



CO-CREATION OF CHANGES REQUIRED FOR BUSINESS MODEL INNOVATION

D4.3. Portfolio of fair business models VI

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Authors

First Name	Last Name	Beneficiary
Christopher Jr	Galgo	WU
Gohar	Isakhanyan	WR
Jos	Bijman	WU
Verena	Otter	WU
Katja	Logatcheva	WR
Michiel	Van Galen	WR
Marilena	Gemtou	AUA
Liselotte	Puggard	Food and Bio-Cluster
Magdalena	Nertinger	Naturland e.V.
Jon	Bienzobas Adrian	INTIA

In case you want any additional information, or you want to consult with the authors of this document, please send your inquiries to: christopher.galgo@wur.nl or gohar.isakhanyan@wur.nl. We also wish to acknowledge the contribution of Stefanie Bos, Harm Brinks and Juste Vežikauskaitė, who brainstormed, co-created the workshop agenda, and provided feedback on preliminary results, and Alexia Zabalza and Ramon Glienke, who supported the data collection activities.

Quality Reviewers

First Name	Last Name	Beneficiary
Georgia	Frakolaki	NTUA
Andreas	Katsigiannis	KPAD

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Executive Summary

This deliverable has been developed as part of Task 4.3 “Co-creation of changes required for business model innovation” of Work Package 4 of the BEATLES project. It contributes directly to the BEATLES objective of developing a change management framework and initiates the process of developing a portfolio of fair business models (BMs) that can support the transition to climate-smart agriculture (CSA). A change management framework that integrates change management principles with the business model innovation (BMI) processes has been developed, providing a structured approach for navigating the complex stakeholder dynamics required for successful BMI for CSA. This addresses a significant gap in existing literature by providing guidance on how to manage BMI processes that engage stakeholders.

The change management framework was applied using a design science research (DSR) approach, involving five diverse case studies, which represent major farming systems in Europe: Danish pig production, German dairy production, Lithuanian wheat production, Dutch potato and onion production and Spanish apples production. Aiming to develop a portfolio of fair BMs, the completed phases of DSR (problem identification and objective definition) revealed the following eight design requirements:

- Create Incentives for Farmers
- Ensure Equitable Distribution of Benefits and Costs
- Support More Facilitation Towards Sustainability
- Foster Engagement and Collaboration Among Stakeholders
- Improve Access to Technology
- Enhance Transparency Among Value Chain Actors
- Support Consumer Education About Sustainable Choices
- Allow the Exchange of Sufficient and Reliable Information

These design requirements address multiple dimensions of fairness (distributive, procedural, informational, and interpersonal) and apply across diverse agricultural contexts. These initial findings provide important implications in designing and developing fair BMs for CSA.

The next phase will involve the design, development and validation of fair BMs based on these design requirements, with stakeholder engagement continuing throughout the process. The fair BMs will specify value proposition, creation, delivery, and capture arrangements that address fairness challenges while functioning within current policy environments. These BMs will be presented in D4.4. as a portfolio of fair BMs that facilitate transition towards CSA in Europe.

This deliverable advances the CSA and BM literature by providing a conceptualization of fair BMs, by developing a comprehensive change management framework specifically tailored to facilitate BMI for the transition to CSA, and by identifying design requirements to develop fair BMs. Altogether, these contributions provide both theoretical and practical guidance for embedding fairness in BMs and supports sustainability transitions in European agriculture.

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List of Terms and Definitions

Abbreviation	Definition
CSA	Climate-smart agriculture
BM	Business model
BMI	Business model innovation
DSR	Design science research
DR	Design requirement

Table 1: Terms and Definitions

1. Introduction

Climate change presents critical challenges to European agricultural systems, requiring fundamental transformation in farming practices and business approaches. The European Green Deal acknowledges these challenges, setting ambitious targets for sustainable food systems, biodiversity protection, and carbon neutrality by 2050 (European Commission 2020). The transition to climate-smart agriculture (CSA) has been recognized as essential for achieving those targets (Erekalo et al., 2024). However, this transition presents significant challenges for stakeholders across different agri-food value chains (Pedersen et al., 2024). Farmers, particularly small-scale, face disproportionate burdens, including substantial upfront investment costs, knowledge gaps, technological barriers, market uncertainties, and increased risk exposure (Gemtou et al., 2024). These challenges are further compounded by uneven distribution of costs and benefits across the value chain, where farmers often bear a significant portion of implementation costs, while downstream actors may capture more of the value created (Fałkowski et al., 2017; Swinnen et al., 2021). Power asymmetries between farmers and their business partners exacerbate these imbalances, making the transition particularly challenging, especially for small-scale farmers (Omar & Thorsøe, 2024).

A fundamental aspect of addressing these challenges and inequities is ensuring that the CSA transition is perceived as fair by all involved parties. Existing research in agri-food chains, which defines fairness as a multifaceted and subjective construct, suggests looking at four dimensions to study fairness (Gudbrandsdottir et al., 2021; Prete et al., 2025). The four dimensions include *distributive fairness*, related to perceived fairness of outcome distribution; *procedural fairness*, related to perceived fairness of the procedures used to determine outcome distributions; *interpersonal fairness*, which refers to the degree to which people are treated with politeness, dignity and respect by those executing procedures; and *informational fairness*, which focuses on the quality of information provided about the procedures, resulting in outcome allocations. Therefore, in CSA transition, achieving fairness encompasses critically addressing issues related to these four dimensions, which is particularly crucial, as the questions of - who benefits, who decides, who has access to information, and who bears the risk – shape adoption patterns and outcomes (Rosenstock et al., 2020). Additionally, fairness is crucial for building trust and commitment to long-term change (Ling et al., 2024; Rousseau & Have, 2022). Without explicit attention to fairness, the transition to CSA risks further exacerbating the existing power imbalances and inequities within food systems, including limited access to markets, weak bargaining power for small-scale farmers and unequal profit distribution, potentially undermining the long term sustainability goals it aims to achieve (Onyeaka et al., 2024).

