



What makes a change agent in environmental conflict transformation? Evidence from rural France

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Abstract

Transformation of agriculture towards increased sustainability is needed to meet the challenge of declining biodiversity. Nevertheless, stakeholders' differing perceptions of what sustainability should be, and the multiplicity of possible ways to achieve it can lead to conflictual situations, highlighting the importance of conflict transformation as part of the broader sustainability transformation. If conflict transformation needs to be addressed to prevent the status quo persisting, such processes also reveal the state of social relations and allow us to analyze how collective actions could lead to broader transformations. Using three case studies involving conflicts around pesticide use in the region Bourgogne Franche-Comté (France), we investigate the hypothesis that transformation processes require the engagement of change agents who are motivated and able to overcome barriers to change. Results from 55 in-depth interviews with stakeholders highlight that transformational change depends less on the capacities of a single individual, and more on the mobilization of a plurality of heterogeneous actors (especially farmers, local authorities, and the general public). These actors need to carry out a range of activities that occur with and for others and have an influence on others. According to interviewees, the actors need to engage others, encourage new initiatives, create spaces for knowledge exchanges, and go beyond boundaries. The effectiveness of change agents also depends on the existence of participatory and proactive processes to bring individuals together to create or capitalize on windows of opportunity.

Keywords Agent of change · Broker · Champion · Pesticides · Agriculture · Conflict · Transformation · Sustainability

Introduction

Agriculture is increasingly facing the challenges of climate change and declining biodiversity (IPBES 2016; IPCC 2022). On the one hand, because of the greenhouse gas emissions it generates—with agriculture, forestry, and other land uses accounting for 23% of total emissions in the period 2007 to 2016 (IPCC 2020)—and the use of fertilizers and

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pesticides, agriculture is considered as a key sector contributing to these challenges. On the other hand, agriculture is increasingly feeling the pressures of the increase in temperatures as well as the frequency and severity of droughts, the decline of pollinators, and increase in invasive alien species (Paini et al. 2016; Potts et al. 2016; Smith et al. 2014). Moreover, climate change and biodiversity loss are occurring in a context of social transformation of agriculture. For example, in France, the number of farms has been decreasing since the 1970s while their area has been increasing, and there are currently about 400,000 farm managers, compared to over 1,600,000 in the early 1980s (Agreste 2021). Furthermore, as agriculture becomes more intensive, it also becomes more disconnected from the rest of the population. As a result, farmers are criticized and labeled as destroyers or polluters of the environment but also increasingly vulnerable, which contributes to a deep malaise of the profession (Young et al. 2022).

In response to these environmental and social challenges, there have been multiple calls for transformations towards greater sustainability in agriculture. Transformation, in this context, not only require technical changes, but also social change at the individual, relational, cultural, and structural levels (IPBES 2019; Patterson et al. 2017; Skrimizea et al. 2020; Young et al. 2022). The prospect of a transformation towards a more sustainable agriculture involves many heterogeneous actors who not only belong to the agricultural worlds (farmers, technicians, etc.) but who also are external to it (inhabitants of rural areas, consumers, etc.). For example, it can include peer farmers, whose importance in the adoption of innovation has been demonstrated (Gosnell et al. 2019; Goulet et al. 2008; Janvry et al. 2017); technicians, who can be involved in “clarifying what is problematic, and in the emergence and evaluation of possible solutions” (Compagnone 2011, p. 125) or representatives of local authorities, who have the capacity to provide financial support.

Although a number of transformation pathways toward greater sustainability for agriculture exist in the scientific literature, two largely dominate: one based on technological progress to increase industrial production and the other oriented towards environmental preservation to increase biodiversity and ecosystem services (Hill 1998; Horlings and Marsden 2011; Levidow et al. 2013; Plumecocq et al. 2018; Wilson 2008). The existence of different perceptions by different actors of what sustainability should be and the multiplicity of possible ways to achieve it is likely to lead to conflictual situations. Ignoring the need to engage with conflict transformation can result in inequitable social-ecological states and undermine the sustainability of agricultural transformations (Bennett et al. 2019; Blythe et al. 2018; Panda 2018; Rickards and Howden 2012; Skrimizea et al. 2020; Vermeulen et al. 2018).

