou et al., 2012; Totin et al., 2018) and their capacity development (Sanyang et al., 2016). To faciliate the functions of the diverse actors in IPs, some case studies have concentrated on how design and implement IPs (Kilelu et al., 2013; Schut et al., 2016a; Dabire et al., 2017; Govoeyi et al., 2019) and how scale them up to enhance their impacts on the different stakeholders (Botha et al., 2014; Schut et al., 2016a; Totin et al., 2020). As a matter of fact, impact of the IPs has been assesed comparing their performance in different countries in Africa (Pamuk et al. 2015; Davies et al., 2018) and also in different regions such as Africa, America and

Asia in a review (Schut et al., 2018). In another comparative study in Africa, ICT platforms have been studied to document the opinion of farmers and agricultural professionals (Munthali et al., 2018). Non-human agents (actants) has traditionally received little attention in the literature, although this situation is changing due to the growing interest in IT mechanisms (Freeman and Qin, 2020). Overall, IPs risk remaining isolated cases of success rather than contributing to addressing systemic constraints and being institutionalized, outscaling innovations beyond its audience and upscaling innovations to higher policy levels (Schut et al., 2016a; Totin et al., 2020).

### *3.3.3.3. Role of Agricultural Knowledge and Information Systems and Agricultural Innovation Systems*

The role and evolution of the AKIS has been widely analyzed in Europe. Articles have pointed how extension services have been introducing elements of privatization and how they have affected farmers and networks (Pascucci and De-Magistris, 2011; Curry et al., 2012). The effectivity of AKIS has been also studied in Africa comparing the situation of Kenya and Ghana according to organizational ties (Adolwa et al., 2016). We see that even though AKIS are a type of multi-actor arrangement, these systems still operate under the linear approach of innovation process, generally reaching poor results due to the scarce alignment with farmers' needs. Putting farmers at the center of the innovation process is still far from systemic approaches in AKIS, but they can improve the agency of the different actors.

The AIS enables an understanding of the major forces in the socio-technical change in agriculture but struggles with the issue of agency (Hermans et al., 2013). As it happens in IP studies, focusing on the micro-level of AIS allows to investigate the different roles and the different roles and functions of actors have been analyzed to study the microlevel of AIS through SNA (Hermans et al., 2013; Chindime et al., 2016) and historical analysis (Chindime et al., 2016) to enhance the performance of their function. In addition, special interest have arised the historical analysis of the actors that can play an intermediary function to enact linkages in AIS and promote interaction among multistakeholders (Yang et al., 2014; Kishioka et al., 2017). The literature on innovation intermediaries tends to focus on these formal professional roles; instead, informal intermediation are underrepresented. Nevertheless, most of AIS studies focus on macrolevel aiming to disentangle the complexity by providing a holistic image of both constraints and failures faced by different stakeholders. Thus, we find comparative studies revolving around the identification of entry points for intervention in different sectors (Ortiz et al., 2013; Schut et al., 2016b) to point out feasible and timely solutions. Other authors have concentrated on structural issues revealing institutional constraints trough case studies (Amankwah et al., 2012; Turner et al., 2017) or comparative analysis (Struik et al., 2014; Schut et al., 2015). Some case studies have gone further regarding structural issues analyzing as well how institutional and political constraints limit stakeholders functions (Kebebe et al., 2015; Menary et al., 2019) while others besides have aggregated the asses of systemic failures to examine the whole system (Lamprinopoulou et al., 2014; Turner et al., 2016). Pigford et al. (2018) theoretical article have pointed out how an Agricultural Innovation Ecosystem thinking, largely applied to business contexts focusing on the multistakeholder processes for value co-creation, might expand AIS analysis disentangle power asymmetrys, crossing sector boundaries and including the role of non-human agents (actants), in order to integrate

different innovation systems in multifunctional agricultural sector to improve the viability of collaborative and inclusive innovation processes.

Table 4 summarizes the arguments of the previous sub-sections.

**Table 4.** Characterizing governance mechanisms in the innovation process

Level of analysis	Type of multiactor arrangement	Research focus	Representative references
<b>Microlevel approach (individuals)</b>	Innovation Platforms (IPs)	Role and functions of actors	Klerkx et al., 2013; Van Paassen et al., 2014; Wellbrock and Knierim, 2014
	Agricultural Innovation Systems (AIS)	Role and functions of actors	Hermans et al., 2013; Chindime et al., 2016
	Networks	Structure of social networks	Spielman et al., 2011; Isaac, 2012; Nelson et al., 2014
<b>Macrolevel approach (multistakeholders)</b>	Innovation Platforms (IPs)	Impact of innovation platforms	Pamuk et al., 2015; Davies et al., 2018; Schut et al., 2018
	Agricultural Knowledge and Information Systems (AKIS)	Evolution and changes in Agricultural Knowledge and Information Systems	Pascucci and De-Magistris, 2011; Curry et al., 2012; Adolwa et al., 2016
	Agricultural Innovation Systems (AIS)	Understanding constraints	Amarkwah et al., 2012; Ortiz et al., 2013; Struik et al., 2014; Kebebe et al., 2015
		Understanding systemic failures	Lamprinopoulou et al., 2014; Turner et al., 2016

### 3.4. Concluding remarks and future research agenda

The innovation process in the agricultural sector needs to strike many balances between the elements of social systems while tackling several contradictions. It is necessary to scrutinize the agricultural innovation process and the main social-cognitive processes to contextualize the innovative process's problems and its needed reforms. It is even more important to shed light on the underlying mechanisms and processes that characterize the decentralization and democratization of innovation and its implications at the innovation level. An actor-centered approach serves this aim (see Korten, 1987; Meyer et al., 2013; Holmes and Potvin, 2014; Figueroa, 2015; Adelman and Verkuyten, 2020; Marchezini, 2020).

Overall, we noted that agricultural innovation studies are fueled by cross-fertilization from other fields. As well, we have shown how tensions arise from all different dimensions (stakeholders, levels, perspectives...) and how redefinition is continuous in the agricultural innovation process being all this 'newness' not necessarily mutually exclusive, allowing for co-existence or leading to hybrid systems. To address all these tensions and changes, the worldwide 2030 Agenda for Sustainable Development prompting the emergence of new ideas about learning, organizational cultures, and agriculture and innovation themselves, supported by local empirical evidence, could be a key ally.