In the agri-food chain context, Samoggia and Beyhan (2022) have highlighted the crucial role that business models (BMs) can play to enhance fairness. For transition to CSA, BMs that ensure fairness are needed to generate CSA value (Rosenstock et al., 2020). However, the current literature lacks a clear conceptualization of the design and content of those BMs that promote fairness, calling for studies to identify and develop BMs that can address fairness-oriented challenges (Samoggia and Beyhan, 2022). Additionally, innovating towards fair BMs requires a strategic and well-managed change management process, because it represents a significant shift from the established practices and is likely to encounter stakeholder resistance arising from ingrained routines, existing mindsets, and prevailing power structures (Ulvenblad et al., 2018). However, existing frameworks for business model innovation (BMI) (e.g. (Geissdoerfer et al., 2017; Wirtz & Daiser, 2018) currently do not provide guidance on how to manage the changes required for BMI, particularly involving the people facing the change processes in the entire BMI process.

Recent studies recognize that effective change management can increase the success rate of sustainability transitions (Sancak, 2023). This also applies to transition towards fair BMs and CSA. Change management is the practice of applying a structured approach to transitioning an organisation and its stakeholders from the current situation to a future state that generates the

expected benefits (Young, 2019). This approach underscores the need to engage and support the people undergoing the change process (Moran & Brightman, 2000). In the context of successful transition to CSA, where multiple stakeholders must coordinate several actions across complex value chains (Isakhanyan et al., 2024), change management becomes even more important for overcoming potential resistance, securing stakeholder buy-in, and building momentum for transformation. However, the CSA and BM literature show limited attention to change management and its importance to navigate the change processes required for BMI and CSA transition (Gardezi et al., 2022; Lang, 2020).

These gaps in the literature - the lack of a clear conceptualisation of the design and content of fair BMs and a lack of integrated framework of change management for BMI - led us to the following research questions:

1. How can fair business models be designed and developed to support farmers' implementation of climate-smart agriculture?
2. How can a change management framework facilitate and be applied to support fair business model innovation for climate-smart agriculture

This deliverable primarily addresses the second research question, by developing a comprehensive change management framework setting up the innovation process that results in fair BMs. The change management framework is applied through a design science approach, involving five case studies, to identify cross-cutting design requirements for the development of fair BMs. This deliverable is developed within the scope of WP4 Task 4.3 "Co-creation of changes required for business model innovation" and contributes directly to the task objective of developing a change management framework setting the foundation for the portfolio of fair BMs to be presented in D4.4. (Portfolio of business models v2).

The sections that follow provide (2) the Theoretical background, (3) the Change Management Framework, (4) the Design Science Approach, (5) the Co-creation workshop results and discussions, and finally (6) the Conclusions and Next steps.

2. Theoretical Background

This section provides the theoretical foundation for developing a change management framework that guides the BMI for CSA. The section is structured around three key theoretical areas that form the basis of our approach. First, we define fair BMs and distinguish them from sustainable and inclusive BMs. Next, we examine BMI as a process reviewing established frameworks from the literature, to identify key phases and components relevant to our context. Finally, we investigate change management theories, focusing on approaches that can facilitate transitions in agricultural systems. Altogether, these theoretical elements provide a comprehensive basis for understanding how to design and implement fair BMs that support CSA.

2.1 Conceptualizing Fair Business Models

The transition to CSA necessitates the adoption of BMs that not only promote environmental sustainability and resilience but also ensure fairness for all the stakeholders involved (Rosenstock et al., 2020). Understanding which BMs promote fairness requires examining how they differ from the more established sustainable BMs.

The conceptualisation of sustainable BMs is well-developed in the literature (Bocken et al., 2014; Stubbs & Cocklin, 2008). Sustainable BMs are BMs that aim to capture economic value, while maintaining or regenerating natural, social, and economic capital beyond its organizational boundaries (Schaltegger et al., 2016). Sustainable BMs have a more holistic perspective on value and stakeholders, extending consideration beyond shareholders to include the natural environment and society as key stakeholders (Bocken et al., 2014). Sustainable BMs integrate sustainable value principles into all three BM elements: value proposition, value creation and delivery, and value capture (Geissdoerfer et al., 2018). In contrast, studies specifically covering fair BMs remain limited and an operable definition is yet to emerge. Few studies (e.g. (Mouchtaropoulou et al., 2024; Oliveira et al., 2021) have started to distinguish between sustainable and fair BMs – often referencing them together as “sustainable and fair BMs” without offering clear conceptual boundaries. Notably, this has also been observed in the case of inclusive BMs and fair BMs (e.g.(Guyalo et al., 2021). Inclusive BMs however are also distinct and are considered as “a type of sustainable BMs that seek to productively engage income-constrained groups in the value chain, by providing solutions to neglected problems”(Schoneveld, 2020, p. 8). The use of different terminology in the literature, suggests that researchers recognize these concepts as distinct, though their distinction remains undertheorized.

This distinction becomes crucial, because a BM can be environmentally sustainable, without necessarily being fair. For example, a BM might be environmentally sustainable, by achieving reductions in emissions, however, if it accomplishes this by unfairly reducing farmer’s profit margins, excluding them from relevant decision-making processes and transferring the costs to consumers, it will not qualify as a fair BM. While the concept of sustainability includes social considerations, a specific focus on fairness provides a more precise examination of power dynamics, resource allocation, and relationships between stakeholders within the agrifood value chains. A sustainable BM might address environmental impacts and economic viability; however, a fair BM would extend this, by guaranteeing that farmers receive a reasonable return of their labour and investments, are adequately informed, have a meaningful voice in decision-making processes, and are treated with dignity and respect throughout the value chain.

