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Advancing Food System Transformation and Addressing Conflicts Through Transdisciplinary Methodologies: Strengths and Limitations of the Community Voice Method, T-Labs, Film-Making and the Miracle Question

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Food systems are changing through various socioeconomic and policy processes. For example, in France, following concerns over the effects of pesticides on ecosystems and health, the French government launched the "Ecophyto II+" plan in 2019 that aims for a 50% reduction in the use of pesticides by 2025. This top-down food system transformation is leading to conflicts between stakeholders over how to enact such a policy, and its implications for farmers and their practices. By adopting a transdisciplinary research approach, we explore conflicts linked to food system transformations in the context of three case studies in France. The case studies revolve around conflicts over pesticide use and reduction in three agricultural settings in Bourgogne Franche-Comté, namely (a) water management near Auxerre, (b) apiculture-agriculture relations in the Jura, and (c) viticulture-local resident relationships near Macon. We use four innovative transdisciplinary techniques to integrate inclusively the viewpoints of diverse stakeholders with the aim of generating actionable responses to transform food systems. First, the Community Voice Method (CVM) includes filmed semi-structured interviews and integrates a number of opportunities for participation and successive rounds of data analysis. Second, the interviewees were asked a "miracle question" that encouraged them to step back from conflicts and practices toward their ideal vision of agriculture and food systems. Third, the CVM resulted in the production of four films that relate the visions and perception of each case study interviewees in their own words and in their own setting. Finally, Transformation Labs (T-Labs) conveyed the main results of the CVM knowledge synthesis through the films produced and opened a dialogue toward the development of solutions. We review the four techniques, how they were implemented in the three case studies, and with which outcomes. Thus the aim of this paper is to offer reflections and lessons learnt from different transdisciplinary processes as a means of strengthening their application in other contexts. We argue

that such methodologies, whilst resource-consuming, are essential to fully understand the complexity of food system transformations from the often-conflictual perspectives and competing knowledge claims of the multiple actors involved. In addition, we highlight the role of these techniques in building long-term trust between researchers and other stakeholders, and the benefits in terms of opening up dialogue and developing long-term solutions, as determined by the stakeholders themselves.

Keywords: agriculture, Community Voice Method, films, transformation, participation, Transformation Labs, workshop, conflict

INTRODUCTION

In light of the importance of tackling the current crisis relating to biodiversity, a number of political commitments have been made. One of the most important ones is the UN General Assembly's adoption of the 2030 Agenda for Sustainable Development in 2015, where governments are committing to achieving 17 Sustainable Development Goals (SDGs) over the next 15 years. However ambitious the SDGs are, it is clear that by missing so many previous political commitments to address the biodiversity crisis, there is an urgent need for a fundamental transformation in the way in which we tackle the issue. This is particularly relevant to the agricultural sector, which covers ∼40% of the EU in terms of land coverage (EUROSTAT, 2018). This sector is considered a main driver of environmental degradation (Stoate et al., 2009; Pe'er et al., 2020) due to the extensive adoption of intensive, mechanized, and chemically-based farming to meet the growing global demand for agricultural commodities (Henle et al., 2008; Stoate et al., 2009; Zabel et al., 2019; Vanbergen et al., 2020). Governments are putting measures in place to respond to the challenge of maintaining biodiversity while ensuring food security (Tilman et al., 2011; Kastner et al., 2012). This aims at achieving a general movement of sustainable agricultural transformations, defined here as processes that "imply changes in cognitive, relational, structural and/or functional aspects of agricultural systems aiming at new qualitative and/or physical outcomes that contribute to social justice and environmental integrity in agriculture and beyond" (Skrimizea et al., 2020, p. 257). This is the case in France, where the "Ecophyto II+" plan was launched in 2019 aiming for a 50% reduction in the use of pesticides by 2025.

The trade-off between productive agriculture and farmland biodiversity can, however, lead to conflicts, which are understood here as social conflicts among actors with different, and often conflicting, attitudes, and where power asymmetries between actors occur (Redpath et al., 2013). In the case of the dramatic and rapid change in France over pesticide use—here perceived as a top-down food system transformation—conflicts between stakeholders are emerging over how to enact such a policy, and its implications for farmers and their practices (Lecuyer et al., 2022). Viewing such conflicts as expressions of more systemic issues and symptoms of unsatisfied needs and marginalization of certain stakeholders (Skrimizea et al., 2020), it becomes clear that sustainable (agricultural) transformations are complex and contested governance challenges.

Addressing the sustainable agriculture transformations challenge requires changing how decisions are made and strategies are developed by bringing together the competing knowledge claims of "experts," academics, practitioners, policy makers and citizens (Kenter et al., 2019; Wyborn et al., 2019; Ainsworth et al., 2020). Researchers have considerable agency and responsibility in participating in or creating conditions for transformations (Pereira et al., 2020; Whitfield et al., 2021). In this respect, many alternative types of research processes that aim at being more participatory and thus more democratic, inclusive and transdisciplinary have emerged (Wyborn et al., 2019; Pereira et al., 2020). Transdisciplinarity refers to a "reflexive, integrative, method-driven scientific principle aiming at the solution or transition of societal problems and concurrently of related scientific problems by differentiating and integrating knowledge from various scientific and societal bodies of knowledge" (Lang et al., 2012, p. 26). "Knowledge co-production" is a form of participatory transdisciplinary process that has gained momentum in sustainability science and practice. Knowledge coproduction is defined here as an "iterative and collaborative process(es) involving diverse types of expertise, knowledge and actors to produce context-specific knowledge and pathways toward a sustainable future" (Norström et al., 2020, p. 2). Such a process is particularly important (and challenging) in conflict situations around transformative change, where many actors have a stake in the issue (not always solely at the local level), where stakeholder values and practices are central to both conflict development and management, and where stakeholders can use knowledge as a form of power—either to strengthen their own positions, or undermine others (Hodgson et al., 2018). Nevertheless, while a growing body of literature shows that knowledge co-production in an action research setting is fundamental to achieve sustainable transformations, co-production discourse and practice has also been critiqued for insufficiently attending to conflicts and power relations overlooking what we previously described as unsatisfied needs and marginalization of certain stakeholders (Blythe et al., 2018; Chambers et al., 2022). Chambers et al. (2022) recently argued for the need of engaging with co-production methodologies that address this gap by embracing the tensions of transformative processes and jointly elevating, questioning, exploring and navigating conflicting agendas within. In this paper, we contribute toward these gaps related to