While conflicts are often perceived from a negative point of view (i.e. the negative impacts of conflict), together with other authors (Mouffe 2013; Rodríguez and Inturias 2018; Simmel 1955; Skrimizea et al. 2020) we believe that it is also important to consider conflicts as forms of interactions with potentially positive effects (i.e. the creative aspects of the conflict). Taking into account the diversity and heterogeneity that constitutes conflict situations entails finding common political or practical ground which can form spaces for collaboration and positive action (Abson et al. 2017; Butler et al. 2022). Furthermore, conflicts can reveal the state of social relations, allow us to analyze how some actions can support the “translation” of different stakeholders’ interests and knowledge (Hargadon 2002; Kristjanson et al. 2009; Latour 1992) and how collective actions can lead to transformations of the social world (Lemieux 2007). They can then allow us to better understand the

role of key actors that we have generically named "change agents"¹ and defined broadly as those who "take an active role in promoting or shaping the change" (Meharg 2020).

Much research on change agents has focused on their effectiveness or their ability to bring about change. From this perspective, studies have shown that the latter is related to personal characteristics such as empathy, connection, proximity or openness (Lunenburg 2010; Phipps and Morton 2013) and to cognitive abilities to "break the existing state of mind", to "keep the options open for a long time", to "suspend judgment", to "break the 'performance scripts'" (Amabile 1983). Distilling insights from health, education and international development, Meharg (2022) identified characteristics (i.e. an individual's personality such as personal values and beliefs, efficacy and mastery, entrepreneurship and creativity, roles) and competencies (i.e. combinations of skills, ability, behaviour and values which can be actively cultivated, such as being good with people, learning skills, and being adaptive) of change agents. In addition, studies have also identified the potential roles of change agents—often in the context of what makes them successful or not. In the specific context of transformation of agricultural systems and related conflicts, the role of change agents has been identified as being aware of the political and knowledge brakes and levers that exist in the system, engaging with stakeholders' power dimensions to transform conflict, integrating the spheres of science, practice and social movements, bridging the gap between mismatched top-down provisioning of institutions and bottom-up initiatives at the territorial level, and finally enabling the opening of solution spaces (Skrimizea et al. 2020).

Despite these different approaches to change agents, research tends to focus less on other dimensions that could explain their effectiveness such as "perceptions of the role and (especially) the value of brokers in society" (Klerkx et al. 2009). Likewise, research often focuses on individuals who are a priori defined as change agents and leaves aside questions concerning the factors that may lead some individuals to take on this role, including the institutional or social environment which can foster or hinder their competencies (Meharg 2022). In this paper we address these research gaps, in order to get a better understanding of who are potential agents of change on the ground in the context of conflict transformation in agriculture (RQ1)? And what make them so based on the perceptions of other stakeholders (RQ2)? Based on three case studies of agricultural change in France, we address these research questions by examining the types of actors and actions that stakeholders themselves consider as being necessary to transform the conflicts surrounding agricultural transformation.

Case studies and methodology

Case study sites

This study was conducted in the Bourgogne Franche-Comté (BFC) region in France. It covers 47,800 km², and is the fifth largest region of France, and of the least populated

¹ Research on these "key actors" in transformation processes often refers to them using various expressions such as "change agents" (Carnall 2008), "innovation brokers" (Klerkx et al. 2009), "change champions" (Fields 2005), "leader" (Olsson et al. 2004), "local champions" (Young et al. 2012) and "knowledge brokers" (Phipps and Morton 2013). Nevertheless, the literature review shows that authors most of the time do not specify why they use such or such expression. In order to be consistent throughout the article and to use a term with the capacity to encompass these multiple expressions, we decided to use the generic expression "change agent."

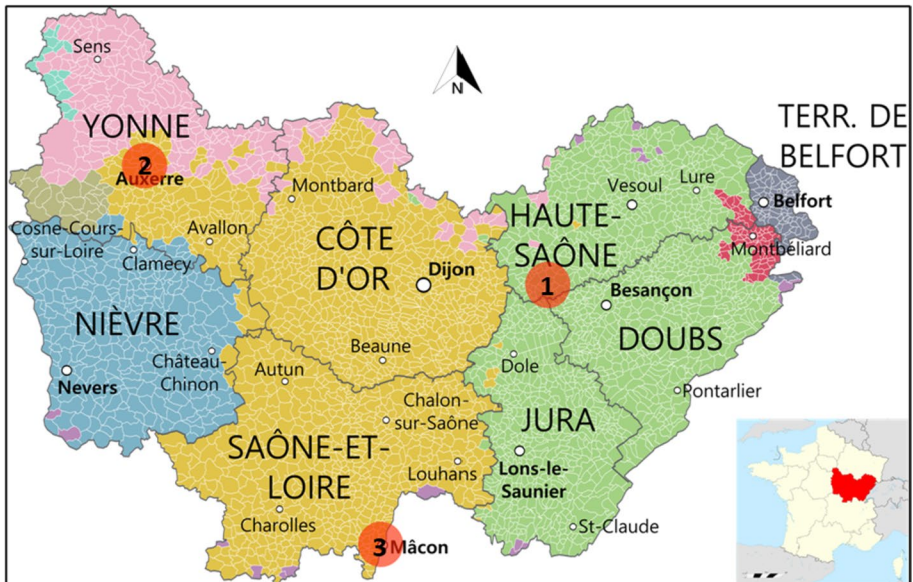


Fig. 1 Map of Bourgogne Franche-Comté region of France and the administrative departments, with the locations of the three study sites (red dots). Source: Authors