In this context, we argue that fair BMs are distinct in their primary focus of addressing fairness challenges. These challenges include distributive challenges (equitable distribution of benefits and costs among all actors), procedural challenges (inclusive and transparent decision-making processes), informational challenges (ensuring good quality of, and access to, information for all participants), and interpersonal challenges (promoting ethical and respectful treatment among all stakeholders). These fairness challenges might differ significantly across different agricultural contexts and therefore might manifest with different emphases and priorities in each setting. For example, in some contexts, when CSA technologies require substantial investments, farmers may

face more challenges regarding distributive fairness or being fairly compensated, rather than on interpersonal fairness, such as being treated with politeness. While a fair BM would address all four fairness dimensions, we recognize that practical implementation requires acknowledging the contextual priorities. Next to contextual considerations is the inherent subjectivity of the perceptions of fairness. In essence, what is perceived as “fair” still depends on individual perspectives, based on values, experiences and positions within the value chain itself, which needs to be considered when designing fair BMs. Taking these considerations into account, we propose that fair BMs should demonstrate intentional efforts to address the most pressing fairness concerns, while committing to progressively improve fairness across all dimensions over time, rather than expecting a complete balance across all dimensions simultaneously.

Building on this understanding and drawing parallels from the definition of sustainable BMS, we define **fair business models** as *business models that embed fairness considerations (either distributive, procedural, informational, and interpersonal) into a firm's value proposition, value creation and delivery, and value capture*. As such, fair BMs provide value to customers, while ensuring equitable outcomes, inclusive processes, and just relationships among stakeholders, throughout the agri-food value chains.

2.2 Understanding the business model innovation process

Business model innovation (BMI) represents a fundamental shift in how organizations operate and create value. In the agri-food sector, BMI is gaining importance as companies face increasing pressure to adopt sustainable practices (Barth et al., 2017). BMI can be triggered by various factors, including technological advancements, changing customer needs, and the need for enhanced sustainability (Geissdoerfer et al., 2018). Effective BMI often involves experimentation, learning, and adaptation (Geissdoerfer et al., 2022).

The current literature about BMI processes reveals a heterogeneous landscape where several frameworks have been proposed to provide structured approaches (Wirtz & Daiser, 2018). For example, Lindgardt et al. (2015) use three process steps: uncover opportunities, implement new BMs and build platform and skills. The framework by Frankenberger et al. (2013) structures the BMI process into four key phases progressing from *initiation* (understanding ecosystems and change drivers) through *ideation* (generating novel approaches), *integration* (building on cohesive models) and *implementation* (realizing new models while managing resistance). The Cambridge BMI Process by Geissdoerfer et al. (2017) offers a more granular framework, consisting of eight sequential phases specifically designed to address what they term the “design-implementation gap” —the challenge of translating promising BM concepts into successful market implementations through iterative development from initial ideation to final adjustment and diversification. Synthesizing across frameworks, Wirtz and Daiser (2018) in their systematic review, suggest seven generic process steps for BMI: analysis, ideation, feasibility, prototyping, decision-making, implementation and sustainability. Examining these frameworks reveals that they share crucial structural similarities i.e. a phased approach moving from contextual analysis, creative ideation, practical integration and strategic implementation. These shared characteristics make these frameworks adaptable for incorporating fairness considerations explicitly throughout the BMI process. Such adaptations have been demonstrated in sustainable BMI (e.g. (Jørgensen & Pedersen, 2018; Yang, Evans, et al., 2017).

However, a critical limitation emerges: while the frameworks acknowledge the importance of stakeholders, they do not provide guidance on how to involve them in the change process. Wirtz and Daiser (2018) acknowledge the relevance of change management during the implementation of BMI; however, they did not integrate nor applied a change management framework across all phases of the BMI process.

2.3 Navigating change: Change management theories

The successful implementation of fair BMs requires change management approaches that address both organizational transformation and stakeholder engagement challenges. Change management theories have been developed to understand and manage various change processes, particularly to address opposition to change, increase the probability of change success, and reduce transition time (Malek & Yazdanifard, 2012). In this section, we examine three foundational frameworks that collectively inform the development of change management framework to facilitate BMI for CSA.

Kurt Lewin's three-stage model provides a foundational understanding of the change processes, involving "unfreezing" (disrupting status quo and creating change readiness), "change" (implementing new behaviours amid uncertainty), and "refreezing" (solidifying new practices into routine operations) stages (Cummings et al., 2016; Lewin, 1951). Kotter (2007) eight-step process offers a more detailed roadmap for managing complex organizational changes, progressing from establishing a sense of urgency, creating a guiding coalition of leaders and managers, developing a vision and strategy to implement change and ultimately institutionalizes new approaches by embedding changes in organizational culture. Kotter (2007) emphasized that successful change efforts are often "messy and full of surprises", requiring managers to view the change through a "see-feel" perspective. Finally, The ADKAR model developed by Hiatt (2006) focuses on individual change through five sequential development of awareness of why change is necessary, desire to support and participate in the change, knowledge about how to change effectively, ability to implement the change and identify barriers, and reinforcement to sustain change through feedback and rewards.

These foundational change management theories offer valuable insights for change management in BMI and CSA transition. Their direct application to transitions in the agri-food sector, however, requires careful consideration of several sector-specific characteristics: the high degree of autonomy among farmers, the long-term nature of agricultural periods and investments, a significant dependence on environmental factors, and the multi-stakeholder complexity of agri-food value chains (Barth et al., 2017). These distinctive characteristics create unique change management challenges that generic frameworks, designed for conventional organizational contexts, may inadequately address. The strategic integration of change management theories with BMI frameworks offers a promising approach to overcome these limitations.

3. The Change Management Framework for Fair Business Model Innovation

Building on the theoretical foundations established in the previous section, we propose an integrated change management framework, tailored to facilitate the fair BMI for CSA.

This framework integrates change management principles with BMI processes, to address the unique challenge of fairness in CSA transition. As illustrated in Figure 1, the change management framework consists of four interconnected phases: Initiation, Ideation, Integration, and Implementation. These phases inform the stakeholder engagement throughout the process of fair BMI for CSA. Each phase is presented across three dimensions: change management principles, stakeholder engagement, and BMI activities. The change management principles dimension resembles that of Lewin (1951) three stage model of change (unfreezing, change, refreezing). More specifically, the Initiation phase aligns with the unfreezing concept, the Ideation and Integration phases with the change phase, and the Implementation with the freezing phase. The stakeholder engagement dimension specifies the progressive evolution of the stakeholders' role and their engagement throughout the change process. Lastly, the BMI activities dimension incorporates specific tasks derived from the BMI literature, with explicit attention to incorporating fairness considerations. The phases of the change management framework are discussed in more detail below.