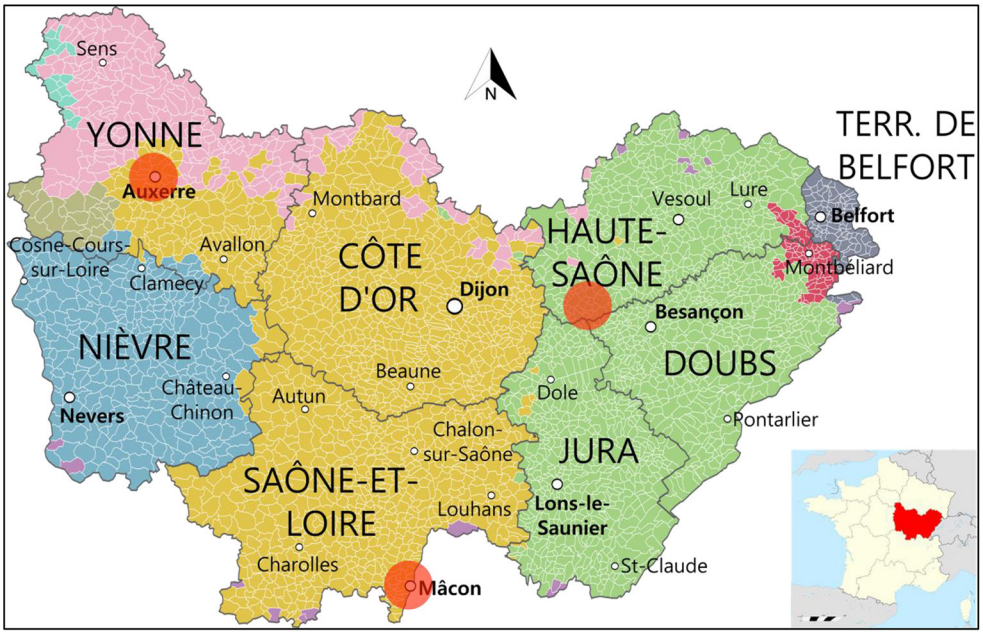

FIGURE 1 | Map of Bourgogne Franche-Comté region of France and the locations of the study sites (red dots). Source: Authors.

transdisciplinary methodologies capable of addressing conflicts and power relations in the context of transformative change.

The aim of this paper is to offer reflections and lessons learnt from different transdisciplinary processes as a means of strengthening their application in other contexts. In particular we focus on the lessons learnt from a participatory approach seeking to address the conflicts linked to food system transformation in three French localities. The case studies we used in our research all revolved around conflicts over pesticide use and reduction in three distinct agricultural settings in Bourgogne Franche-Comté: water management near Auxerre, apiculture-agriculture relations in the Haute-Saone and viticulture-local resident relationships near Macon. We used four innovative techniques, (a) a Community Voice Method, (b) a miracle question, (c) films and (d) a Transformative Labs approach. The focus was to integrate inclusively the viewpoints of academics and societal stakeholders (considering power relations) and translate the outcomes of this transdisciplinary process into actionable responses to transform food systems, namely context-specific knowledge, and pathways toward a sustainable future. We review each method in turn before reflecting on their applicability and outcomes, and on how future methodologies can be evaluated and improved upon in the context of transformative change.

METHODS

Case Studies

Three case studies were selected for this study (see **Figure 1**; **Table 1**), all of which are in the Bourgogne Franche-Comté (BFC) region in the east of France. The selection of the region was dictated by the funding source, as the project was funded by the French National Research Agency as part of a wider programme called I-SITE-BFC ("Initiatives Science Innovation Territoire Economie en Bourgogne-Franche-Comté"). This programme aimed to bring in more knowledge, cultures and international exchanges to Bourgogne-Franche-Comté by appealing to foreign scientists, and in turn, use this knowledge and exchange to enhance research contributing to knowledge of the BFC. As part of the funding programme, the topics suggested in the proposals were very open, with a general guideline that projects should contribute to knowledge on socio-ecological and food transitions.

The Bourgogne Franche-Comté (BFC) region covers 47,800 km^2, and it is the fifth largest region of France. At the same time with 2.8 million inhabitants (2017) it is one of the least populated regions in France (59 inhabitants/km^2). Agriculture occupies almost 50% of the regional surface area, with a diversified sector that includes arable land, grasslands, dairy and livestock (mainly cattle) production, viticulture, and polyculture. In 2018, the total value of production in the agricultural sector was around €5.6 billion, subsidies excluded, with crop production accounting for over 18% of the value, 37% of which was for wine production, cattle production (14%) and dairy production (13%) (Agreste, 2019). It is worth noting that some of its agricultural output such as Burgundy wine and Comté cheese are world-renowned.

The selection of the three case studies within the BFC region followed an iterative process that built on informal interviews with key stakeholders of the region, including scientists, union representatives, NGO representatives and elected representatives. Together they suggested a range of key themes and case studies. We then focused on those case studies that demonstrated conflicts, and where a transformative change approach could be possible. We then liaised closely with key collaborators in

TABLE 1 | General characteristics of the three case studies.

	Case study 1	Case study 2	Cade study 3
Main conflict focus	- Contested impact of pesticide use on bees	- Contested impact of pesticides on local communities	- Contested approaches to mitigate pesticide impacts on water quality
Key stakeholders	- Beekeepers (professionals and amateur); - Arable farmers	- Wine producers (organic and conventional) - Local communities (individuals and associations) - Elected representatives	- Arable farmers (organic, conventional, soil conservation) - Elected representatives - Environmental organizations
Current efforts to address conflicts	- Experiments and workshops with key stakeholders organized by the ADABFC	- Communication pamphlets aimed at local communities for improved understanding of wine production - Local charter developed by wine production associations to set guidelines on pesticide use	- Local water charter signed by a number of local farmers

each case study area, including (a) the Association pour le développement de l'apiculture en Bourgogne-Franche-Comté (ADABFC), (b) the Confédération des Appellations et des Vignerons de Bourgogne (CAVB) and, (c) the Communauté d'agglomération de l'Auxerrois. This process, which consisted of in-depth discussions with our collaborators prior to the start of the research but also at regular intervals during it, was essential to ensure the initial and continued relevance of the research to the challenges faced in each case study area. The characteristics of the three case studies are outlined below and in **Table 1**.

The first case study explored conflicts between beekeepers and (other) farmers (as many beekeepers consider themselves farmers) in the region, focusing on the use of pesticides around the towns of Dole, Besancon and Vesoul. With over 4000 beekeepers and 105,000 hives, BFC is the 5th largest beekeeping region in France (Agreste, 2019). This case study is essentially embedded within the broader context of the natural and important relationship between beekeepers and other farmers. Beekeeping requires areas that are managed by other farmers where bees can forage to collect nectar and pollen, and produce honey and other hive products. Conversely, bees ensure pollination, thus contributing to the production and quality of many crops. However, simplified crop rotations, a scarcity of agro-ecological infrastructures (e.g., hedges, field margins), and the use of crop protection products, medicines or other chemicals used in agriculture that are toxic for bees (domestic and wild) can lead to episodes of bee mortality, or at least a lack of abundant and diverse food resources for bees (Vanbergen and The Insect Pollinator Initiative, 2013). This alters the "win-win" relationship that may exist between beekeeping and farming, and leads to conflicts. As a result, various European and French legislative tools have restricted and banned the use of insecticides believed to be harmful to bees and other pollinating insects. This fragile balance between beekeeping and other farming activities (and the associated legal changes imposed on farmers' practices) have often mobilized the latter, who claim to lack alternatives, while finding themselves amidst scientific uncertainty about the degree to which their practices are indeed to blame for bee loss (Cailloce, 2016). In the context of our case study, and to address such issues, the "Association pour le Développement de l'Apiculture en Bourgogne-Franche-Comté" (ADABFC) has initiated technical experiments and dialogue between beekeepers and other farmers, as part of a wider research project aiming at promoting mutual understanding and cooperation.