In particular, our study allowed to identify the main social-cognitive processes and mechanisms affecting stakeholders' capabilities to mobilize resources for innovation reported in previous studies; it also allows to highlight new relevant research avenues to advance our understanding in the direction to sustain the self-organizing capabilities of farmers and manage the supportive ecology for their social learning and innovation.

The main social-cognitive processes identified in our integrative review that underlie the innovation processes enacted by individuals in their social systems are three in number: (i) decision-making processes; (ii) knowledge management processes; and (iii) governance mechanisms. By discussing the main literature studies on decision-making processes, our study emphasizes the complex nature of the forces that may facilitate or impede diverse stakeholders to mobilize local resources and adopt innovations. By highlighting the main contributions on the knowledge management processes, it pays attention to the individual and collective capacities required by future societal strategies. By describing the main governance mechanisms for innovation, it also directs attention to the role of context and exogenous mechanisms creating the conditions for a variety of stakeholders to innovate and to direct their actions towards the investment of local resources.

We have found that past studies have mainly emphasized the endemic innovativeness of communities and different other social systems surrounding farmers and underlined the aspects of social learning and social clustering more than analyzing the processes through which farmers understand and assimilate new ideas induced by new technologies. The basic assumption of past literature studies seems to have been the idea that farmers learn through working with intermediaries and through social structures. This process produces communal skills, knowledge, insights and understanding of how to deal with new situations. Long term resilience is believed to be achieved through the implementation of local structures and technology, because local approaches consider local conditions, practices and competences. However, scholars have neglected describing and characterizing the knowledge transfer processes, instead focusing on the application of new technology in specific local conditions. This lack of academic work may lead to problems with proposing implementation and the adoption of new technology because we are academically under-equipped to assess local techno-ecosystems. Despite the assertion that technological diffusion often happens in conjunction with increases in the motivation and competencies of society as a whole (Gharajedaghi, 1999), we have noticed many studies that examine how technological developments address the needs and aspirations of both farmers and others in the same ecosystem. It is still not clear what guides farmer choices and keeps their goal directed behavior under different circumstances. Also, not yet well addressed is the relevance of personal traits and personal competences in terms of skills, knowledge, foresight, wisdom, and the understanding of farmers' purposive actions toward the adoption of new technologies. The studies we reviewed did not examine the synergies between motivation and competences, mechanisms of social learning and the ecosystems that may sustain the endemic diffusion of a local innovation.

This review also helps to envision future research avenues. To this end, we have proposed some questions, in Table 5, based on the more recurrent phenomena and challenges. These questions need to be answered because contemporary studies have either not delved deep enough, left contradictions in their answers or may not have responded to them at all.

**Table 5.** Future research avenues in the innovation process in the agricultural sector

<b>Categories</b>	<b>Themes</b>	<b>Future research questions</b>
<b>Decision-making process</b>	<i>The socio-economic and psychological analysis</i>	-How do farmers perceive technological discontinuities? -How do farmers behave facing technological discontinuities?

		<ul style="list-style-type: none"> <li>-To what extent do farmers accept technological discontinuities?</li> <li>-How do farmers come with the implementation of different technologies?</li> <li>-What are the mechanisms through which farmers try to reduce gender disparities?</li> <li>-How can women or other under-represented groups be more involved into the decision-making process?</li> <li>-What motivates farmers to escape the status quo and innovate in the agricultural sector?</li> <li>-What kind of attitude should farmers develop when facing the introduction of process innovations?</li> <li>-How do learning and uncertainty impact the perception of farmers when introducing Technological innovations?</li> </ul>
	<p><i><b>The role of organization and information</b></i></p>	<ul style="list-style-type: none"> <li>-How can more systematic approaches be implemented in the decision-making process when radical changes occur at the level of the operations?</li> <li>-To what extent farmers organize in order to take advantage of the digital transformation?</li> <li>-How much effort does it take for farmers and other stakeholders in the innovation ecosystem to coordinate when facing technological change?</li> <li>-Is the social and human capital of organizations operating in the agricultural sector properly leveraged in order to innovate?</li> <li>-Is participatory collaboration encouraged in the agricultural sector? If so, what are the key enabling dynamics?</li> <li>-What is the best governance to take advantage of collaborative efforts in the sector?</li> <li>-How can farmers overcome organizational rigidities when implementing new technologies?</li> <li>-What type of skills and capabilities do farmers need to explore and exploit the advantages of technological change?</li> <li>-Which hybrid solutions do exist at the crossroads of digital transformation and innovation management in the agricultural sector?</li> <li>-Which communication behavior do farmers put in place when adopting technological innovations?</li> <li>-How do farmers manage the information flows within the value chain?</li> <li>-Which role does education and training play in easing technological adoption?</li> </ul>
<p><b>Knowledge management</b></p>	<p><i><b>The role of tacit knowledge</b></i></p>	<ul style="list-style-type: none"> <li>-To what extent does tacit knowledge affect the way farmers innovate?</li> </ul>

		<p>-Do farmers perform experiments in order to generate and validate tacit knowledge?</p> <p>-How do farmers transfer tacit knowledge? To what extent does transferred knowledge shape the innovation process stages?</p> <p>-Is there any substantial difference when it comes to deal with tacit knowledge in men and women?</p> <p>-How can local (tacit) knowledge be transferred to future generations of farmers?</p>
	<i>The role of explicit knowledge</i>	<p>-Is it possible to bridge tacit and explicit knowledge in the agricultural sector? If so, how?</p> <p>-Through which methods do farmers enable the transfer of explicit knowledge?</p> <p>-Is collaboration in the agricultural sector conducive of spillover and explicit knowledge transfer?</p> <p>-To what extent do scientists and farmers interact in order to create new explicit knowledge?</p> <p>-How can local (explicit) knowledge be transferred to future generations of farmers?</p>
<b>Governance mechanisms</b>	<i>Role of networks and innovation platforms</i>	<p>-Which managerial and organizational theories are instrumental to better understand the role of IPs in the agricultural sector?</p> <p>-How can power asymmetries between multiple stakeholders be better analyzed through the use of platforms?</p> <p>-Can platforms enable better network dynamics among farmers and influence their innovativeness?</p> <p>-Which knowledge governance mechanisms are better suited for innovation in the agricultural sector?</p>
	<i>Role of agricultural knowledge and information systems and agricultural innovation systems</i>	<p>-How can we better characterize the micro-level dynamics of agricultural innovation systems?</p> <p>-What are the structural and institutional mechanisms at play in designing effective agricultural innovation systems?</p> <p>-How do agricultural knowledge and information systems change over time? What is their impact on innovation?</p> <p>-Which role do systems' constraints and failure play on the innovation capability of farmers?</p>
<b>General</b>		<p>-Is it possible to balance digitalization and inclusiveness? If so, how and under which circumstances?"</p> <p>-How demographic changes and depopulation challenge in the agricultural sector can be faced from innovation perspectives?</p> <p>-How does innovation in the agricultural sector help in accomplishing the sustainable development goals (SDGs)?</p>