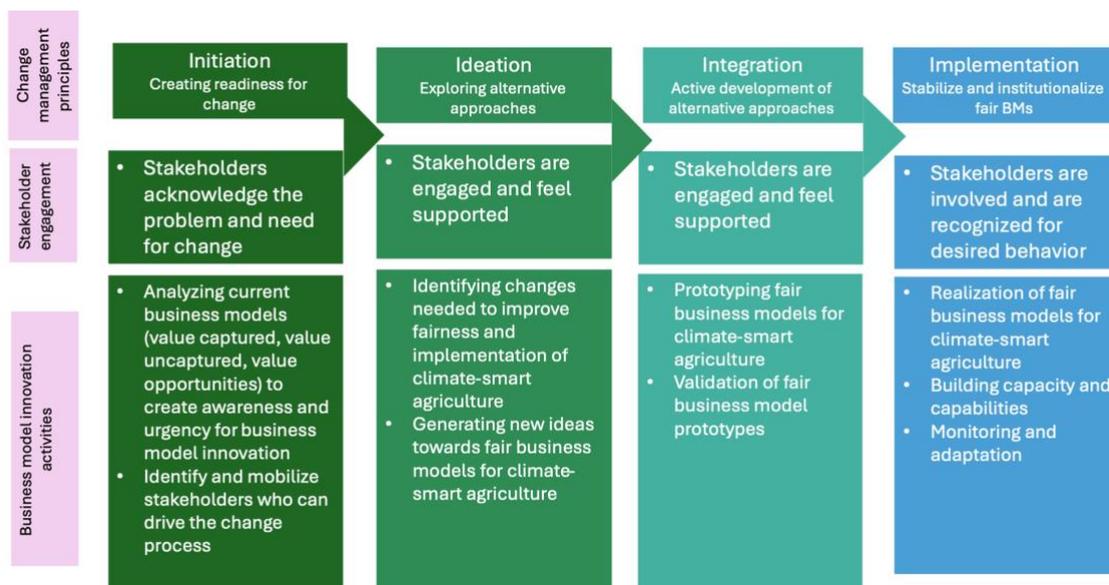


Figure 1. Change management framework for business model innovation in climate-smart agriculture (Source: Authors)

In the Initiation phase, the change management principle focuses on creating readiness for change. This principle is fundamental to successfully change initiatives and establishes the foundation for subsequent phases, by disrupting the status quo and generating motivations for new approaches. As Lewin (1951) noted, creating readiness involves both the awareness for change and acceptance of its necessity. In the context of fair BMI for CSA, this principle translates into helping stakeholders analyse and recognize the limitations of the current BMs and practices, as well as the opportunities presented by more fair alternatives. In this phase, the stakeholders acknowledge the problem, the need for change and thus are motivated to explore new approaches. The BMI activities in this phase include analysing the current BMs for value captured, value uncaptured and value opportunities, and identifying and mobilizing stakeholders who can drive the change process. The analysis helps stakeholders identify inefficiencies, fairness challenges, and opportunities for improvement, thus creating awareness and urgency for BMI.

These activities benefit from integrating participatory approaches that facilitate meaningful stakeholder engagement, promote alignment of diverse stakeholder goals, assess attitudes towards change and inspire the exploration of novel solutions.

In the Ideation phase, the change management principle shifts to the exploration of alternative approaches. This principle is crucial for generating innovative solutions to the challenges identified in the previous Initiation phase. In this phase, stakeholders move beyond the problem acknowledgement to become active contributors of potential solutions, or alternative approaches (fair BMs), bringing their diverse perspectives and expertise to the innovation process, through participatory approaches. This engagement helps ensure that the resulting outcome address the stakeholders' needs and concerns.

The Integration phase focuses on the change management principle of actively developing the alternative approaches. This involves comprehensive and consistent BMs from the ideas generated in the previous Ideation phase. The Integration phase involves designing and developing the fair BM, ensuring fairness considerations are addressed in the BM components. In this phase, stakeholders move from ideation to preparation for action. Key BMI activities include developing detailed BM prototypes that address fairness dimensions, validating the relevance and plausibility of the prototypes and refining them based on stakeholder validation.

In the Implementation phase, the change management principle focuses on institutionalizing the change. This principle is aligned with Lewin (1951) refreezing concept, emphasizing on embedding new practices and processes into routine operations and organizational culture. In the BMI context, this involves establishing processes, policies, and governance structures that support the fair BMs. This phase represents the highest level of engagement for the stakeholders, where they consistently implement the fair BMs and continuously refine them, based on experience. This engagement ensures that the BM evolves, in response to changing conditions and stakeholder needs. Key BMI activities include piloting the fair BM in real-world contexts, establishing monitoring mechanisms to track fairness outcomes and developing feedback loops for continuous improvement. This phase often requires significant capacity building among stakeholders, appropriate incentive structures, and clear communication channels to support the ongoing implementation and refinement of the fair BMs.

By structuring the BMI process across these four phases and three dimensions, the change management framework provides a comprehensive approach for managing the complex change process required for BMI. The integration of change management principles with BMI activities addresses a critical gap in the existing BMI framework – the lack of specific guidance on stakeholder engagement throughout the BMI process. The framework also provides practical guidance for implementing the framework in diverse agri-food contexts that can be adapted by researchers and practitioners. The incorporation of fairness considerations throughout the process further enhances the framework's novelty and practical application.

4. Design science research approach

The change management framework was applied to guide the design and development of fair BMs through the design science research (DSR) approach. The change management framework provides the conceptual lens, through which we understand how to engage stakeholders in the BMI process, while DSR provides a methodological approach to facilitate the application of the framework.

The DSR approach was employed, because its focus on developing artifacts and the knowledge about them to solve real-world problems, aligns with the study's objectives to develop theory around fair BMs and to design and develop implementable BMs for CSA (vom Brocke et al., 2020). One significant benefit of DSR is that it fosters collaboration between academics and practitioners, thereby bridging the relevance-rigor gap (Dimov et al., 2023).