The second case study explored conflicts between wine producers and local communities over concerns regarding pesticide drift from vineyards to local schools and homes. Our study sites were located around the towns of Chalon-sur-Saone and Mâcon, which form the renowned viticulture areas of the Côte Chalonnaise and Le Mâconnais. Due to its climate, Bourgogne is highly susceptible to agriculture-related diseases. For example, between April and July, whenever there is a risk of disease outbreak, wine producers spray pesticides to control disease and pests, particularly mildew and powdery mildew. As in other parts of France (as well as other parts of the world), the aerial spraying of pesticides has met resistance from local communities (especially neo-rurals) but also tourists in Saône-et-Loire. Considering that this type of conflict concerns diverse agricultural practices and is prevalent in many parts of France, in December 2019, the French government reinforced related measures with a decree (Décret n°2019-1500 du 27 décembre 2019) on Zones Non Traitables or "buffer zones." This prohibits the spraying of pesticides within 10 meters from settlements for crops over 50 cm high (e.g., vineyards) and within 5 m for others. Since its draft proposal, the decree has raised concerns among Burgundian wine producers, who fear that such a buffer zone could affect the area of vineyards, impacting negatively their annual turnover. In addition to these existing concerns, a new study was launched in November 2021 by Santé France Publique to study the health impacts of pesticides on humans, using wine production as its case study. This is concerning for wine producers who feel they have been targeted and that results of that study may worsen relationships between them and local communities.

Our third case study was around the Auxerrois water catchment area, where there is a conflict between stakeholders on how to manage water quality (Calla et al., 2022). This is associated with problems arising from the past use and resulting high concentrations of nitrates and residues of phytosanitary products associated with cereal farming in the area. The conflict started as far back as the 1990s, when the services in charge of monitoring the quality of the water distributed in the catchment area's

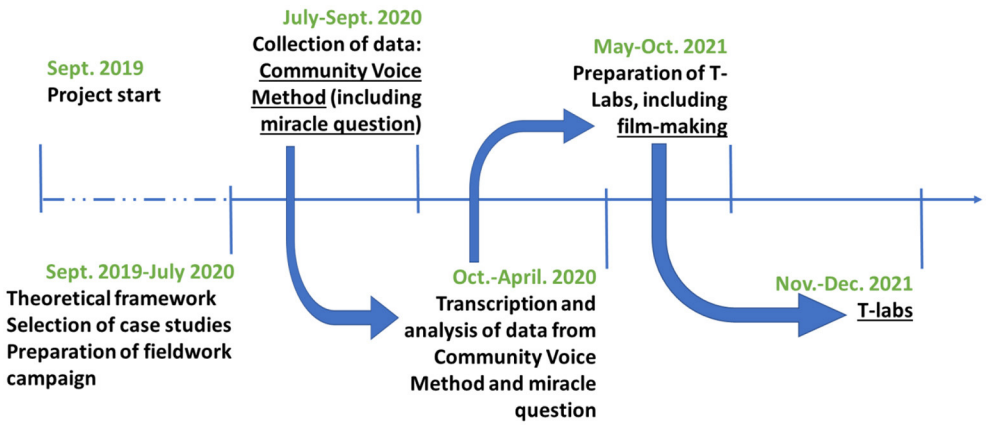

FIGURE 2 | General research approach and timings.

networks, observed that the maximum threshold for nitrates was exceeded (Calla et al., 2022). The situation became so strained that in 2018, the Regional Health Agency was asked to consider emergency scenarios, including the distribution of bottled water for 70,000 inhabitants. Whilst "curative" approaches such as the construction of a treatment plant were considered, eventually a "preventive" solution was selected. This consisted of working with farmers by transforming agricultural practices through systems that use fewer inputs (mainly fertilizers and plant protection products), if not abandoning synthetic inputs altogether. Farmers have reacted in different ways to this approach. Some have chosen to convert to organic farming and do without chemical inputs, others have opted for soil conservation agriculture which works through a limited use of chemical inputs (but above all the abandonment of plowing); while others have preferred to take a "reasoned" approach by signing up to agri-environmental measures. The results, however, are perhaps slower to emerge than was anticipated, and a new administration is now pushing for the curative approach. The issues that collaborators were keen to focus on were how to ensure the greater compatibility between the curative and preventive approaches, and how to maintain collaborative relationships in the long-term.

General Research Approach

Our research followed a qualitative multi-method research design (Fetters and Molina-Azorin, 2017). Four main techniques were used in this study. First, a Community Voice Method (CVM) where interviewees were filmed (Community Voice Method and the Miracle Question section). Second, as part of the interviews, participants were asked a "miracle question," to encourage them to step back from conflicts and practices to their ideal vision of agriculture in terms of individual, relational, structural and cultural transformations (Community Voice Method and the Miracle Question section). Third, the result of the CVM resulted in the production of four films that relate the visions and perception of each case study participants in their own words and in their own context (Films and Transformation Labs section). Fourth, the films were screened as part of Transformation Labs (T-Labs) to convey the main results from the knowledge synthesis approach, and to open dialogue toward the development of pathways (Films and Transformation Labs section).

Figure 2 outlines the succession and timing of the four techniques, while Data Collection and Analysis section provides more information about the implementation of each of these four techniques. Finally we elicit the main lessons learnt from the design and implementation of these techniques through a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats). Our research was carried out with ethical clearances obtained from the Université de Bourgogne Franche-Comté (CERUBFC 2021-06-15-017-2) and prior written consent given by each participant.

Data Collection and Analysis

Community Voice Method and the Miracle Question

The Community Voice Method (CVM), based on filmed semi-structured interviews, is an approach to public participation and participatory research that integrates a number of opportunities for participation and successive rounds of data analysis (Ainsworth et al., 2019). In the context of conflicts and transformative change, CVM has a number of strengths and opportunities. A CVM follows a step-wise process, consisting of in-depth interviews and analysis, which we followed in our research:

Initially in-depth recorded and filmed interviews were conducted with stakeholders to understand the underlying discourses in each site. We designed a guide for semi-structured interviews (see Box S1 in **Supplementary Material**) (Young et al., 2018) as a basis. In the context of this study, the interview guide was designed to allow interviewees to share their experiences and express their values, perceptions, and knowledge related to agriculture and its past, present and future evolution in their territory (Questions 2–5). We focused on exploring the interviewees' vision of an ideal (future) agriculture and their perceptions with regard to enablers and disablers for a

transformation to take place toward this ideal vision (Questions 3 and 5).