		<p>-To what extent the human-machine interface can be better characterized in the era of the digital transformation?</p> <p>-Is the impact of technological change always positive on the social and human capital in the agricultural sector?</p> <p>-Which managerial-organizational theories could be apply in knowledge management studies?</p> <p>-Which strategies can be designed to make participation more inclusive?</p> <p>-How can the link between learning, knowledge transfer, and innovation be characterized in the agricultural sector?</p> <p>-Which are the differences and similarities in the innovation processes of farmers in developing and developed countries?</p>
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## 4. Analyzing social change in the rural areas: Case study

### 4.1. Context

The Canary Islands present an eminently tertiary specialization. As reflected in the Canary Islands' PDR, 85.5% of the GVA is generated by services, while in rural areas, that figure stands at 82,1%. The primary sector has traditionally had a low economic and social value revealed by 64% agricultural land in disuse, leading to only 10% of local self-supply. However, there are still a few towns devoted to agriculture and farming (especially the artisanal cheese industry in the north and agriculture in the centre), mainly for the local market. The Canary Islands is one of the territories with the highest poverty and unemployment rates in Spain (INE, 2014). Specifically, 85% of rural households have difficulties making ends meet (ISTAC, 2007). This context has generated an emotional climate of hopelessness and uncertainty shared by the population and professionals in rural areas (PDR Gran Canaria, 2014).

AIDER Gran Canaria, declared of public interest by the Government of Canarias, is a non-profit rural association represented in its board by public and private members. Their main objective is to apply regional development activities in the rural territory of Gran Canaria island (67% of the surface and 16% of the population of the island). A strong geographical and climate heterogeneity characterizes the rural territory: arid and warm south, mountainous and severe weather centre and highly environmental protected and humid north. The island's small size facilitates a substantial urban-rural nexus because of improved infrastructures and the gradual reduction of the digital gap, even though access and quality are still far from optimal. The motivation for continuing familiar traditions and the increasing sensitivity of local administrations towards rural areas are assisting this territory. However, threats such as slight ageing and a nascent depopulation process are concerns for generational renewal. Also, some cultural features diagnosed such as lack of networking, lack of associationism, a low tolerance of risk and failure, close attitude towards experimentation, negative image of entrepreneurs are changing due to the social changes experimented (PDR Gran Canaria, 2014).

### 4.2. Local Actors Inclusion in Entrepreneurial Ecosystem for Social Change: a case study

#### Abstract

The recent theory of entrepreneurial ecosystem focuses more on understanding multi-levels of the ecosystem being emerging as an institution, network, and network of networks with its underlying value creation relationships and social legitimacy. This paper uses semi-structured interviews of the members, staff, and collaborators of a non-profit rural association to explore the role of local agents' inclusion in the emergence process of an entrepreneurial ecosystem for a social change at a micro agent to institution level. The findings have revealed a new three-step process of the ecosystem emergence that include the local agents' i) understanding of the locale ii) cultural ties theorisation of locally shared values and relationships, and iii) diffusion and institutionalisation of the congruent social change. The local agents' inclusion

facilitates the ecosystem emergence and enhances the resilience and sustainability of the ecosystem as it ingrains up social embeddedness and is not perceived as an external prescription or intervention.

#### 4.2.1. Introduction

The ecosystem metaphor has an appeal for it being a holistic perspective to understand structures in various fields such as biology, social science, economics, management, and entrepreneurship (Hulme & Philip, 2017; Kenney et al., 2019; Praton & Sutanti, 2016; Vilà & Hulme, 2017). An entrepreneurial ecosystem can be defined as a network of organizations structured around a focal platform (Sussan & Acs, 2017; Vargo et al., 2017). The platform incorporates both production and use side of the agent's activities, where the value emerges through innovation and is called an entrepreneurial ecosystem (Thomas & Autio, 2015). The discussions on entrepreneurial ecosystems are focused on understanding various levels of the ecosystem (O'Connor et al., 2018; Theodoraki & Messeghem, 2017). Therefore, as a matter of choice, an entrepreneurial ecosystem can be ingrained into multiple levels of its social existence (Cunningham et al., 2019; Theodoraki & Messeghem, 2017). For example, it may exist as a social institution, as a network of institutions, or even a network of networks indicating various levels of depth and breadth of the ecosystem (Lu et al., 2017; Reeves & Chittaro, 2021; Vargo et al., 2017). At each societal level of the ecosystem, local conditions where an ecosystem is establishing determine attributes of the ecosystem (Stam & van de Ven, 2021). These attributes include the nature of shared values (Cropanzano & Mitchell, 2005).

There are also arguments on the shared value co-creation and co-consumption processes within the ecosystem (Aarikka-Stenroos & Ritala, 2017; Alves et al., 2016; Bonamigo & Mendes, 2019; Hein et al., 2019; Polese et al., 2018; Zhang et al., 2018). At each level of the ecosystem, the primary focus is usually on how networks of various agents connect to emerge and co-create and co-consume a value as a collectively perceived benefit (Vargo & Lusch, 2016). During this value co-creation and co-consumption, the agents work as a community and contribute both living and non-living resources (Acs et al., 2017).

The co-created and shared value causes the agents to depend on each other, and this dependency is core to an ecosystem, where agents work for each other benefits and even protect each other from threats (Vargo et al., 2017). The dependency condition also causes the emergence of new types of relationships among the agents at each ecosystem level. Thus, the ecosystem emerges as a web of relationships (Cavallo et al., 2019; Hechavarría & Ingram, 2019).