The DSR methodology followed a structured process, comprising of six phases: problem identification, objective definition, design and development, demonstration, evaluation, and communication (vom Brocke et al., 2020). As these phases often require different approaches, it is common in DSR to employ multiple research methods (Johannesson & Perjons, 2021). Figure 2 provides an overview of the methods conducted/to be conducted for each phase and their timing. The figure also illustrates the engagement between three stakeholder groups: the researchers, case study leaders and the case study stakeholders, in relation to the methods applied. This illustration shows the direct application of the change management framework for fair BMI.

For this deliverable, we report in detail the level of the completed phases of problem identification and objective definition. The subsequent phases will be discussed in Deliverable 4.4. Data collection was conducted across the five BEATLES case studies: pig production in Denmark, dairy production in Germany, wheat production in Lithuania, potato and onion production in The Netherlands and apple production in Spain. This diversity allowed us to identify both context-specific and cross-cutting requirements to design fair BMs.

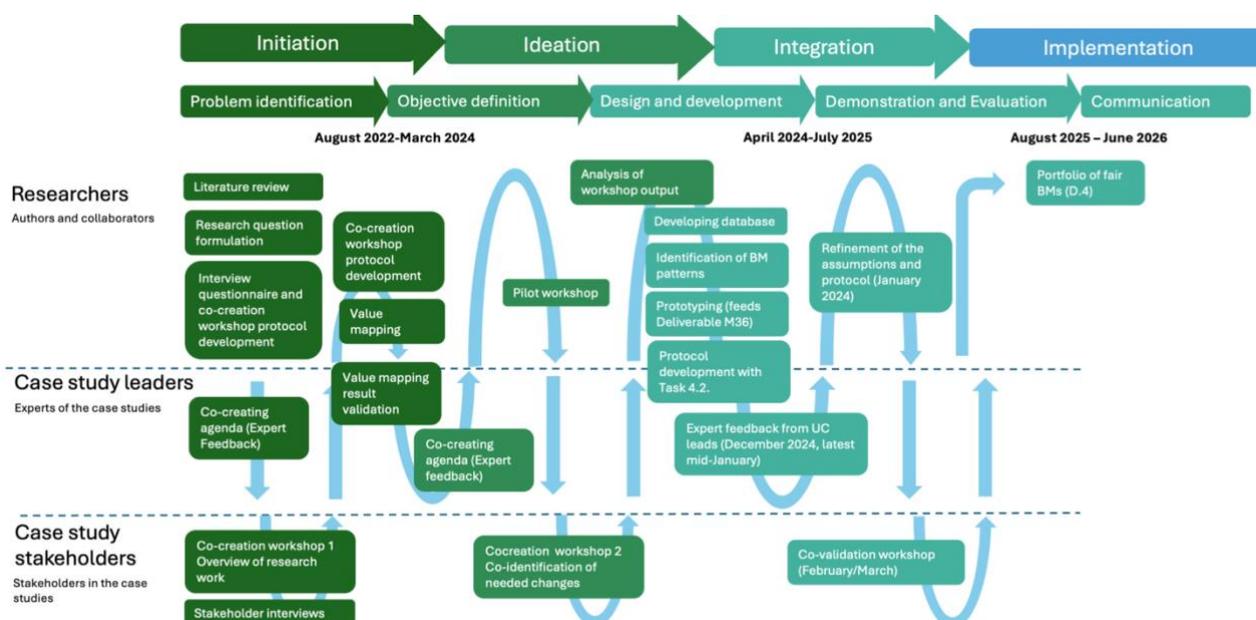


Figure 2. Design science research approach

4.1 Problem identification

The problem identification phase aims to define the specific research problem, justifying the value of a proposed solution. The DSR approach started with an awareness of the major problem: fairness challenges in agri-food value chains and the role of BMs in addressing these challenges. Specifically, we identified the lack of a clear conceptualization of the design and content of BMs that promote fairness (see Introduction). The process of identifying the problem was informed by a literature review and was subsequently verified, by conducting two sets of semi-structured interviews with stakeholders across all five use cases. Essentially, the interviews were conducted to provide contextual understanding of the identified problem, guiding the approach to BMI.

Prior to the interviews, an overview of the data collection activities for the DSR approach was presented in the five co-creation workshops in 2023. These workshops aimed to address the objective of another work package in the BEATLES project, on defining the value chain components, focusing on the five case studies and their respective stakeholders and identify lock-ins and levers that impede or foster the transition towards CSA. Essentially, the overview was presented to create readiness for change, initiating the process of change management for BMI. Subsequently, two sets of semi-structured interviews were conducted, in collaboration with the case study partners, who were involved in reviewing the interview protocol, the recruitment of the participants and the actual interviews. The interviews were conducted either in person or online, using Zoom or Microsoft Teams, and were recorded with consent by the interviewees, and analysed by the researchers.

The first set of interviews was conducted from January to March 2023, with different stakeholders in the five use cases, to explore the current CSA practices, challenges, and opportunities related to CSA in each case. The interview data revealed various perspectives on the challenges of implementing CSA and highlighted areas, where current BMs are not able to address. These data provided input for the value mapping analysis, which used the simplified value mapping tool (Figure 3)- a tool developed to assist firms in sustainable business modelling (Bocken et al., 2013). This analysis allowed us to understand what value is being exchanged, by identifying value captured, value uncaptured, and value opportunities in the case studies. Value captured is “the benefit delivered to the firm and its stakeholders; it includes not only monetary value, but also the wider value provided to the environment and society” (Yang, Vladimirova, et al., 2017, p. 32). Value uncaptured is “the set of benefits that could be captured but has not yet been captured” (Yang, Evans, et al., 2017, p. 1801). Some examples include waste streams in production, underutilized resources, insufficient use of expertise and knowledge, repeated work, the need for experts in certain fields, the need for a platform, underutilization of by-products and poor product and service quality. Value opportunities are “any activities that can capture, create, and deliver new value to the firm and its stakeholders” (Yang, Evans, et al., 2017, p. 1797). The output of this exercise was then organized, based on the elements of a business model, according to Osterwalder and Pigneur (2010). The result of this analysis is presented in the Annex on page 39.