As part of the interview, interviewees were asked a "miracle question," inspired by solution-focused therapy (de Shazer, 1985). We asked interviewees to imagine that, after their normal working day, they went to bed and during the night a miracle happened, that resulted in a transformed and ideal agriculture. The slight particularity was that no one told them that the miracle had happened. So the question becomes how would they know this miracle had happened, and what would it look like. What is important is not the miracle question itself, but what it triggers at the intrapsychic and relational levels. The miracle question allows a shift, freeing the interviewees from the discourse of complaint. In other words, (s)he leaves the position of victim to become active, and (s)he finds solutions to implement in their emotional and professional environment, and their relations (de Shazer et al., 2007).

We purposively selected interviewees through a combination of stakeholder analysis and snowballing that aimed at identifying key informants. Once the case study was selected (see section Case Studies), we carried out a stakeholder analysis based on the analysis of policy documentation, scientific literature, local press, and other reports. This enabled the compilation of potential key informants, as well as the identification of three key collaborators, one for each case study, who were the first to open the field to other relevant participants (see section Case Studies). Once these collaborators identified potential interviewees, we followed a snowball sampling approach to recruit more interviewees. We also checked this list against our initial stakeholder analysis to add other interviewees and reduce any potential bias from the identification of stakeholders by the collaborators and their suggested interviewees. Interviewees were engaged in, cared about, or were directly impacted by agricultural practices (and tensions) in the respective study sites. We sought interviewees that could provide rich information and represented a diversity of interests and socio-cultural aspects within (and across) the three case study regions (Patton, 2002). We also aimed to include key actors who have an impact on the territories under study, but who may operate at different scales, from the local to the national level. 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. The profiles of the interviewees are summarized in the **Supplementary Material** (Box S2).

We carried out a total of 55 interviews, filmed from July to September 2020: 21 interviews for case study 1, 17 for case study 2, and 17 for case study 3. 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 each case. The interviews lasted for an average of 1 h each and were conducted in French. For the interview analysis, we transcribed each interview and the transcripts were corrected and imported into New NVivo (QSR International Pty) for coding. The interviews were analyzed using thematic analysis adapting the steps suggested by Braun and Clarke (2006). First, the transcripts were analyzed by the authors breaking down the data and re-organizing it through coding. The codebook derived both from the analytical framework (Skrimizea et al., 2020) and from the recurring themes emerging from the data which were not evident in the existing framework (see Box S3 in **Supplementary Material**) (Fereday and Muir-Cochrane, 2006). The codebook was used to sort concepts within the interview text according to one or more sub-codes. Text coded within each 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 until an acceptable level of agreement was achieved (Landis and Koch, 1977).

Films and Transformation Labs

Four films were developed through the interviews, with the support of a professional film-maker. One film was on the visions of an ideal agriculture based on the results from the "miracle question" across all case studies; the remaining three films described each of the case studies. The aim of the films was to summarize the main discourses conveyed by the interviewees in their own words and in their chosen contexts. To develop each film, a coding analysis was conducted based on coding (section Community Voice Method and the Miracle Question), to identify quotes representing the most frequently occurring perspectives from each section of the interviews. Discussions then took place between the authors to ensure that each film included: (a) each interviewee at least once (for the case study films), (b) all key discourses identified by interviewees, and (c) a wide range of perspectives. The script was sent to the film-maker for a first draft, and an iterative process between the filmmaker and the authors ensured that the film was of a relevant length for use in workshops (see below). The script was sent to all interviewees for their approval prior to the video editing, together with the clip of their appearance. As such, each interviewee was provided with the extract of their interview selected for the film, and where that extract would be placed in the overall film. This was key to ensure that each interviewee's quote was placed in context with the rest of the film. Three interviewees opted not to be included due to personal reasons or concerns that their message(s) had not come across as expected.

An important step in the CVM process is the feedback on the interviews' results (through the films, in our case), their reflexive evaluation, and their reintegration into public discourses. A key issue from our perspective was also to allow for the results of our study to lead to in-depth discussions and pathways toward transformation. As such, we adopted an approach that merged CVM with Transformation Labs (or T-Labs), as the two approaches have a number of similarities.

T-Labs build on the methods and approaches outlined in the Social Innovation Lab Guide (Westley et al., 2015). "Labs" bring together diverse groups of people working on complex challenges to see the system through different perspectives, redefine problems and identify opportunities for innovations to make a difference. T-Labs consist of three steps: The first is "Research and Preparation" (Step 1). Research activities that aim to identify and frame the question (Research In) and explore across scales and across a diversity of stakeholders (Research Out) were captured through the interviews (section Community Voice Method and the Miracle Question). The second is the workshop

itself (Step 2). In this case we held 1-day workshops that had three main components: (a) allowing participants, including "agents of change" or stakeholders in the systems that have the ability to change the system, to "see" the system in which the problem has arisen, (b) to identify the criteria for an innovation in the context of this problem domain, and (c) to identify points of leverage. The third is Taking Action after the T-Lab (Step 3), with the writing up of strategies identified in each case study (including how they will be implemented, and by whom), the implementation of strategies by change-makers, and the evaluation of impact across scales in the system (Pereira et al., 2021). The integration of T-Labs and CVM allowed for films to be a prominent feature of the workshop, and to add the transformative dimension more explicitly into the overall methodological design.

One workshop was organized in each site at the end of the second year of our 3-year project, to ensure that there would be sufficient time afterwards for the research team to support the stakeholders in their choice of transformative solutions. The three workshops were planned in close cooperation with our key stakeholders to ensure that the dates suited them, that the place chosen for the workshops was suitable, and that the topic corresponded with their expectations. A list of potential attendees was developed by the authors, and shared with key stakeholders in each study site. Potential attendees included previous interviewees (see section Community Voice Method and the Miracle Question), but also additional key local actors that could have a role in developing and implementing any solutions identified during the workshop. A professional facilitator was hired to ensure safe and constructive discussions. Whilst the researchers were observers during the workshops to evaluate the process and the outcomes of each workshop, we acknowledge of course that the researchers had a prior steering role, in terms of organizing the workshops, selecting the participants, structuring the workshops and preparing the videos (Whitfield et al., 2021). At the start of each workshop, participants were also asked to complete and sign a consent form, which described the aims/process of the research, and asked for specific permission to use photos during the day and to contact them after the workshop for an evaluation. The workshop agenda followed the three-step process of a T-Lab (see Box S4 in **Supplementary Material**).