ones (59 inhabitants/km²). Agriculture covers almost half of the BFC and includes arable land, grasslands, dairy and livestock (mainly cattle) production, viticulture, and polyculture. The total production value of the agricultural sector is €5.6 billion, 37% of which is for wine production, followed by crop production (18%), cattle production (14%) and dairy production (13%). More precisely, after discussions with scientists, unions and NGO representatives and elected representatives, we selected three territories. Following the theoretical framework focused on conflict transformation developed by Skrimizea et al. (2020), case studies were chosen on the basis of the following criteria: (a) the presence of conflicts around pesticide use and a broader agricultural transition, (b) the existence of attempts to resolve these conflicts, (c) the opportunity to investigate different types of farming, and finally (d) the potential to collaborate with key regional actors (the *Association pour le développement de l'apiculture en Bourgogne-Franche-Comté* (ADABFC), the *Confédération des Appellations et des Vignerons de Bourgogne* (CAVB) and the *Communauté d'agglomération de l'Auxerrois*) to ensure the initial and continued relevance of the research to the challenges faced in each case study area (Calla et al. 2022). Rather than focusing on “resolved situations”, we have therefore chosen to focus our attention on cases requiring conflict transformation in order to identify stakeholders’ point of view about potential change agents. The three study sites are outlined below and in Fig. 1.

Study site 1, around the towns of Dole, Besançon and Vesoul, focusses on conflicts over pesticide use between beekeepers and (other) farmers (Calla et al. 2023). We chose this case study because of existing efforts aiming at transformational change through a research program trying to involve beekeepers and farmers around the issue of the effects of pesticides on bees. Study site 2 is in the Auxerrois water catchment area, where there is a conflict between stakeholders on how to manage water quality (Calla et al. 2021). It was chosen because of the important transformative work of local institutions over the last 30 years

to implement preventive measures to protect water catchment quality and to invite farmers to change their practices. Study site 3, around the towns of the relationship between winegrowers and local communities over pesticide drift from vineyards to local schools and homes. This territory witnessed a strong conflict between these two groups during the spread of the *flavescence dorée*—a damaging bacterial disease affecting vineyards—in the early 2010s and has the specificity of having many cooperatives that are attempting a transformation of their practices but also of the image of wine and viticulture.

Methodology

We followed a qualitative research design (Fetters and Molina-Azorin 2017) using semi-structured interviews (Young et al. 2018). Our interview guide (see Supplementary Materials 1) was part of a wider project in which interviewees were invited to share their experiences and express their values, perceptions, and knowledge on agriculture and its evolution in their region, their vision of a ‘transformed agriculture’ and their perceptions of enabling and disabling factors for such a transformation. The latter allowed us to identify elements concerning the actors who could facilitate change.

The recruitment process for interviewees began with a review of “grey literature”—particularly the local press, reports, and policy documentation—in order to gain a better understanding of the territories and stakeholders involved. This allowed for a compilation of potential key informants, as well as the identification of three key collaborators (mentioned above) because of their involvement in attempts to resolve the conflict situations. These key informants also suggested possible interviewees and we then followed a snowball sampling approach to recruit more interviewees. We also checked this list against our initial stakeholder review to add other interviewees and reduce any potential bias from the identification of stakeholders by our collaborators. Interviewees were engaged in, cared about, or were directly impacted by agricultural transformation in the respective case study sites. Our aim was not to gain a representative sample (for example, the sample of case study 1 does not include “elected officials” or “association representatives” because neither the review of grey literature nor the snowball sampling led us to this type of actors), but to find interviewees that could provide in-depth information on potential agricultural system transformation and associated conflicts and represented a diversity of interests and socio-cultural aspects within and across the three study sites (Patton 2002). We were especially interested in including the voices of people who were relevant to the issue but less heard and marginalized from decision-making processes (Calla et al. 2022). Thus, when we asked people to indicate who they thought we should interview, we specified our intention to have access to people with different points of view and degrees of participation, and we put specific effort in contacting and convincing those actors to meet us for an interview. This resulted in the identification of five interviewees considered as marginalized.