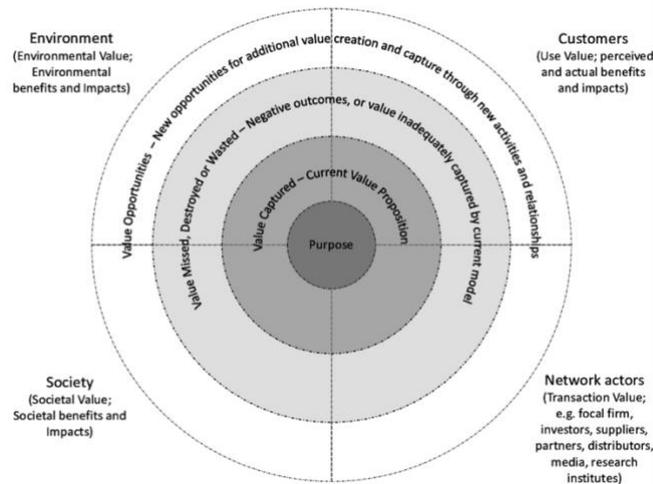


Figure 3. Value mapping tool (Source: (Bocken et al., 2013))

To validate our analysis and ensure contextual relevance of our findings, follow up meetings were organized with the case study leaders. In these meetings, the results of the value mapping tool were discussed. The case study leaders, with their contextual knowledge and on-going relationships with the local stakeholders, provided valuable insights that helped refine our analysis. More importantly, they helped prioritize the identified value opportunities, based on their importance and applicability within each specific case study. This process transformed the broad value mapping results into focused inputs for the subsequent co-creation workshops, ensuring that stakeholder engagement would be directed towards the most promising areas for fair BMI.

The second set of interviews was conducted from February to May 2024 with thirty (30) farmers from the five use cases, to explore how implementation of CSA practices change the existing BM of the farm. The results from these interviews showed that CSA practices create different types of changes in the existing farm BM, but do not trigger BMI. The results also highlighted the persistent challenge of capturing value created from CSA implementation. The detailed methodology and findings will be presented in a forthcoming article in Business Strategy and the Environment entitled "Harvesting value! Exploring how climate-smart agriculture practices change farm business models in Europe".

4.2 Objective definition

Building on the prioritized value mapping results, the objective definition phase moved from problem analysis to scoping of solutions, focusing specifically on co-identifying the concrete changes needed to advance fairness in CSA implementation. This phase established clear design requirements for the subsequent BM design and development, by articulating specific changes needed to achieve fairness.

Central to this phase, was the design and execution of co-creation workshops across all five case studies. "Co-creation" is defined as a participatory approach to design and decision-making that involves multiple stakeholders and users (Jones, 2018). It is an open, active, and creative process, in which all relevant stakeholders are engaged and guided through a design process, usually conducted through a facilitated workshop (Ind & Coates, 2013). The co-creation workshop agendas were co-created with the case study leaders and the BEATLES researchers and were carefully structured to maintain a focused engagement around the identified problem - the issue of fairness in CSA implementation. A protocol describing the process and tools used during the workshop was also developed by the researchers, to guide facilitators in the conduct of the workshop (see Annex). Prior to the workshops, the case study leaders were trained as facilitators. Participants were then recruited through the case study leader's existing networks. In each case, these workshops brought together diverse participants, representing diverse stakeholder groups across

each value chain, including farmers, processors, advisors, and policy makers. The workshops were held between February and March 2024 across the five cases. Table 2 summarizes the details of the 2024 co-creation workshops (schedule, stakeholder participation, number of participants, type of meeting). The workshops were conducted in local languages, to ensure all participants could contribute effectively. While efforts were made to include diverse stakeholders, some groups may have been underrepresented in the co-creation process (e.g. retailers). The composition of the workshops' participants inevitably influenced the identified changes and their prioritization.

Case	Date and Venue of the co-creation workshop	Type of meeting	Value chain stakeholders represented (including numbers)	Participants
Wheat farming, Lithuania	13/3/2024, Radisson Collection Astorija Hotel, Vilnius	Hybrid (digital and in-person)	Farmer (2), farmer association (1), technology provider (1) retailer (1), policymaker (1)	6
Organic dairy farming, Germany	29/02/2024, Heissenhofinzell	Hybrid (digital and in-person)	Farmer (2), breeding association (1), dairy processing (2), feed producer (1), retailer/trader (2), agricultural advisor (2), policy/government officer (2), consumer (2)	14
Pig farming, Denmark	8/3/2024, Herning	In-person	Farmer (1), feed supplier (2), researcher (1), policymaker (2), technology provider (7), advisor (1), business developer (1), investor (1)	16
Organic apple farming, Spain	5/3/2024, Pamplona Navarra	In-person	Farmer/processor (juice) (3), policymaker (1), researcher (2), advisor (3)	9
Onion and potato farming, The Netherlands	20/03/2024 Alvanto Sint Annaland	In-person	Seed producer (1), farmer (2), potato breeder (1), supplier (1), advisor (3), policymaker (2), processor (1), researcher (1), certifier (1)	13

Table 2. Overview of the five co-creation workshops held in 2024 (Source: BEATLES Deliverable 1.2 Co-creation activities V2)

The co-creation workshops combined creative ideation with convergent prioritization tools. Firstly, the participants engaged in a facilitated discussion about fairness definitions and current fairness challenges in their value chains, establishing a shared language and common understanding of fairness challenges. Building on this foundation, they collectively identified and articulated specific changes needed to achieve fairness. The results of the value mapping exercise were used and were evaluated on how they can contribute to fairness, resulting in a list of co-identified changes. These co-identified changes were then systematically prioritized through dot voting, ensuring that every participants' perspectives contributed to the collective ranking of the priorities. Following the dot-voting, the participants were asked to identify and map key actors, who could play essential roles in implementing the co-identified changes towards fairness. This mapping exercise provided crucial insights into the multi-stakeholder nature of fairness challenges and the need for collaborative approaches to BMI. The final workshop activity engaged the participants in mapping the co-identified changes on an impact-feasibility matrix (Figure 4), further refining the prioritization by considering both the potential contribution of the change towards fairness and its practical feasibility.