The workshop allowed for a range of participatory approaches to be used, including:

- Reciprocal presentations of participants, where each person presents another person after a conversation;
- Focused conversations in trios to stimulate active listening and address specific questions related to the films, with one person speaking, one reformulating and one taking notes, and participants asked before the films to prepare post-its answering certain questions (i.e. "what is important for you/for the relationship between W and Y?" and/or "what makes you react?");
- Instant vision, with a large poster entitled "a vision of the future relationship" that is open for all participants to contribute to with drawings, keywords, or symbols (see **Figure 3**);

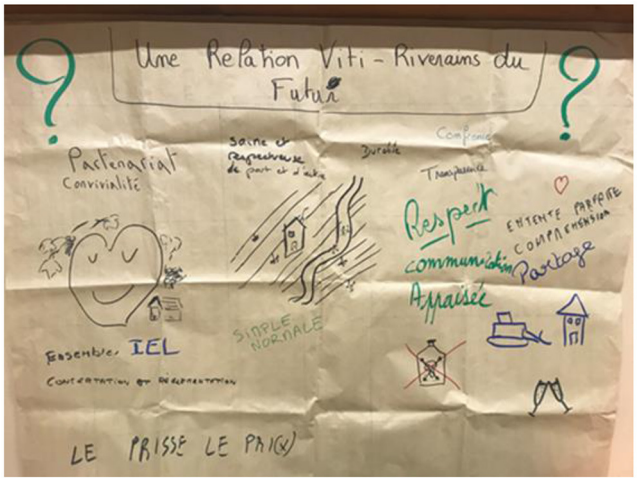

FIGURE 3 | Instant vision during the transformation lab portraying the future relationship between wine producers and local communities.

- Keep-Drop-Create analysis in small groups where participants reflect on the improvement of the current situation through structured thinking (i.e., questions such as "what works and should be continued?," "what should be dropped?" and "what could be created/would be an innovative solution?") (**Figure 4**);
- Open brainstorming for idea generation, where all participants can contribute an idea captured on a post-it note, and the facilitator grouping related ideas in clusters to highlight main themes;
- Structured action plan, where for each identified solution, participants explore in small groups ways to implement it [i.e., questions such as "who should be involved?," "what should be done?," "how could this be done (resources)?," or "when (schedule/timing)?"];
- Samoa circles (also called fish bowls) with concentric circles, where participants who want to speak join the inner circle. Allows for active listening, equality amongst speakers and trust-building.

We developed three strands of evaluation during and after the workshop: (a) evaluation of the CVM results (through evaluation from the participants of the films during the workshop); (b) evaluation of the workshop process and outcomes (through feedback at the end of the day and follow-up questionnaires with workshop participants—see Box S5 in **Supplementary Material**); and (c) self-reflection through observation sheets during the workshop and a project team debrief after the workshop. Following each workshop, a report synthesizing the ideas generated was compiled and disseminated to participants.

RESULTS

CVM and the Miracle Question

Interviewees largely agreed to be filmed (only two refused for personal reasons). It is important to note that the interviewees

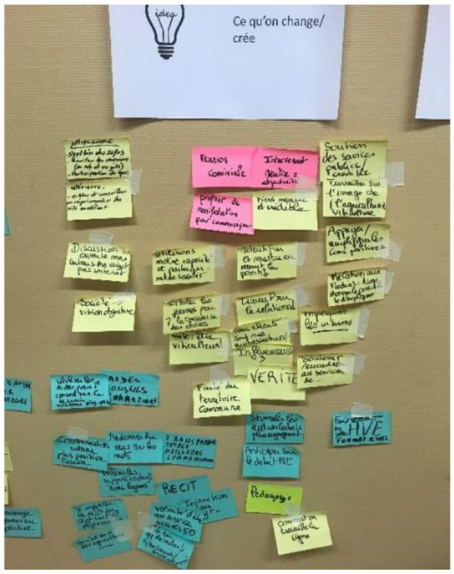

FIGURE 4 | Example of the Keep-Drop-Create analysis in the T-Lab.

were informed well in advance that interviews would be filmed and could reflect on whether they would give consent to be filmed and on the location of the interview. This resulted in filming taking place in diverse settings, including, among others, in fields, in front of bee hives, on river banks. Whilst the setup of the filming was initially a little unusual for the interviewees, their self-consciousness dissipated within the first few seconds of the filming, with interviewees focused on the interviewer, rather than the filming material. The interview questions were generally easy for the interviewees to respond to.

Our sample was heavily biased toward men (with only 12 female interviewees), despite efforts to identify and interview more women. In addition, the average age of our interviewees was about 50 years old (**Supplementary Material S2**). Snowball sampling was useful in accessing perhaps less well represented groups such as farmers, as it was generally much easier to identify interviewees and initiate contact by mentioning that a fellow farmer had suggested them.

The "miracle question" worked well in the majority of interviews, with only 3 interviewees either not able, or choosing not, to engage in the miracle question. The miracle question had to be introduced gently and it was common for interviewees to be initially a little confused by the required response. Once they were reassured that there no right or wrong answers, interviewees often had very wide-ranging responses, and highlighted a number of issues and perspectives that we had not considered when developing the rest of the interview guide, and indeed perspectives that did not reoccur over the remainder of the interview.

Following coding, the key themes to emerge from interviewees, and used to structure the vision film, were as follows:

- Change in environmental conditions;
- Fulfilled, valued and recognized agriculture (including better understanding of agriculture and food value, fulfilled farmers, institutional support, and productive agriculture);
- More localized agriculture (including improved relationships and a re-localized agriculture);
- Scientific and technological future pathways;
- Small and more diverse and respectful agriculture (including the improved relationship between humans and nature, smaller and more diverse farms, and an agriculture more in tune with the environment).

In effect, the above themes were pathways toward more sustainable food systems, as identified by interviewees without prompting from the interviewer. By keeping the question open, and talking about "an ideal agriculture," interviewees were free in their interpretation. For some interviewees, this happened through their senses. For example, one interviewee perceived the miracle through his hearing: "*I think the first thing we'll notice is that there will be no more noise. If it was really a miracle in relation to nature, we have no more engine noises. There's no more noise. And when we wake up, that's what it's going to be: Silence.*" For another it was with what he could see when we woke up to the miracle: "*hedges, and flowers, and butterflies [laughs].*"

Interviewees also responded with regards to how the miracle would make people feel. For example one interviewee suggested that: "*People would be happier, in my opinion, more fulfilled. We wouldn't have this malaise, I think, in the agricultural world. And everyone could perhaps live more equitably. And then, in addition, it would also be beneficial, well for our health, for us, and also for all the biodiversity.*" The question allowed for very deep feelings to emerge such as well-being, pride in their jobs, recognition and legacy. As one interviewee attested: "*It's a very good question. The miracle in agriculture, well, that would be that all the farmers in France earn their living. That there are no more suicides in agriculture, that there are no more families torn apart, that there are no more inheritance problems, that there is no more agri-bashing. That farmers be proud of their profession, and be able to proudly pass it on to their children, to their wives, to their husbands.*"

Overall, the two techniques have diverse strengths and weaknesses, as well opportunities and threats for their implementation as outlined in **Table 2**.

Films and Transformation Labs

The development of the films was iterative and intensive—especially in terms of selecting the quotes based on our inclusion criteria, following our previous coding and gaining participant approvals (see **Table 2**). We relied on a professional filmmaker, who accompanied us during the interviewing and edited the films to create a high-quality documentary. The involvement of a professional filmmaker also allowed us to have quality pictures of interviewees and their settings, which we sent to interviewees at Christmas to share our best wishes. These contributed to building a continued and trusting relationship with them. The films were presented to all interviewees (and other stakeholders) during the workshops held in November–December 2021 (see **Figure 5**).