We carried out a total of 55 interviews, from July to September 2020: 21 interviews for case study 1, 17 for case study 2, and 17 for case study 3 (Table 1). Considering that the appropriate sample size in qualitative research is determined by data saturation (Patton 2002), these interviewees were found to be sufficient for the needs of our study. The interviews lasted for an average of one hour and a half and were conducted in French. For the analysis, we transcribed each interview, and the transcripts were corrected and imported into NVivo (QSR International Pty) for coding. First, the transcripts were analyzed by the authors breaking down the data and re-organizing it through coding. The codebook (see Supplementary Materials 2) was derived both from the analytical framework developed by

Table 1 Codes used to identify interviewees in the three study sites

Code	Occupation	Study site	N
Tech1-CS1 to Tech5-CS1	Technician/Consultant	Study site 1	5
Bee1-CS1 to Bee11-CS1	Beekeeper	Study site 1	11
Far1-CS1 to Far5-CS1	Arable farmer	Study site 1	5
Tech1-CS2 to Tech6-CS2	Technician/Consultant	Study site 2	6
Far1-CS2 to Far7-CS2	Arable farmer	Study site 2	7
Wine1-CS2	Winegrower	Study site 2	1
Elec1-CS2 to Elec2-CS2	Elected official	Study site 2	2
Asso1-CS2	Associative representative	Study site 2	1
Tech1-CS3 to Tech3-CS3	Technician/Consultant	Study site 3	3
Wine1-CS3 to Wine7-CS3	Winegrower	Study site 3	7
Asso1-CS3 to Asso6-CS3	Associative representative	Study site 3	6
Elec1-CS3	Elected official	Study site 3	1
			55

The first part refers to the occupation of people we interviewed (“Tech” for Technician/Consultant; “Bee” for beekeeper; “Far” for arable farmer; “Wine” for winegrower; “Elec” for elected official; and “Asso” for associative representative) – these are numbered sequentially. The second part refers to the study site (Study site 1, 2 or 3)

Skrimizea et al. (2020) and from the recurring themes emerging from the data which were not evident in the framework. The codebook was used to sort concepts within the interview text according to one or more codes or sub-codes. Thus, the data used in this article were mainly sorted by the codes “Agency”, “Agent of Change”, and “Enablers”. Text coded within each code and sub-code could then be quantified and cross-tabulated in NVivo to identify common themes. To mitigate individual researcher bias and increase consistency, inter-coder comparison analyses were conducted (Fereday and Muir-Cochrane 2006). In accordance with ethical clearances obtained and prior consent given, results were supported by interviewee quotations, which were anonymized using pseudonyms and generic profession (Table 1).

Results

Who are potential change agents?

Interviewees mentioned nine different types of actors who, according to them, are likely to enable change in agriculture – which are presented in Table 2 according to the encoded references.

Among these, agricultural structures, such as the Chambers of Agriculture, the agricultural cooperatives, and the unions were cited in 30% of the references. Regardless of their activity (i.e., field crops, winegrowing, breeding, beekeeping), farmers were considered as potential change agents in 18% of references. Local authorities, which include state services and regional councils, occurred with the same frequency. Interviewees also indicated NGOs dedicated to the protection of the environment in 13% of the references. Other actors also mentioned included citizens, scientists involved in

Table 2 Types of actors mentioned as potential change agents by interviewees (organized by their occupations, see Table 1)

Codes	Farmer (n=12)	Beekeeper (n=11)	Winegrower (n=8)	Technician (n=14)	Association representative (n=7)	Elected official (n=3)	Total (n=55)
Agricultural structures	38%	47%	31%	34%	11%	20%	30%
Farmers	29%	20%	28%	12%	5%	12%	18%
Local authorities	7%	0%	0%	31%	16%	48%	18%
NGOs	7%	7%	3%	7%	41%	12%	13%
Citizens	5%	0%	21%	2%	14%	8%	8%
Scientists	5%	0%	0%	10%	3%	0%	4%
Industry	9%	0%	3%	5%	0%	0%	4%
Educational institutions	0%	20%	0%	0%	11%	0%	3%
Medias	0%	7%	14%	0%	0%	0%	2%
Total	100%	100%	100%	100%	100%	100%	100%

The shades of green in the boxes in the table indicate the variation in mentions of potential change agents. A darker box means a higher number of mentions by the interviewees

groups of experts mandated to deal with local issues, industry, educational institutions such as agricultural secondary schools, and the media.

Interviewees tended to link change agents with their own social context. For example, association representatives and elected officials tended to present NGOs and local authorities (41% and 48%, respectively) as change agents. In the same way, technicians from agricultural structures or local authorities estimated that these were the most important (34% and 31%, respectively). Whatever the occupation of interviewees, agricultural structures were considered as one of the main potential change agents – except for the association representatives who conferred more importance to local authorities (16%) or citizens (14%).