The relationships help form broader social groups who have unified shared values and cause the social acceptance of the ecosystems (Dennis et al., 2017; Hutchins, 2014; Thomas & Autio, 2015). Various macro-level actors, such as governments and policymakers, are also found playing essential roles in the social acceptance of the ecosystems (Purbasari et al., 2020; Suresh & Ramraj, 2012). Once the ecosystem gets social approval, the macro-level roles formalize power relationships with micro roles at the operational level of the ecosystem. The power relationships define legitimate roles to be performed within the ecosystem, including the roles of being dominators, complementors, and users of the ecosystem (Dedehayir et al., 2018) and thus establishing a distributed hierarchy for control for and within the ecosystem. These

roles also create new microstructures for operations, enhance social relationships, and lead to a change in specific local (Perrini et al., 2010).

Literature also suggests that a change through an entrepreneurial ecosystem is mainly perceived as some forms of economic outputs (Acs et al., 2017), such as increasing employability and income levels. This focus on economic outputs causes entrepreneurship to be classified as a positive economic science. There is, however, an emphasis on changing “the boundaries of entrepreneurship theory and research by reframing entrepreneurship as positive economic activity to entrepreneurship as social change” (Calás et al., 2009, p. 552). As more recently, various macro and micro agents, have repurposed their activities to emerge with new entrepreneurial ecosystems for social priorities during Covid-19, rather than explicit economic outputs (Ratten, 2020; Ratten & D’Souza, 2021). Therefore, it is important to learn more about the emergence of ecosystems for social change (Aversa et al., 2021; Cunningham et al., 2019; Dedehayir et al., 2018), keeping in account the focal role of local agents. This research, therefore, aims to forward this line of thinking *to explore the process of entrepreneurial ecosystem emergence for a social change and the role of local agents in the process*. Here the key question is, *how does agents in a rural territory create an ecosystem and realize a social change?* Local agents work at the very operational level and thus they remain more aware of the ecosystem emergence process and the nature of social change that happens (Afranty, 2018; Aversa et al., 2021; Roundy et al., 2018).

The following section presents the background theory on the entrepreneurial ecosystem and social change, followed by a methodology for exploring the ecosystem emergence process for a social change in a rural non-profit organisation.

#### 4.2.2. Entrepreneurial Ecosystem and Social Change

Organisations, irrespective of their natures and locations, are expected to bring up innovations and solve complex social issues, such as community development, social exclusion, gender empowerment, and poverty reduction (Margolis and Walsh, 2003). It has particularly been noticed in the Covid-19 pandemic when various governments, businesses, civil society organisations and others have formed emergent ecosystems and responded to crucial but complex issues such as Covid-19 vaccination and management of the pandemic (Ratten, 2020; Ratten & D’Souza, 2021). This orientation of entrepreneurial ecosystems towards social change, attracts both academics and practitioners (Galindo, 2008; Perrini & Vurro, 2006).

A social change is perceived and focused on improvement in people lives and society as a whole (Hellerstein & Neumark, 2020). This starting focus on social change affects the ecosystem approach to entrepreneurship as an activity for social reform in various locales (Calás et al., 2009; He, 2018; Sautet, 2020; Tang & Li, 2021). For example, an ethnographic study has suggested how entrepreneurial fishermen have enabled unique social organisation in Stewart Island and New Zealand. The common values of rationality and economic maximisation have worked as core binding value proposals for social improvements (Levine, 1985). More recently, in rural Mexico, local businesses have reconfigured old resources such as lands, animals, and crafts to start productive projects with focus on establishing new

social connections and relationships and thus have improved collective life in the locality (de Gortari & Santos, 2020). In both these examples, the local agents, fishermen and businessmen, were instrumental in initiating their respective ecosystems and the resultant social changes.

The local agents are important for the very formation of these ecosystems for social change (Guerrero et al., 2020) as they can communicate local social preferences for the ecosystems to achieve (Hellerstein & Neumark, 2020) and establish new relationships for the target change to happen (Bullock et al., 2018; Ingram et al., 2018; Pillai & Ahamat, 2018). When an ecosystem builds upon the local preferences and relationships, it can be made sustainable and legitimate quickly as it becomes socially embedded (Bidegain et al., 2019; Fan et al., 2019). The social embeddedness also helps the ecosystem to gain governmental, and policymakers support, such as help in establishment of incubators, accelerators, and public policy endorsements of new entrepreneurial activities (Pustovrh et al., 2020). These public and governmental supports also cause the ecosystems to achieve more depth and breadth, in particular local and greater social inclusion for a desired and congruent social change (Hellerstein & Neumark, 2020; Purbasari et al., 2020; Pustovrh et al., 2020; Suresh & Ramraj, 2012).

The public and governmental supports also create a way for the ecosystem legal acceptance, and thus it achieves institutionalisation (Bidegain et al., 2019; Bullock et al., 2018; Ingram et al., 2018; Pillai & Ahamat, 2018; Pratono & Sutanti, 2016). The institutionalisation provides a new legal and political bases for the ecosystem, and it then achieves a greater harmony and continuity in its operations. The ecosystem, however, would need to remain open and adapt to deeply rooted social problems (Daniel et al., 2018; Lu et al., 2017). Such socially-oriented ecosystems derive its strength for sustainability and effectiveness from people in the locality as they provide the very base value propositions, resources, and relationships for an ecosystem to emerge and sustain (Acs et al., 2017; Aversa et al., 2021; Battilana & D’Aunno, 2009; Dedehayir et al., 2018; Lienhoop & Schröter-Schlaack, 2018; Purbasari et al., 2020). Figure 1 portrays a holistic ecosystem conceptualisation and focuses on local agents’ role in the ecosystem emergence for a social change.