TABLE 2 | SWOT analysis of the four transdisciplinary techniques used in the context of transformative change and conflicts.

	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Community Voice Method	Differentiated research from what interviewees had experienced Created a bond with the interviewees, especially through sharing of photos after the interviews Led to the development of films rather than written quotes	Costly in terms of time and resources to set up filmed interviews Requires additional ethical approvals as interviewees cannot be anonymized Some interviewees may refuse to be filmed	Allows researchers to address challenges of representation and power Allows interviewees to convey their perspectives in a setting of their choosing Addresses the potential power and bias gap between researchers and interviewees	Interviewees may feel intimidated by the filming and less open in their responses Long process that needs to be followed through, not just with the interviews, but the dissemination of results back to interviewees and the integration of their feedback
Miracle question	Easy to integrate in interview guides Allows for broader themes and perspectives to emerge Helpful in terms of constructing pathways toward transformation	Requires proper introduction to avoid being confusing to interviewee Needs to be embedded within a broader context, to create pathways to reach the miracle	Allows interviewees to move from a discourse of complaint to a discourse of solutions Allows the interviewees to create a reality and bring it to life.	When relaying the results of the miracle question, stakeholders may feel it is too disconnected from reality, conveying a utopia
Films	Offer powerful research summaries, that bring out emotions as well as content Useful in terms of starting dialogue amongst stakeholders	Costly in terms of time and resources to edit films Require substantial effort for developing films that will only be used in one workshop	Reduce the power gap between researchers and interviewees Reduce an element of bias in terms of how the results are conveyed (compared to written quotes)	Remaining bias in terms of the selection of quotes Lack of anonymity, which needs to be carefully communicated to participants
Transformation Labs	Allow for in-depth discussions and social learning between stakeholders with different perspectives Allow for solutions and innovations to emerge within a short time-span	Require a trained facilitator that needs to both adapt to each T-Lab, and be accepted by the participants Require resources (e.g. good facilities, facilitator) Require time to organize and prepare Difficult to reach solutions within a day, as a lot of time needs to be spent on sharing positions and needs of stakeholders before moving on	Allow participants to better understand the viewpoints, worldviews and values of others Allow a safe space for reflection, sharing and development of solutions amongst stakeholders Address power asymmetries between stakeholders Provide a different and unusual approach for participants that may be experiencing stakeholder fatigue	Difficult to implement in cases of high inter-personal conflict, where the conflicts need to be addressed before moving on to solutions Require resources (e.g. excellent facilitator, organization of the T-Lab, identifying, inviting and chasing up the relevant participants) Rely on having the relevant participants attending, and in sufficient numbers

The strengths and weaknesses relate to the lessons learnt from our application of each technique, whereas the opportunities and threats apply to future potential applications in other contexts based on our experiences.

FIGURE 5 | Setting during the viewing of films in the T-Lab.

The workshops were held in locations suggested by our three key collaborators, and known to interviewees. The importance of the setting cannot be emphasized enough. In two of the workshops, the setting had comfortable spaces for participants to work in, flexibility for the organizers in terms of setting up small discussion groups, and enough space to add materials on the walls, among others. In one setting, the space was very large and sparse, and despite efforts to make the space more comfortable to participants, the setting impacted negatively on the overall discussions and engagement.

Whilst we aimed to have around 20 participants in each workshop, the workshops comprised 13 participants in the apiculture case study, 21 in the viticulture case study, and 16 in the water case study. The ratio of those invited to those attending was about 3:1. In all workshops, participants expressed that they would have appreciated more diversity among the participants (e.g., more farmers in the water case study, more representatives of consumer associations in the apiculture case study, and more local community associations in the viticulture case study). In addition, in some workshops, some participants could only attend the morning or the afternoon session, which disrupted the dynamics and required the facilitator to adapt.

The evaluation of the films was positive, with feedback shared in plenary, and through feedback cards. The participants appreciated the format of the films, and expressed diverse emotions based on the viewing (e.g., "moving," "comforting," "sad," "passionate"). One participant noted that the films should be disseminated more broadly, as they showed a dimension to farming that was rarely communicated: "*Passion is what drives farmers, but it's rarely conveyed.*" The workshop participants also identified a number of themes that emerged in the films. These include, among others, the lack of recognition of farmers, poor image and communication of farming practices, lack of alternatives to pesticides, change of narratives around farming, lack of collective initiatives and thinking among and between farming groups and others, shifting societal demands around food price and quality, and administrative burdens. These were themes that were also identified in our analysis and the resulting films, but which were reinforced through the participants' feedback.

The evaluation of the workshop at the end of the day was broadly positive, with participants appreciating the quality of the facilitator's work, the opportunity for exchanges between the participants that increased understanding and trust-building, and the new questions raised by the process. As one participant expressed it: "*The more you learn, the more you wonder.*" These were captured when asked for their one word describing how they felt about the day (**Figure 6**). Limitations of the T-Labs as perceived by participants included the lack of diversity of participants, unclear perspectives and diverse expectations in terms of next steps, and timing (either with time too short on certain activities, or the day feeling too long). The evaluation of the techniques was also carried out by the research team, through a SWOT analysis (**Table 2**).

DISCUSSION

Lessons Learnt From the Application of the Different Techniques

The research presented here responds to the urgent need to advance and promote transformative change in food systems, as well as address the conflicts such change can trigger. This is achieved through the use of transdisciplinary knowledge coproduction methodologies that are inclusive and fair (i.e., involve diverse types of expertise, knowledge and actors—and take account of and try to address power imbalances), and lead to outcomes (i.e., context-specific knowledge and pathways toward a sustainable future). Below, we highlight the main lessons learned in terms of the extent to which CVM, the miracle question, films and T-Labs contributed to these two aspirations.

Lessons Learned for Promoting Inclusiveness and Fairness

In our work we built on a combination of methodological pathways suggested by Chambers et al. (2022), focusing on (a) exploring diverse agendas, (b) elevating marginalized agendas, and (c) navigating conflicting agendas. Thus, the approaches used were selected in large part to address the need for inclusive and fair integration of diverse types of knowledge, expertise and actors with a first aim of exploring diverse agendas and fostering mutual understanding and respect for a plurality of perspectives (Chambers et al., 2022). As stated in the introduction, a key challenge of transdisciplinary approaches, which is even more acute in conflict situations, are the potential power imbalances between actors (Blythe et al., 2018). As such, methodologies need to take account of these imbalances, and provide a voice for those actors that are less often heard, and often absent from decision-making processes (Ainsworth et al., 2020). In the case of our research, the emphasis was to ensure that farmers (often small scale) were at the heart of our research and that diverse channels for recruiting interviewees and participants were mobilized in order to attempt to reach possibly less "networked," more marginalized actors. Although the entry point through our key stakeholders initially prioritized more networked farmers, the stakeholder analysis and snowball approach for interviews then allowed for a broader representation. The selection of the case studies based on the presence of conflict and the final inclusion of

FIGURE 6 | Word cloud based on one-word evaluation of the day across the three T-Labs.

a diversity of actors permitted to navigate the conflictual agendas that played out during all the steps of the transdisciplinary process from the initial interviews to the workshops.