What make these actors change agents?

Based on the qualitative analysis of interviewee perceptions on what makes a change agent, we aggregated responses under four main themes, namely the ability of change agents to “engage others”, “encourage bottom-up initiatives”, “create spaces for exchange”, and “go beyond boundaries”. Each is described and explored in turn in this section.

Engaging others

Firstly, as global changes and transformation processes of agriculture involve a wide range of actors, interviewees identified that potential change agent must be able to “engage others”. A first way of achieving it according the interviewees was to give visibility to transformations. On this point, interviewees mentioned the role that pioneers

can play in changing practices: “*There are farmers who have always been avant-garde and who try to anticipate things, so they too are pulling up the others*” (Tech1—CS1). Beyond these intentional actions of some farmers mobilizing others around new agricultural practices, they also insisted on the necessity to show the successful changes and make them tangible for others. An organic farmer explained: “*They can see that the organic farmers are making good wine today—this was not always the case 15 years ago—that the yields are decent [...]. So, I think that conventional farmers see that it is possible. Ten years ago, nobody believed in it, there were only 2–3 crazy ones like me*” (Wine4—CS3). And another farmer said: “*I want to set up a day, to open my farm... if that can change the vision of some people, that would be good*” (Far5—CS2). Moreover, this dimension seems to find its interest because “*Farmers like to be able to see, check, go and talk, etc., that plays a big part*” (Elec1—CS2).

Furthermore, this type of action to engage others also goes through the development of communication strategies. For example, a means to reach out to the general public mentioned by interviewees was the organization of events, conferences, or meetings: “*So what we did in Saône-et-Loire, in 2014 I think, was to write a charter for the good use of pesticides. [...] And, with this charter, we went afterwards to the communes, to the villages where there were concerns. With the mayor, with the wine growers, we held meetings to explain—and the people who complained, to explain to them*” (Wine7—CS3). But the dimension also finds its extension in the use of social media, which was seen as a means to engage with other farmers and more broadly the general public. Hence, a winegrower observed that more and more farmers invest in social media with the aim of publicizing their activities: “*There is a greater presence on social networks of agricultural actors. So, there you have it, it’s also a way of reaching a bit more people. [...] we should also go to the next stage and make links with other social networks and spread it like that*” (Wine1—CS2). Despite social media tending to reach already convinced people, interviewees considered that their strength was the capacity to address a large group of people, including “new generations”, considered as “*our best ambassadors*” (Asso1—CS3). Indeed, as young people were considered a lever to engage with a more general public – including their parents – NGO representatives stressed the need to engage with the next generation of farmers: “*For two years now, I have been working at the agricultural college. [...] You can’t convince everyone overnight. Some people are a little more closed than others, but the message gets through all the same. That’s important*” (Bee11—CS1).

While visibility and communicating were seen as important, interviewees also considered the need to find the right arguments to engage others. The capacity to mobilize farmers therefore also depended on how the need for change was presented to them. As such, a technician explained that engagement about more sustainable agriculture may begin with a focus on economic rather than environmental issues: “*My perception is that a large number of farmers, I don’t know if it’s the majority, are thinking of [...] the fact that we’re having difficult years, and that thinking about how to improve the margin of a crop or a rotation also involves reducing the use of phytosanitary products, which are a big part of the costs*” (Tech1—CS2). That is not to say that farmers are mainly interested in economic aspects. Indeed, the same interviewee explained that their attachment to a diversity of issues may be used as leverage to bring about change – which leads us to consider that a change agent may also be characterized by their capacity to find the right argument or entry point to mobilise others: “*We have several groups of farmers who are very interested in agroecology, and in particular soil conservation agriculture. [...] This is a motivation that dates back ten years or so, the shift from the*

question of water protection to the soil. In fact, I think that the soil has been a way of getting farmers interested in thinking about their practices, which we couldn't do with water quality" (Tech1—CS2).

Finally, whilst some actors such as elected or union representatives were already in political and technical arenas, for others such as NGOs the process of engagement requires time and effort but was seen as worthwhile for the legitimacy it affords them: *"We have a big job in making [our] case to elected officials, to enquiry commissions, to public consultations. [...] We say, "watch out, there's this, you didn't think of that". [...] But we are also listened to, there are elected representatives who come to ask us for help"* (Asso1—CS2). This process can also be facilitated by making oneself indispensable for choosing the pathway to a more sustainable agriculture – in particular by developing expertise and gathering evidence. Indeed, the latter was considered as a mean to support alternative practices: *"Where we perhaps didn't have too much data a few decades ago [...] today we are beginning to have figures, data, and hindsight with regard to the benefits of organic farming on water resources, the environment and the soil"* (Far1—CS2).