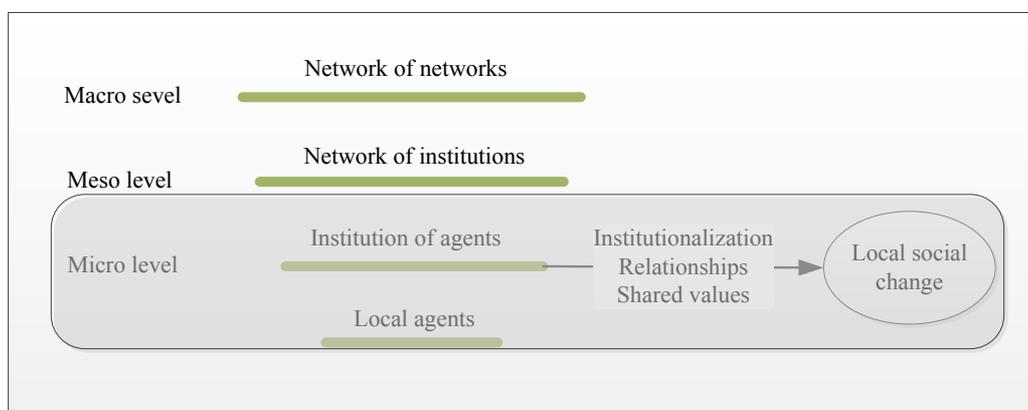


Figure 1: Developed based on (Cavallo et al., 2019; Dennis et al., 2017; Hechavarría & Ingram, 2019; Hutchins, 2014; Perrini et al., 2010; Sussan & Acs, 2017; Theodoraki & Messegem, 2017; Thomas & Autio, 2015; Vargo et al., 2017; Vargo & Lusch, 2016)

Collectively, the ecosystem emerges at various levels of social existence with ingrained agents relationships, shared value, and institutionalisation. This research will focus on the micro and agent-institution level of the ecosystem to understand the ecosystem emergence process for a local social change. The next section outlines a methodology to explore a non-profit organisation for understanding the emergence process of an entrepreneurial ecosystem for social change.

### 4.2.3. Methodology

#### 4.2.3.1. *The case of a rural association*

This study has used qualitative methodology to have a holistic understanding of local agent inclusion in the emergence of an entrepreneurial ecosystem for social change. Studies on the entrepreneurial ecosystem support such qualitative research (Levine, 1985; Pustovrh et al., 2020; Theodoraki & Messeghem, 2017), expecting that such studies will have more in-depth and collective sense of the ecosystem emergence. Qualitative and narrative format of the data presentation better suites a process research (Weibin Lin; Bin Chen; Shichao Luo; Li Liang, 2013).

#### 4.2.3.2. *Research setting*

The study is conducted in a peripheral European region focusing on a non-profit association in a rural area. The association was supported by the European initiative named Leader<sup>8</sup> programme in the 1990s. The association aimed to establish an ecosystem that supports development projects setups in the rural proximity and thus revive entrepreneurship in the rural areas and generate employment. A non-profit association located in a rural area is an interesting setting for exploring the ecosystem emergence, focusing on local agents inclusion because the local agent's inclusion is supported through public policy in the region. It is assumed to have a pivotal role in the regional ecosystem emergence.

The rural context was not a high-speed environment for the ecosystem emergence as structural constraints impede changes to arrive quickly. This higher time lag for the social changes to happen was, in essence, a research opportunity to analyze the ecosystem emergence as ecosystems take longer to appear (Vilà & Hulme, 2017). In this context, the successful rural association is analyzed to illuminate the phenomenon of ecosystem emergence and how that leads to social change. The association is a dynamic group as it was always open for actors to join in. It was formed by a self-regulating network of many different actors from public and private sectors, who have formally and informally coalesce to undertake congruent activities for the desired social change.

#### 4.2.3.3. *Sampling and data collection*

The research used an explorative qualitative case approach (Flyvbjerg, 2006; Yin, 2020), which has successfully been used in exploring entrepreneurial ecosystems (de Gortari & Santos, 2020; Elia et al., 2020; Perrini et al., 2010; Pratonio & Sutanti, 2016; Purbasari et al., 2020; Sarwar et al., n.d.; Thomas &

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<sup>8</sup> LEADER came from the French acronym for 'Liaison Entre Actions de Développement de l'Économie Rurale', meaning 'Links between the rural economy and development actions'.

Autio, 2015). Data were collected from members of the association (n=24), staff (n=2), and collaborators (n=4). Semi-structured interviews are used to reveal agents' views and illuminate the ecosystem emergence and social change resulting from them being engaged in the field for longer. The agents acted both as participants, sharing their experiences and informants expressing their opinions of broader perspectives and observations. A carefully designed research protocol is used to conduct the interviews to cover the themes to be explored while being flexible to allow unanticipated issues to emerge. Thus both inductive and deductive logic are applied (El Ebrashi, 2013; Neuman, 2014).

The initial focus on approaching the data was informed by focusing on the micro-foundations of ecosystem genesis (Aversa et al., 2021). This to make up an initial mindset about the expected findings, and thus through this approach the data was collected and interpreted with an open mind but not with an empty mind (Han, 2010); rather, an orientation towards the understanding of ecosystem emergence is provided beforehand. Therefore, initially, some theoretically informed themes are explored with members, included their motivations for participating in the association, their expectations and experiences of participation, their behaviours, and the potential and actual benefits. With the staff and collaborators, we aimed to ascertain their understanding as to why the ecosystem had been established, its aims and objectives, relationships, membership, services provided for the members, and their perception of potential and actual benefits.

Both telephone or online interviews lasted up to 1:30h and, with permission, were tape-recorded and analyzed, with overall objectives of understanding the ecosystem emergence and the local agent's inclusion. Selected quotes from interviews are used to illustrate important temporal steps of ecosystem emergence. This approach is popular in the relevant methodological literature where various temporal narrative episodes are analyzed to make sense of the emergence (Hards, 2011; Neuman, 2014; Tranfield et al., 2003).

#### 4.2.4. Analysis and Interpretations

The focal non-profit association was founded in 1996 by four members from civil society organizations and two staff technicians with backgrounds in development.

*At the first stage of ecosystem emergence*, the primary motive seems to be the founders' learning from the past poor performances or similar associations and even failures of organizations operating in the same area. The founders were technical experts to form an association and were also aware of the locality and valued change therein. Learning from the previous experiences appears a sensible and even strategy to approach the new establishment, where means-ends relationships are not well understood or defy calculation. Indeed, where the actions of others objectively change costs and benefits. When the fact that others routinely drive on the right side of the road increases the benefits of doing so, diffusion is again rational. The process underlying diffusion can be seen as an inherent sense-making one, where actors jointly construct an understanding of the appropriateness and worth of some practices.

“Generating joint projects and, let's say, adding projects together, joining wills had always been highly complicated in our territory. There was a lot of individualism, a short-term vision, and everything failed.