The CVM and resulting films ensured that not only were the voices heard through quotes that would be conveyed by researchers, but that the interviewees were directly communicating their concerns and aspirations. This was continued during the workshops through the methodologies used, which encouraged participants to listen to others, even reformulating their concerns and views. The iterative exchange between the authors and film-maker, and between the authors and interviewees ensured that interviewees were kept fully updated on the progress of the films, their role in them, and how they would be portrayed, thereby building trust between researchers and participants. The process also ensured that all actors were heard: each interviewee who gave us approval for the use of his image has at least one appearance in the films. The viewing of the film at the workshop, and resulting discussions also allowed for a triangulation of our results from the interviews themselves, checking that no new themes emerged.

The T-Labs were also key in ensuring an inclusive and fair process—both in terms of who was invited and who turned up on the day, but also in terms of how the stakeholders were engaged during the workshop. The invitations to the workshops were very broad and included not only our interviewees, but also all other relevant actors recommended by interviewees during interviews, and others that we had identified in our stakeholder analysis. The activities conducted during the T-labs were carefully designed to foster spaces of "humility," where all actors possessed legitimate views and could contribute to and question knowledge (Latulippe and Klenk, 2020; Chambers et al., 2022). The fact that the workshops were facilitated by an independent professional facilitator trained in conflict mediation was key to ensuring that processes during the workshop aimed at reducing conflicts and power imbalances between stakeholders and that all participants felt heard in their personal perspectives and emotions in sufficiently safe/"safe-enough" spaces (Ely et al., 2021)—thereby contributing to building a trusting environment. This is a key aspect in conflict transformation, that sees power dynamics as one of the main underlying cause of conflict and aims at providing more agency to actors and structures (Rodríguez and Inturias, 2018). Food system transformation will be supported by any process, including such transdisciplinary methods, that can overcome power asymmetries and reposition power as a force for conflict transformation (Skrimizea et al., 2020; Lecuyer et al., 2022). The choice of an independent professional facilitator was also a conscious decision taken after reflecting our own positionality as researchers; it permitted to distance ourselves from the process of the T-labs and avoid the risk of bias and power imbalances between researchers and participants (Ely, 2021).

The above focus on reducing power imbalances also contributed to trust-building, a key outcome of transdisciplinary processes, and highly relevant in the context of transformative change and conflict (Young et al., 2016; Whitfield et al., 2021). The trust-building between researchers and other actors was a process that evolved and made use of opportunities. For example, sending professional personalized photographs with all participants at Christmas led to a number of correspondences between researchers and other actors, and a building of trust which led to more open and easy dialogue, with interviewees regularly calling researchers to update them with news. This was also apparent after the T-Labs, when researchers received a number of calls and emails from participants, following up on discussions started in the T-Labs. The trust-building between actors was also apparent, with often very emotional sharing of perspectives at T-Labs, which were acknowledged by the group. More research will need to be carried out in the final year of the project to better understand the more long-term impact of the methodologies on trust-building and the intensity of conflict in the case studies.

Lessons Learned for Promoting Outcomes Relevant to Stakeholders

In terms of ensuring relevance, much of this was done ahead of any research taking place—as it should in transdisciplinary

research. Indeed, the first 6 months of the research were spent developing a theoretical framework for the research, but also ensuring, through our close collaborations with key stakeholders, that our research was relevant and useful. As seen in the Methods section, the selection of case studies was also carried out in collaboration with and based on the suggestions of stakeholders. Enough time for preparation was key also for the identification of the right combination of actors to be included in the transdisciplinary process: experience has shown that time pressure can result in the rapid creation of a large, seemingly inclusive pool of stakeholders that however lacks sensitivity to representation and can lead to outcomes serving only the most "evident" social groups and individuals (Chambers et al., 2022).

The greatest benefit of the methodologies used was the context-specific knowledge and coproduced pathways toward a collectively defined sustainable future developed as a result. The miracle question was key in identifying pathways toward a sustainable future, as determined by interviewees. The unusual nature of the question allowed participants to project themselves, whilst remaining grounded in a reality. The miracle question is in fact conceived to get out of the problem space and to think differently, thus facilitating problem solving and allowing a renewed perspective outside the usual framework in which people operate (de Shazer, 1985). From there, new meanings can be conceived, allowing many to access a playful, childlike, joking and pretend state, breaking out of the habitual thought pattern that has created a problem that cannot be solved. The pathways identified by interviewees were realistic, but also allowed them to "think outside the box." The question also led them to build their pathways in a layered approach. Many of the interviewees walked us through their vision. For example, starting with what they saw when they opened the window, to the people they interacted with as they walked into town, and how the landscape looked around them. This meant that the pathways were often incredibly detailed and spanned different scales (individual to structural and even cultural). The resulting film is often very moving, as we hear and see the aspirations of interviewees, within the setting of their choice. We believe they can contribute to influence power and conflict transformation by modifying the dominant narratives (Rodríguez and Inturias, 2018; Skrimizea et al., 2020), and support the creation of positives narratives, both collectively and individually from diverse perspectives that could act on the status quo and enable transformation (Pereira et al., 2018; Raudsepp-Hearne et al., 2019). Following on from the films, the workshops were set up in a way that allowed participants to develop possible joint solutions. This was very important to the research team, as a number of interviewees had told us that the workshops needed to be more than "talking shops." The process of getting to solutions, and the types of solutions identified varied significantly across workshops, depending on the context. Indeed, in one case study where the institutional context had changed radically since we had carried out the interviews, the facilitator quickly established that it was too soon to encourage participants to think of solutions, and that the priority was on re-building trust between participants in this new context. Reading the room, and building in some flexibility is key in these processes, as an abrupt focus on solutions could have exacerbated tensions. In the other workshops, the development of solutions was achieved, and in one workshop, leverage points were also established.

Limitations and Suggestions for Improvement

The main limitations of the methodologies used were their cost, the difficulty of targeting the relevant stakeholders in both the CVM and the T-Labs, the need for experienced facilitators to support the T-Lab process, and the need to adapt to change.

The resourcing of the process, both in terms of time and money, was a challenge in our research. The decision to film interviews was taken after the project was funded, and therefore budgets had to be amended to allow for this extra cost. Perhaps what was most challenging in terms of resources was the time spent developing the film scripts. For future processes, it would be timelier to start with the development of the film scripts before carrying out the more detailed coding. Having said this, the detailed coding did help the authors better identify the key issues to bring to the fore in the films. In addition, the research team was also acutely aware of the time we were asking of participants—for the interviews, but also in the making of the films, and time spent at the workshops—and were keen to ensure that that time was not seen as being wasted by participants. In future processes, costs associated with transdisciplinary approaches should ideally be integrated from the set-up of the research. However, as with many transdisciplinary projects, flexibility is needed, which can impact on the subsequent use of resources (Ely et al., 2021). In our case, our funders did not require us to have settled on case studies or methodologies when our project proposal was submitted. This flexibility, which we acknowledge is not a given in all funding mechanisms, allowed for a co-development of the research and the methodologies used with stakeholders, which in turn allowed for greater relevance of our research.