Overall, the co-creation workshops conducted for the objective definition phase yielded three key outputs that will directly inform subsequent design activities: (1) a comprehensive list of the co-identified changes needed towards fairness in each case; (2) several stakeholder-identified key actors for implementing these changes; (3) a prioritized mapping of the changes, based on their impact and feasibility. These outputs transformed stakeholders' abstract understanding of fairness into concrete design requirements for fair BMI.

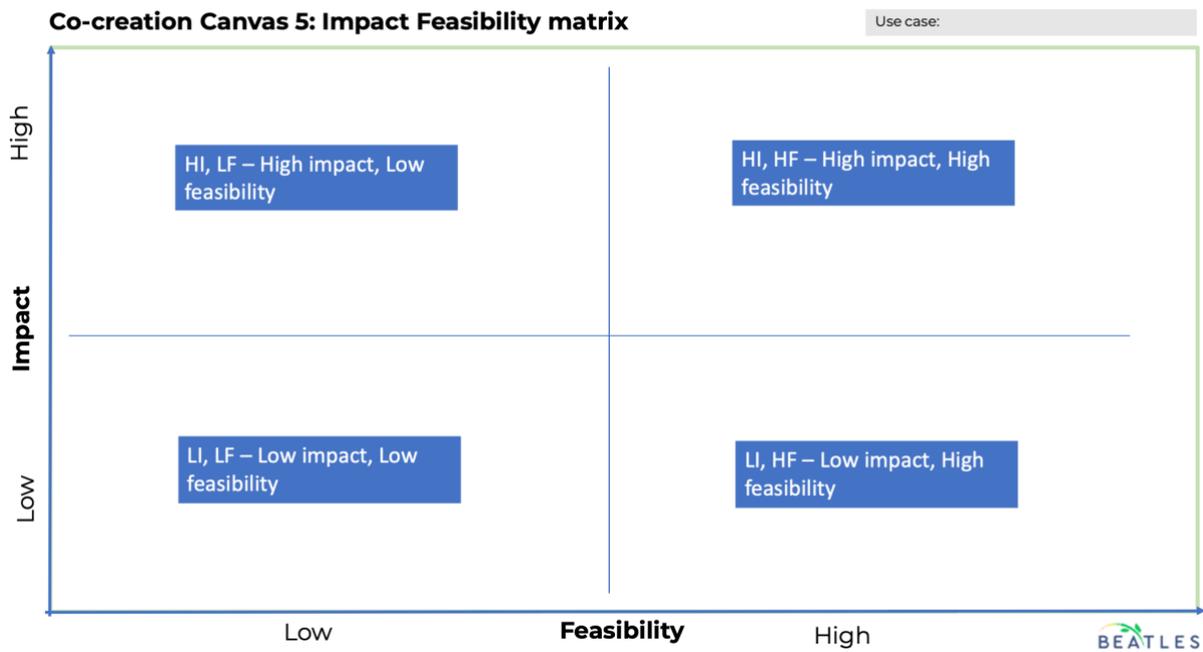


Figure 4. Impact Feasibility Matrix (Source: Authors)

5. Co-creation workshop results and discussion

In this section, we discuss the results of the completed phases of the DSR approach. Using co-creation workshops to carry out the objective definition phase, we have systematically co-created potential changes needed for BMI that supports CSA. The outputs of the objective definition phase are: (1) the comprehensive list of co-identified changes needed toward fairness in each case; (2) several stakeholder-identified key actors for implementing these changes; (3) a prioritized mapping of changes based on their impact and feasibility, organized on Tables 3-7 for each case. The changes listed and the key actors identified were extracted verbatim from the individual reports that were submitted by the case study leaders. The results are presented starting with Denmark case followed by Germany, Lithuania, The Netherlands and Spain.

Denmark. Table 3 presents the list of the co-identified changes needed to achieve fairness for the case of Denmark. The co-identified changes for this case reveal a strong emphasis on distributive, procedural and informational fairness dimensions. Changes 1,3, and 4, focus on incentives and commercialization of climate-smart products, highlighting the need for economic mechanisms that fairly distribute the costs and benefits associated with CSA implementation. These changes primarily target policymakers, consumers, and retailers as key actors, indicating that fairness interventions require multi-stakeholder coordination across the value chain. The emphasis on ESG reporting (change 3 and 6) indicates a prerequisite that information transparency is crucial for fairness, particularly in helping consumers make informed choices about climate-smart products. This connects distributive fairness with informational fairness. Change 2, focusing on closer relationships between consumers, retailers, and producers, addresses procedural fairness dimension. This suggests that stakeholders recognize that fairness requires not only fair economic outcomes but also more collaborative value chain relationships and decision-making processes.

UC Denmark		Key actors	HI, HF	HI, LF	LI, HF	LI, LF	Fairness
1.	Incentives with biological processes	Policymakers					Distributive
2.	The consumer and retailer need to be closer to the manufacturer. Willingness to create a greater commitment.	Retail co-owners like REMA 1000 and Gram Estate (agriculture)					Procedural
3.	ESG report for Mr. and Ms. Denmark. There is a lack of incentive from the consumer to buy more climate-friendly produce	Societal trend and consumers					Distributive, Informational
4.	Commercialization of climate-smart products – needs to involve the retail part, as it is their responsibility to showcase the products for the consumers. We need to approach this backwards	Retailers, consumers, policymakers, farmers					Distributive
5.	Optimization, requirements, structure, and practicality of regulations must change. Policymakers and consumers need more knowledge about how production is done in a more practical way.	Policymakers					Procedural
6.	The use of ESG reports. The data and impact of CSAs become clearer when presented in an ESG context revealing where fairness exists.	Regulation, policymakers					Informational

Note: HI – High impact; HF- High Feasibility; LI – Low Impact, LF – Low Feasibility

Table 3. List of co-identified changes needed for fairness (Denmark)