But, somehow, all that had to change to generate something meaningful.” Member

“We perceived that although other organizations worked for development in the territory as they had hardly any contact with the small entrepreneurs, there was no progress. They were far from the real needs; they had to get closer to the population. There was no such participatory, vindictive part. For me is a sign that it was not valuable and something different had to be done”. Member

“The LEADER program was an opportunity for financing... but also for generating entrepreneurial fabric and strengthening the rural economy at that time. The funds only impact the investment level, but if you do not combine it with strengthening the associative and entrepreneurial fabric, it comes to nothing. So, we had to start doing just that, which was not done before, to keep a group of people working together for a long time”. Founder

*At the second stage of ecosystem emergence*, the founders realized that it is important to build cultural ties with local people to have them on board while initiating the association. Therefore, the founders have systematically monitored other local initiatives and local fellows to understand how to better associate with them. They also started interacting with local people to understand their needs and cognize shared theories about the local world. These theories work as narratives, helps in the unification of thoughts, and help to establish sustainable associations.

“As we were all linked to the rural world, more or less we already knew what initiatives there were. The rural area had many opportunities, but it had not been given the importance it had. If you give it importance, people see that it is important, and changes can be generated. We had to connect with them.

We visited many places to be able to know what they thought and have their opinion.” Founder

“We made ourselves known and began interacting with entrepreneurs from the rural world by listening to them and inviting them to join or connect with the association. The objective was to encourage their participation, give them a voice and encourage them to be actors of all the changes” Founder

"We saw a possibility because they made us see that, if we got together and participated, we could value all that cultural heritage that surrounds our rural area." Member

Initially, the focus seems to be developing a basis for the association, whereas the conceptualization is stepped up as "bottom-up" theorizing. Such theorizing was expected to enable the diffusion of new social values in the territory and consequent settlement of their association. The locally situated and individual-need driven theories about what to raise as a point of actions for the association would have affected the individual's adoption patterns of conceptualizing the ecosystem emergence. The pair interactions generate shared understanding and have helped to homogenized actors involved and thus established congruence in objectives.

The founders have collected ideas about mechanisms for the association. The same discussions have motivating arguments about the individual rationality of adopting new social values and also adapting themselves to others' values. Indeed, the founders wanted to construct cultural categories to expand interaction among their members. Cultural categories should be quite broad to serve as more than opportunities for communication and promote the homogenization of their members around models of progressive policy. The founders and the staff start building two cultural categories through which the diffusion of new social values could be accelerated.

“From that moment, we committed ourselves and embarked on two crucial holistic lines: gender empowerment and support traditional entrepreneurship (artisanal cheese, wine production and shepherding) and heritage (troglodyte caves and culture). We wanted to activate action cycles around these two lines to ensure impact in the territory and the individuals in the medium-long term. The key aspects were two. Externally create stable networks with civil society and moving away from politics and internally maintain a reliable structure on the association board and create a group identity” Founder

Through the analysis of the local context, they could build a general model of more emerging needs and proceed with the development of two abstract categories, under which people could also more easily recognize the cause and effect of their activities. With this theorization, the real diversity of their activities could seem meaningful.

Once the theorization is internalized, the founders got a pragmatic approach by enacting and codifying the shared values into the very routines of self-interested actors. This approach is contrast to the formal communication of theorization as prescriptive rhetoric. The emergent activities underlining the continuing role of a compelling logic, which permitted the movement to gain support and to reduce self-interested opposition. Very compelling theoretical arguments may diffuse very rapidly themselves, attenuating point-to-point diffusion. The relevance of their theorizing, which emerged with two relevant lines created homogeneities within the populations, were able to simplify the real diversity of social life. There lines of interests made the characteristics salient, that they offered and intended to sensitize observers for any sources of variation. The established and related practices have simplified the theorization and enabled local people to understand their outcomes that they have produced.

“If we had a meeting with a sector, the members who had that connection accompanied us. At the same time, we tried to create an associative fabric in other sectoral areas to strengthen them. The members also accompanied us in this process, and sometimes they were the protagonists when it came to dynamizing it.

We had a vision of commitment to development, of course, rural development, not conventional productivist development, let's say. That was what the association was providing” Founder.

“We began to work in a participatory way, to collaborate in joint work, to contribute ideas and have them heard, to meet the different actors, to visit their projects, it was a routine change that gave us a more integrated, more social vision, less individualistic” Member.

"At first, there were members who were a bit reluctant to participate, but they did so, and the exchange helped them to open their minds to other realities" Collaborator.

*At the third and final stage of ecosystem emergence*, theorization enters into a diffusion mechanism for social change. Most concretely, local people became central conduits of diffusion by subscribing to the association. In this way, local people have internally reproduced and acted based on the theoretical model enacted by the association. In this sense, the theorization of the association becomes a mechanism of diffusion itself.

“Being in the association already means a commitment to the rural area because they could not be there, not pay a fee, so I think the involvement of the associates through that fee is something important. It is not big financial support, but a moral one, let’s say” Member

“Some members know that it is a commitment and pay the subscription, which is why they have remained” Founder

"Seeing that a group of people get together and work for the development of the rural world seemed super interesting to me. Serious and positive work was done, it was worth contributing with the subscription of course" Member

Where potential adopters internally reproduce, and act based on the theoretical model, these efforts lead diffusion to flow along the lines of relations linking last change to happen across the ecosystem. If theorization shapes diffusion and what flows, is not a copy of some practice existing elsewhere, instead it is the theoretical model that is likely to flow. Once the theorization has diffused into the routine, the association has established relations with local institutions. These relationships are used to get their definitive legitimation on the territory.

“3 years later, they started to collaborate and create alliances with more territorial institutions...They gained more presence and influence.” Collaborator

Figure 2 depicts a three steps ecosystem emergence.