A second limitation of the approaches was the difficulties in engaging with the relevant stakeholders in the case studies. It was disappointing in all workshops, for example, that certain groups were under-represented (e.g., farmers in the water management case study, or local community associations in the viticulture case study). In addition, we could have included researchers (other than the research team) to ensure greater transdisciplinarity in the workshop discussions in terms of a science-policy-society dialogue. A suggestion for addressing this could be to carry out a two-workshop process (resources allowing), where the first workshop would be only with the interviewees, who could comment on the films, suggest a theme for a follow-up workshop, and identify key people to invite, which they would take responsibility for inviting themselves (with the support of the research team when needed). By doing so, the participants of the first workshop could engage in the process as "agents of change," integrating different domains (science, practice and social movement) and creating bridges between top-down and bottom-up approaches that can support food transformations at the territory level by developing social networks and recognizing or creating and seizing windows of opportunity (Westley et al., 2013; Butler et al., 2015; Caron et al., 2018; Skrimizea et al., 2020).

A third limitation was the reliance on an experienced facilitator in our transdisciplinary methodologies. The T-Lab required a facilitator that (a) understood the methodology and

its aims, (b) had experience of dealing with stakeholders in conflictual situations, and able to be flexible in terms of changing the T-Lab structure when needed, while keeping to the general aims and approaches of the methodology; and (c) was acceptable and accepted by the group of stakeholders. The facilitator was invaluable in our research, both in terms of developing the workshop agenda and process with the research team ahead of the workshops, and adapting methodologies and approaches on the day depending on the group dynamics. Indeed, while the agenda was the same for all three case studies, adaptations were needed. For example, at the start of one workshop, a participant expressed concern over the aim of the workshop, and the limited number of farmers and other stakeholders present. This comment sparked a debate, which needed to be managed by the facilitator, who had to adapt the day significantly in order to accommodate these concerns. Despite this adaptation, the group still managed to identify solutions and leverage points. Such facilitation expertise and capacity are not always accessible. Our suggestion, based on our experience, would be to consider the issue of selecting a facilitator ahead of any decision to organize a T-Lab, or communication to stakeholders of a potential workshop. In addition, time needs to be spent with the facilitator ahead of the workshops to explain the process of the T-Lab, its aims, and to develop a tailored programme. Finally, good inter-personal relations with the facilitator are essential. During the workshop, the facilitator regularly checked in with the researchers to ensure the aims of the workshop were being reached.

A fourth and final limitation was adapting to change. This adaptation could be at the scale of the individual T-Lab organization. For example, in one T-Lab we discovered at the last minute that there was no material for viewing the films. We had to use our own equipment, which had a negative impact on the quality of the viewing, and made it difficult for participants to understand the film. A recommendation for future process would be to check the settings in advance of the workshops to ensure the most fit for purpose spaces, where participants feel safe but also able to think outside of their usual settings; and where all the necessary material allows for the methodologies used to work. Adapting to change also impacted on the timing and format of the T-Labs. For example, initial dates set for T-Labs clashed with an important farming practice. We had to amend the date to better suit the farmers attending the workshop. Adaptability was also required with regards to the Covid pandemic, which meant that we could not meet stakeholders in large groups over extended periods of time. This resulted in us needing to be even more adaptable, for example organizing workshops during those times when they were allowed by law, and then adapting to the changing regulations, for example insisting that all participants wear masks and checking their sanitary passes on their arrival. There were, however, some advantages to the pandemic: thanks to the COVID pandemic, the film-maker we hired to film the interviews had spare time to edit the subsequent films. A final adaptation to change, which we had not anticipated, was in terms of our changing roles as researchers during the course of this transdisciplinary research. At the start of the process we saw ourselves very much as reflective scientists (collecting and analyzing data from the CVM, and observing the resulting actions of the T-Labs for example), as well as process facilitators (initiating a process, selecting participants and encouraging the expression of all viewpoints) (Wittmayer and Schäpke, 2014). As the process has evolved, however, we are increasingly seeing our role changing into one of change agents, empowering participants to own their processes. In the apiculture case study, for example, the final year of the project will focus on coaching the ADABFC to build their future capacity. In the viticulture case study, we will be supporting them in creating their narrative of past and future transformation. Whilst this new role is likely to build closer relationships and trust with the local communities and provide new avenues for future action; we are acutely aware of the need to be transparent with ourselves but also with other stakeholders (including our own institutions) about our changing role, but also its limitations. For example, whilst we still have funding to work on the project for 1 year, we cannot guarantee involvement as part of an ongoing process—an issue faced in other transdisciplinary research (Ely et al., 2021). These considerations around the roles of researchers need to be discussed with the communities with whom we work in transdisciplinary research, including the potential benefits and limitations of changing roles (Whitfield et al., 2021).

CONCLUSIONS

Our aim in this paper is to offer reflections and lessons learnt from different transdisciplinary techniques (Community Voice Method, the miracle question, films and T-Labs) as a means of strengthening their application in other contexts of transformational change, especially in addressing conflicts and power asymmetries.

Beyond the above reflections on the use of transdisciplinary knowledge coproduction methodologies to create transformative solution spaces in food systems, three key final reflections emerged from our experience. The first is the dynamic context of the case studies, which impacted on the use and outcomes of the techniques. In one case study in particular, the institutional context had changed radically between the time when we carried out our interviews, and the time we held the workshop following a local election. This changed context meant that the theme we had initially identified for the workshop was no longer as relevant, because participants had to rebuild trust with the new institution in place before being able to think of solutions. The T-Lab methodology may assume a continuum, but the realities of time taken to analyze data and plan a workshop means that many changes can happen that need to be incorporated in the overall methodology.

The second point is the need for resources. In our case we could hire a professional film maker and a professional facilitator to increase the quality of our films, and ensure constructive and tailored workshops. This also meant that we could free up time for the researchers to analyze data and evaluate workshops. Having trusted professionals that invest in the work, and become part of the research team was invaluable.

The third key learning point was that beyond the methodologies, the solution-focused participatory approach

throughout the project permitted a continued process of deliberative engagement with the key collaborators, interviewees and workshop participants, and created bonds that have been fundamental for and profoundly shaped our roles as reflective scientists, process facilitators, and change agents creating transformative spaces in the three cases.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Comité sur l'Éthique des Recherches de l'Université de Bourgogne Franche Comté. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

JY, ES, and LL participated in the development of the research. JY, SC, and LL contributed to the data analysis. SC and JY led on the initial draft of the manuscript with all other authors contributing to the writing of this paper. All authors participated in the data gathering. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fsufs.2022.835203/full#supplementary-material

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