Encouraging bottom-up initiatives

Because of what they considered as the limitations of top-down actions, interviewees mentioned that a potential change agent must be able to "encourage bottom-up initiatives" – especially if they could be supported by local authorities. Some interviewees, however, saw this action as difficult to implement within the current French administrative system: *"In France, there are specifications that must be respected. That's why there were problems, including in school canteens because you can't say "I want to buy from such and such a farmer". You have to do something general, and a call for tenders; and for a long time, these calls for tenders were won by the lowest bidder"* (Elec1—CS2).

Nevertheless, interviewees gave several examples. One mentioned the role played by a wine producing cooperative: *"we've had initiatives from our colleagues who have put in flowering fallows, bat nesting boxes, and one of them has put in sheep to graze in winter [...] So we're also working on that"* (Wine7—CS3). NGOs could also have a key role to play. For example, a beekeeper found support from NGOs to develop projects for the transformation of unused areas into flowering meadows; while an organic farmer who wanted to plant hedges explained that he found support from an NGO with this expertise. On the support from NGOs, one farmer remarked: *"It's a good thing they're here because they make things move forward as much as we do. We're going around in circles within the agricultural profession, and to be supported by people is good for morale and it also [...] reinforces a certain message with the authorities where decisions and actions can be taken"* (Far1—CS2). In order to achieve this, interviewees insisted on the importance of avoiding ready-made solutions and listening to stakeholders' suggestions: *"You have to have a real desire to go further but I think you have to listen to what they [farmers] have to say rather than impose things on them. They don't like that at all"* (Elec1—CS2).

They highlighted three types of interventions that could facilitate a bottom-up dynamic. First, was training aimed at farmers: *"The difficulty is to be able to retrain, so you have to follow a training course, you have to knock on the right doors: that's already a struggle. So, the state should facilitate all this. And then, there is a whole support system. [...] Well, there are structures that exist but for me, it's not enough. And that, in my opinion, is the responsibility of the State"* (Asso1—CS3). Second was improving the capacity of actors to use/experiment with tools which are necessary to take an alternative pathway: *"for this*

method, you need a special seeder. So, it's a problem of investment. So, the association [...] has invested in a seeder and we allow people to use it, to try it out on a few hectares [...] so that they can try it without any financial risk. And if it suits them, they can get together and buy their own seeder after a few years" (Far7—CS2). Finally, facilitating experiments were highlighted: *"We're happy to just allow access to our vineyards, we get a little bit of feedback, we're happy that it's being done, these kinds of observations, by highly competent and motivated people"* (Wine1—CS2). These were all linked to the need for financial support to these initiatives. Indeed, as a technician said: *"Supporting the farmer in changing his practices is perhaps one of the keys to ensuring that one day he will continue with these agricultural practices. Moreover, this is the principle of subsidies"* (Tech4—CS2).

Creating spaces for exchange

As the calls for a transformation of agriculture toward more sustainability implies exploring and discussing current practices, norms, and values, to find existing solutions or new pathways, interviewees explained that a potential change agent must be able to "create spaces for exchange". On this point, farmers agreed on the important role agricultural structures play in creating these types of spaces, especially through groups dedicated to the exchange of experiences and advice. One organic farmer highlighted some of the benefits of such groups: *"We see the fields, we discuss, we simply meet with colleagues who are members and we go from farm to farm to see the crops, the problems and then we bring in a technician who brings us [...] practices that are done in other departments to try to move forward and be at the top of this type of agriculture"* (Far5 – CS2). These types of fora, especially when focused on technical aspects seemed to appeal to farmers. Moreover, these interfaces can also go beyond farmers and integrate non-agricultural groups, despite their sometimes-disappointing attendance levels: *"The Chamber of Agriculture really tries to hold a lot of meetings, but the problem is that the last meeting we held between wine growers and local residents, there were five people from the local residents who came"* (Wine6 – CS3).