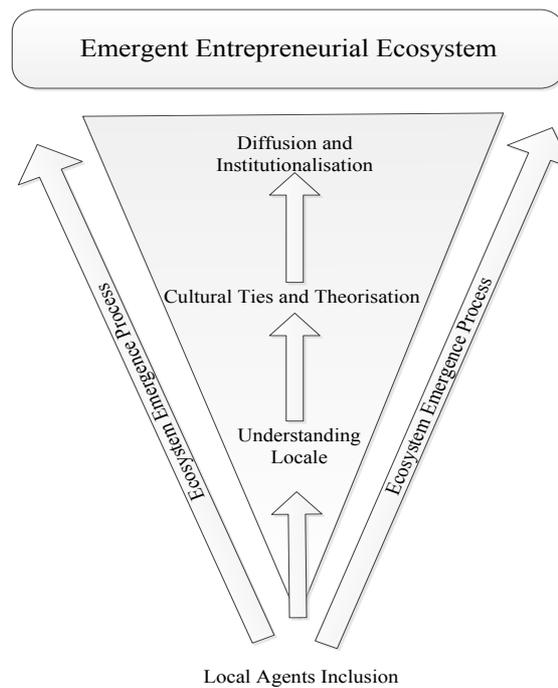


Fig.2: The entrepreneurial ecosystem emergence

The ecosystem emerged when the association has started learning from the local failures, and local agents are included. Afterwards, the cultural ties have resulted in creating more shared value categories as theorization. Ultimately the theorized categories are embedded well into the routines to demonstrate individual and collective social changes, paving the way for the ultimate institutionalization of the association.

#### 4.2.5. Discussion

The narrative analysis of the non-profit association has revealed interesting findings in terms of showing a process of how an entrepreneurial ecosystem emerges and progress with connected and persistent inputs from the local agents' inclusion. Local agents seem to be working as the genesis of ecosystem emergence as they set up the micro foundation for the ecosystem to emerge (Aversa et al., 2021).

At the first stage of the ecosystem emergence at the micro-level, the perspective is established through cluster genesis (Aversa et al., 2021) and institutional conditions for diffusion (Strang & Meyer, 1993) and other related works (Abdille, 2017; Acs et al., 2017; Bansal et al., 2019; Galindo, 2008; Perrini et al., 2010; Perrini & Vurro, 2006; Purbasari et al., 2020; Stam & van de Ven, 2021). Further primary exploration has resulted in the identification of a locally ingrained process of ecosystem emergence. The local agents' inclusion plays a significant role in the ecosystem emergence right from the beginning of the ecosystem till its institutionalisation. It is since the local agents bind the process of ecosystem emergence through their social links. In this regard, the starting phase of learning from the local failures and subsequent identification of local value system seem to be keys to implant the ecosystem emergence within the territory. The locally existing issues have driven the emergent ecosystem to remain resilient. Also, the agents in the ecosystem saw their survival in the ecosystem emergence, and thus they enhanced their

engagements and increased the dynamism of the ecosystem (Elia et al., 2020; Purbasari et al., 2020; Ratten, 2020).

At the second stage of ecosystem emergence, the theorisation stage of ecosystem took place in local perception. The ecosystem is being based on shared values and has therefore strengthened the emergent cultural ties. When these cultural ties are established, the local agents felt included and exhibited an association with the ecosystem. This had seemed to be triggering a spiral effect when more and more people joined the association. They saw the ecosystem being locally based and was not perceived as an external intervention. Such a locally ingrained establishment is essential because social entrepreneurship's behavioural theory suggests that these contextual contributions from locally existing social actors cause a continuous resource mobilisation. Thus, bring sustainable social change (El Ebrashi, 2013), which can ultimately lead to sustainable social development (Bansal et al., 2019).

The theorisation as part of ecosystem emergence has helped in define subsequent cultural categories. The categories are found to be facilitated and supported by local agents' inclusion. This grounded approach to infer a theory for understanding the cultural categories as values is highly likely to have a higher relevance. The reason is that such a micro theory would remain so concrete to the local circumstances and remain in the local rhetoric. This relevant achievement seems to be the critical stimulus for thriving the emergent ecosystem to be adaptive and sustainable. Local agents are more informed of the local value system and can relate themselves for quick adaptation to the emergent ecosystem (Vargo et al., 2017). Also, local agents can see the resultant change through social entrepreneurship as a tool for sustainable development (Bansal et al., 2019).

At the third stage of ecosystem emergence, the association starts getting its institutional legitimacy as the locally based theorisation has also seemed has helped the ecosystem to be owned quickly by the local agents when they saw it adapted to the two concept categories which are based upon the local normative institutions (Risi, 2020). It is, therefore, noticed that memberships of the association have increased, and it became the source of legitimacy and sustainability for the association. Similarly, ingraining the critical categories into the routine seems to be a smart move related to the social institutionalisation of the emergent concepts and ecosystem. It is for this reason that, the new concepts were not felt as being preached by the members, rather have been shown as leading to a desirable and developmental change in individual as well as collective life of the territory. This, perhaps, had happened because the local agents' inclusion has caused the agents to empower and control for bringing social change when power hierarchies are established (Dedehayir et al., 2018). It is suggested that such a localisation of power has a significant role in establishing a local social change, in the routine, and even in overall social order itself (Haug & Talwar, 2016). Therefore, it is important to note that the exhibition of social change needs to be connected close to the local agents' inclusion.

At the conclusion of the third stage, the social change exists as a demonstrated changed routine. This changed routine can also be interpreted as new learning to provide a baseline for another round of ecosystem

emergence. This is to show the continuity of the social change because the social entrepreneurial ecosystem and its process aim to address new complex and emergent problems as and when they arise (Perrini et al., 2010). Therefore, it is important that the findings at the micro-level of the social entrepreneurial ecosystem must be conceptualised at as abstract level as possible to re-think current assumptions and bring in thoughts from multiple disciplines (Mair & Martí, 2006) thus setup new mindsets for onward ecosystem establishments. Nevertheless, the key role of the local agents would remain to be there in the ecosystem emergence, as a micro and independent community that both enable and constrain entrepreneurial ecosystem within a specific territory (Stam & van de Ven, 2021).

#### 4.2.6. Conclusion

This research primarily came up with an emergence process of the entrepreneurial ecosystem for social change. The emergence process is mainly centred around the local agents' inclusion as the very source of every step in the emergence. This perspective is original in the current literature of entrepreneurial ecosystem, where the ecosystem is discretely described by many authors with little specific focus on the local agents inclusion as shown in the literature and discussion sections. The local agent's inclusion is important not merely for implementing any social change but also for the very conceptualisation of change itself. As the proposed emergence process suggests, that at each of the steps, local people inclusion have contributed the local knowledge and values that served as bases for having a more significant association and consequent collective theorisation of the social change. At a later stage of the ecosystem emergence again, the local agents inclusion has served well in terms of deep diffusion of change initiated by the local agents themselves. This research brings up evidence from a single narrative case, and in future, the ecosystem emergence process may be evaluated and refined with multiple associations or organisations in various contexts. This continuous evaluation is important to see if the local agents' inclusion have the same capacity to define the process of ecosystem emergence and its consequent change. Theoretically and empirically, the ecosystem emergence seems to be more evolutionary in nature. It builds up from the very locally placed agents and caused the change diffusion from concrete local routines to abstract conceptualisation of ecosystem emergence. The evolutionary entrepreneurial ecosystem and its consequent social change, may take longer to happen and appear, compared to a more revolutionary and prescriptive social change. Therefore, they remain more sustainable and resilient.