Potential change agents have to facilitate exchange between heterogeneous actors in the same region (i.e., farmers, inhabitants, local elected official): *"I think that what is missing the most is the communication between these worlds. The winegrowers remain a bit in their bubbles, the public lives in the city... well, lives something else and when they come to the vineyards it's to go for a walk. But they don't think that there are people who work there"* (Ass-2—CS3). Such exchanges can be formal, for example through meetings, conferences etc., but one interviewee also highlighted the importance of less formal settings: *"After the meeting, which lasted about two and a half hours, we had an organic drink. People talked to each other for more than an hour and I think we made progress. Because the most reluctant people could ask their questions directly to the researchers and the researchers were there to answer. [...] It had the merit of mixing everyone together and of decompartmentalizing. Because that's what happens. There are those who are right, there are those who do this, who argue, those who do something else, etc. No, here we invited everyone, and everyone expressed themselves and everyone could express themselves. And they expressed themselves individually after the conference. And that's good"* (Ass-1—CS2). Nevertheless, despite the qualification of this event as a success, the representative concluded that *"It was a crazy job and we thought "we're not structured to do this stuff"*", raising the question of the capacity of these NGOs to drive change through creating spaces for exchange.

Going beyond boundaries

The discourses from interviewees revealed that a potential change agent must also be able to “go beyond boundaries”. First, this type of action can be understood in spatial terms and relates to the capacity to allow actors in one area to observe what is happening elsewhere. For example, a farmer explained: “*We moved around, we travelled, we left our area to discover other production methods, because it’s new for us, but there are farmers who have been practicing it for 20 or 30 years in France, so we had to travel a bit to realize what was going on and try to evolve*” (Far3—CS2). An elected representative said that this experience allowed a change in the actions of local authorities: “*the Water Agency saw that the Germans were doing things that were not feasible in France. So, they started, I think last year, to create an experimental zone in France, where there are subsidies which would be—if I understood correctly—managed by the local authority to change agricultural practices*” (Elec1—CS2).

Secondly, it also can take a structural dimension. On the one hand it refers to a capacity to scale up. From the field to the institution—often requiring the involvement of agricultural structures: “*Apart from the farmers and beekeepers who can meet, it’s good to also involve the chambers of agriculture with, sometimes, technicians. Because these people can report to their colleagues within their structures. And then, as a result, it opens up a channel for discussion*” (Bee5—CS1). The scaling up also goes from the field to the territory, again with a key role for agricultural structures: “*The work of bringing the farmers, of making them think about the territories, I would say that it’s a lot of the work of the facilitators that I have in my team*” (Tech5—CS2). And on the other hand, the structural dimension refers to the decompartmentalization of siloes within the local authorities. One interviewee summarized the situation by explaining that: “*Sometimes we have the impression that everyone has the same level of knowledge, awareness of the issues and problems, and when we propose things, we realize the gap, and as a result, the lack of understanding that this generates, and which means that we don’t achieve our goal*” (Tech1—CS2).

Finally, going beyond boundaries can take a temporal dimension. Here, acting as a change agent relates to bridging temporal boundaries imposed by electoral agendas and political cycles. For example, a technician explained that a constraint on the process leading to change is the turnover observed in institutions—whether at the level of local state services or communities: “*If there isn’t a guideline that remains valid regardless of who is elected, everything collapses. And this is a real difficulty in the work that we can carry out in the territories. It’s how you keep the thread and who can keep it because it’s also a question of legitimacy*” (Tech5—CS2). Moreover, regarding the need to protect water catchments, the same technician mentioned that: “*we spent over a year discussing this with the community on the one hand, and with the farmers on the other, and things moved a little, but now, poof, we have the impression that it’s all over, it’s immediately forgotten. What will remain of it in the future now the administration has changed?*” (Tech5—CS2). A priority was therefore seen to be the continuity of action through political or institutional cycles.

Discussion

This study focuses on three cases studies where calls for transformation towards greater sustainability have led to conflictive situations. These result from different stressors (bee mortalities, water pollution and concerns of the local population) and a French government plan (Ecophyto) aiming for a 50% reduction in the use of pesticides by 2018 and then 2025. Because this kind of situation can see the emergence of change agent contributing as a catalyst for change, we aimed to better understand who the potential change agents in agricultural transformation context are, and what make them so according to stakeholders involved in conflict transformation.

First, we find that different types of actors are considered by interviewees as being potential change agents, capable of exploiting the conflicted environment to catalyze a step-change in the system. Farmers, representatives of agricultural structures, local authorities and NGOs were most often mentioned with a correlation between belonging to a particular social group and the perception of actors who could become change agent. In our case, the diversity of potential change agents shows that there is not necessarily a common point of view concerning a type of actor who would be better able than others to promote change. It seems that any actor engaged in a problematic situation can become a change agent. Furthermore, because these different types of actors do not have the same resources (practical, cognitive, economic, etc.), it also suggests that there is not necessarily agreement on the means to achieve transformation (Calla 2020). Consequently, this multiplicity of identified actors and the heterogeneity of their resources invite us to deviate from the view that fostering a change can be considered as the exclusive attribute of a priori defined actors (Cerf et al. 2011; Rodriguez et al. 2009). Therefore, if a range of different actors seem to be considered as potential change agents, the question is less about *who* can become a change agent and more about *what* makes them a change agent.

Thus, we secondly find that interviewees identified potential change agents through their ability to carry out four main actions. “[Engaging others](#)” was linked to actions such as making visible the successful transformations, communicating with appropriate arguments, and making oneself indispensable. “Encouraging new initiatives” consisted in avoiding ready-made solutions and listening to stakeholder suggestions, as well as training and experimenting new solutions or pathways, and subsidizing initiatives. “[Creating spaces for exchange](#)” related to the need for sharing experiences and advice, and for bringing together the heterogeneous actors concerned by the transformation of agricultural systems. “[Going beyond boundaries](#)” referred to the actions that consist of moving from an area to another to explore other systems, scaling up from the field to the institution or the territory, and bridging temporal boundaries imposed by electoral agendas and political cycles. These actions identified by stakeholders are all linked to change agents’ relations with others (between actors, projects, social groups, etc.). This emphasizes the fundamentally relational nature of change and means that a change agent does not emerge from itself or by someone’s decision but through other actors concerned by a situation.

The difficulties of identifying the agents who can bring change and that the latter involves heterogeneous actors then invite us to highlight the importance of what occurs during participatory processes. Indeed, as shown in other research contexts, encouraging social learning and knowledge co-production amongst multiple stakeholders (e.g. in climate adaptation processes) (Kristjanson et al. 2014) and community development (Brown and Lambert 2015), can foster the emergence of change agents and transformative capacity (Butler et al. 2015; Olsson et al. 2004). The partnerships and learning networks established

can create local arenas for innovation in governance and technology allowing ‘bridge-heads’ of transformative practice to develop (Butler et al. 2016; Wollenberg et al. 2007). Thus, because change cannot come from a single actor, it seems that instead of focusing on the search for “the right person”, we should rather study “change networks” (Howells 2006; Klerkx et al. 2009). While such change networks can emerge as part of this type of processes we nevertheless have to remember that initiatives and policies that promote local innovation and experimentation are an important prerequisite (Klerkx et al. 2009).

Furthermore, these findings highlight that change agents cannot only be defined on the basis of attributes such as certain personal characteristics and skills (Amabile 1983; Lunenburg 2010) or competencies (Meharg 2022) but also by what they do in given situation. While it confirms their importance in bridging gaps between the spheres of science, practice and social movements, bottom-up and top-down initiatives at a territorial level (Skrimizea et al. 2020), our results allow us to go further and consider the importance of defining change agents by what actors do (Wiesmann et al. 2011) in moment that some authors have called “tests”—i.e. moments of crisis in which concerned people have to show what they are capable of (Boltanski and Thévenot 2006; Martuccelli 2015). As such, agricultural systems should be analyzed as comprising of heterogeneous actors entangled in a multitude of events that punctuate their trajectory. Then, the success or failure of a change process cannot only be determined by the characteristics of one actor, or from contextual elements alone but instead, depends on a phenomenon of co-determination. Our results highlight that a change agent does not emerge in an environment closed in on itself. It happens when actors are facing contextual events – which reinforce the idea of change processes as a multitude of windows of opportunity (Butler et al. 2016; Kingdon 1984; Olsson et al. 2004; Westley et al. 2013).

Assuming the presence of actors with singular characteristics and competencies that must mobilize when some specific crises require it implies that people seeking to create change must wait for windows of opportunity to open. Nevertheless, we can ask whether agents should only be attentive to the emergence of an opportune moment to act, or whether they should instead adopt an active posture and create these windows of opportunity. We must then recall that the windows of opportunity are often described as a phase of the change process that appears following preparation for the system to change (Butler et al. 2016; Olsson et al. 2004). On this basis, we suggest that while episodes of conflict are always likely to attract the attention of researchers because of their visibility (Gilbert and Henry 2012), it is also necessary to shift our focus from them to more confined spaces where a multitude of incremental actions are played out, which slowly and quietly build partnerships and ‘bridgeheads’ for the emergence of change networks and the transformation of agricultural systems (Butler et al. 2016).

Conclusion

Our study shows that change agents cannot be defined a priori but emerge in situations in which a window of opportunity is opened, by performing activities supported by a logic of association. We suggest that proactive and participatory processes are necessary to bring these latent change agents together, building their capacities and competencies to establish ‘bridgeheads’ ready to capitalize on windows of opportunity when they emerge, or to form the critical mass to create the window themselves. This may require a type of actor which is external to the situation to catalyze this process, including researchers themselves.

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Declarations

Competing interest The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: J.Y., S.C. and L.L. reports financial support was provided by French National Research Agency.

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