## 5. Conclusions and reflections

This research aimed to understand how the transformation towards more sustainable pathways is emerging in rural areas, using an actor-centered approach. The research has started from the notion of rural areas, considering the two main paradigms that characterize it: the industrial and sustainable paradigms. In this way, on the one hand, the difficulty of being able to conceptualize rural areas has been evidenced as it is an evolving concept that generates consensus and dissent. However, it has been considered that having as a starting point a broader notion of the rural area would allow a more nuanced analysis of reality and transformation processes. On the other hand, the vision of rural paradigms from dichotomous perspectives can lead to interpretive reductionism; however, they are instrumental in understanding from which starting points transformations can take place. The co-existence of both paradigms envisions that the generation of transformations in rural areas will only be possible if both are considered, analyzed and acted upon.

To inquire about sustainable transformations in rural areas, this thesis has focused on delving into one of the most important concepts for moving towards sustainable transformations, such as innovation from a multidimensional perspective. In this way, its technological conception has been considered on the one hand and its social conception on the other, since both are essential for the generation of changes. To respond to the research aim, the thesis has not focused on the innovations themselves as has traditionally been approached from the academic field. Instead, the different processes have been analyzed from the role played by the various actors intervening that with their functions, actions or inactions configure and allow the process of innovation and social change to advance or stagnate. This thesis has combined the study of more global processes that are of primary importance in the literature with the study of more micro processes that are fundamental to understanding local realities.

From the methodological point of view, a few brief notes, the use of the actor-centered approach has been demonstrated as a useful approach to understand complex processes at the local level that start from relatively small-scale groups. It provides significant indications on which to inquire to be able to analyze the essence of these micro-realities. Similarly, it is adequate to generate abstractions at broader scales, such as in the innovation process, that go beyond the innovation studied per se to contribute from another perspective, broadening its vision. In this sense, using the notion of the ecosystem has also shown its usefulness in methodological terms since it allows developing a holistic vision of social changes. The use in this thesis of holistic approaches to understanding complex phenomena makes gain in breadth, but at the same time, lose depth in the analysis. This is the main limitation of this research. The literature review and the case study broadly address the research questions to which they intend to answer, contributing to the knowledge in a detailed descriptive way.

Regarding the first research objective (to understand how the scientific literature has analyzed the innovation process in the rural areas from an actor-centered approach at global levels) and research question (*What are the main processes and mechanisms sustaining actor-centered approaches to the management of resources to foster local innovation efforts in the agricultural sector?*):

The literature review gets insights into the main social-cognitive processes and mechanisms affecting stakeholders' capabilities to mobilize resources for innovation: (i) decision-making processes; (ii) knowledge management processes; and (iii) governance mechanisms. It also highlights relevant research avenues to advance the understanding to sustain the self-organizing capabilities of multiple actors to manage the innovation process. Also, some brief reflections. The systematic literature review has shown that all actors must be considered to reach deeper transformation processes in rural areas. That is, for which technological innovations can be adopted in a meaningful way. This will not necessarily come from the different groups of actors who are experts in these innovations, who in many cases do not know the realities in which they are implemented. However, it will be necessary to complement the analyses on the experts' position with the functions and roles that can be exercised by those who may be the actors called to be the most fundamental agents of change, the entrepreneurs and the farmers. The success of sustainable transformations in rural areas depends on how decision-making is carried out, the use and enhancement of its knowledge effectively and its articulation in networks in the most horizontal way possible. The protagonism of these actors is essential to generate a collective transition from a productive and industrialized agricultural reality. Therefore, policies and initiatives must create a more suitable place for them.

Regarding the second research objective (to understand how the social change process can happen in the rural areas through a case study from a people-centered approach at local levels) and research question (*How do agents in a rural territory create an ecosystem and realize a social change?*):

The case study presents by a narrative analysis of a non-profit rural association a process of how an entrepreneurial ecosystem emerges and progress with connected and persistent inputs from the local agents' inclusion and how social change is created. Also, some brief reflections. Social processes are complex and dynamic realities. The fact that many different actors with different interests participate makes the outcome uncertain and depends on how power relations are balanced. Social mobilization and political will have always been the best tandem to change models and adapt them to actual needs. However, it is always difficult for radical social changes to happen. In any case, it is not as difficult as it might seem at first because, as the case study shows, culture and institutional frameworks do not completely condition actions, and there is always room for change, provided that actors working in a network can consider their ideas and develop them. In this sense, the case study shows that human agency and the joint work of the actors horizontally without succumbing to power relations has a positive effect of generating practices and strategies that fight against obstacles at the territorial level and promote social changes.

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## 7. Anex

### INTERVIEW PROTOCOL

#### General information

- A. Age
- B. Place
- C. Formation
- D. Name and type of entity you work for
- E. Place where the entity is located
- F. What does your entity do? What is your role?

#### Questionnaire

- When did you become a member of the association?
- What were your motivations to become a member of the association?
- Within this network, what are the biggest changes that have occurred?
- What were you involved in (what role did you play)?
- What was your level of participation?
- Have you been part of other networks? Of which?
- How would you define your relationship with the actors of the association?
- What type of activities did you do together? How did you value them?
- How was the decision-making process carried out?
- Do you feel identified with the territory? Do you feel identified with the network?
- How did you define the level of commitment within the network?
- How did you perceive the network?
- Were there any characteristics of the territory that facilitate the articulation and implementation of projects?
- What are the contributions of this network to the territory / society?
- How has being part of this network helped you professionally / personally?
- Could you describe the activities you engaged with others? How were these activities coordinated?
- Could you describe how the coordination was maintained? Did you perceive any tensions among the partners?
- How did you balance between your personal involvement and the interest of the collectivity?
- Which interests/advantages had you experienced as member of the association? Could you also list the negative effect of this? What were the expectations others have on you?