Germany. Table 4 presents the list of co-identified changes needed for fairness for the case of Germany. This case reveals an extensive set of co-identified changes, covering distributive, procedural and informational fairness. Many of the changes (3,6,7,9,10,11) focus on regulatory and governance aspects, suggesting that stakeholders perceive there are structural barriers to fairness that require intervention at the policy level. Distributive fairness is addressed through changes that target small farms (4) and mechanisms to increase the demand for organic products (1). These changes acknowledge that current value distribution mechanisms may not favour smaller producers and that market dynamics need adjustment to reward sustainable practices. The strong focus on consumer education (5) addresses informational fairness, emphasizing the need for transparent and honest communication about product values. The holistic definition of fairness (2) suggests that stakeholders recognize the multi-dimensional nature of fairness and the need for

shared understanding among value chain actors. Finally, the identification of planning security (8) as a fairness change, highlights the temporal dimension of fairness perceptions in agri-food contexts where long-term investments require stability and predictability. This aspect specifically targets politicians and regulatory bodies, who must provide stability and predictability for regulations and related investments, enabling stakeholders to make sound long-term decisions. Notably, for most of the co-identified changes, the stakeholders have identified political actors, who can bring forward the needed changes, highlighting their role for achieving fairness.

UC Germany		Key actors	HI, HF	HI, LF	LI, HF	LI, LF	Fairness
1.	Increase demand for organic products	Politics, dairy, farmer association, retail (advertisement), farmers, media					Distributive
2.	Holistic definition of fairness and climate-smart	Media, science (include farmers and practitioners)					Procedural
3.	Origin labelling	Politics, retail, gastronomy, tourism					Procedural
4.	Fair subsidies also for small farms	Politics					Distributive, Procedural
5.	Consumer education (Honest advertisement and information, Campaigns, Fair education and marketing, Communicate added value in a fair way)	Schools, politics (on nationwide level). "Öko-Modellregionen", Dairy					Informational
6.	Changing the current market regulations and practices	Politics					Procedural
7.	Public procurement (to increase demand for organic and fair products)	Politics (also on communal level)					Procedural
8.	Increase in planning security for all actors	Politics, all actors of the value chain					Distributive, Procedural
9.	Regulate retail (food retail) through cartel office	Politics					Procedural
10.	Removal of taxation on organic and regional staple food products	Politics					Procedural
11.	Same rules and regulations for all food imports	Politics					Procedural

Note: HI – High impact; HF- High Feasibility; LI – Low Impact, LF – Low Feasibility

Table 4. List of co-identified changes needed for fairness (Germany)

Lithuania. Table 5 presents the list of co-identified changes needed for fairness for the case of Lithuania. This case demonstrates strong focus on distributive and procedural fairness dimensions, particularly concerning support mechanisms and cooperation structures for small and medium-sized farmers. Changes 1, 3 and 6, as well as the access to resources (financial support, innovative technologies, competitive advantages through cooperation etc.) highlight that fair resource distribution is perceived as a key fairness concern. The emphasis on consumer awareness and trust in organic labelling (2) connects informational fairness with market dynamics, suggesting that the stakeholders recognize the role of information asymmetries in creating unfair market conditions. This change, along with the focus on increased cooperation (6), indicates recognition that fairness requires both structural changes and shifts in stakeholder relationships and behaviours. The inclusion of geopolitical considerations (5) is unique to this case and reflects the importance of broader contextual factors in shaping fairness conditions in agricultural systems, particularly in regions facing distinct geopolitical challenges.

UC Lithuania		Key actors	HI, HF	HI, LF	LI, HF	LI, LF	Fairness
1.	Changing the distribution of financial support to climate-friendly practices and promotion of organic farming	Farmers, policy makers, grain buyer					Distributive, Procedural
2.	Increasing consumer awareness of and trust in products bearing the organic label	Farmers, technology provider, grain buyer					Procedural, Informational
3.	Increasing farmers' access to innovative technologies	Policymaker, Tech provider					Distributive, Procedural
4.	The cultivation technology and technical solutions must be chosen	Farmers, grain buyer, tech provider					Procedural
5.	Changing the geopolitical situation	Farmers					Procedural
6.	Increasing cooperation between small and medium-sized farmers to improve their competitiveness	Farmers, tech provider, policy maker					Distributive, Procedural

Note: HI – High impact; HF- High Feasibility; LI – Low Impact, LF – Low Feasibility

Table 5. List of co-identified changes needed for fairness (Lithuania)

The Netherlands. Table 6 presents the list of co-identified changes needed for fairness for the case of The Netherlands, showing a focused set of changes strongly focused on distributive and procedural fairness dimensions. The primary concern, reflected in changes 1 and 4, is ensuring fair compensation for growers, who implement CSA practices, acknowledging the additional costs and risks that they bear. This suggests that current value distribution mechanisms do not adequately reward farmers for sustainability investments. Value chain transparency, where big value chain players become transparent about the margins they make (2), emerged as a key change, addressing both procedural and informational fairness and indicating that stakeholders perceive information asymmetries and lack of transparency as barriers to fair outcomes. The call for less regulation and more facilitation (3) reflects a desire for more supportive governance approaches that promote rather than constrain sustainable transitions. A notable aspect of this use case is the emphasis on actors “across all value chain” for implementing several changes, suggesting recognition that fairness issues require collaborative solutions, involving multiple stakeholders, rather than isolated interventions.

UC Netherlands		Key actors	HI, HF	HI, LF	LI, HF	LI, LF	Fairness
1.	Reward growers for extra costs, risks and for a sustainable produce / fair distribution of margins	Across all actors					Distributive, Procedural
2.	Make the value chain transparent	Across all actors					Procedural, Informational
3.	Less regulation and more facilitation towards sustainable produce	Value chain					Procedural
4.	Trade and retail already are earning money with PlanetProof; now it's time for the growers to get their share	Farmer					Distributive, Procedural

Note: HI – High impact; HF- High Feasibility; LI – Low Impact, LF – Low Feasibility

Table 6. List of co-identified changes needed for fairness (The Netherlands)

Spain. Table 7 presents the list of co-identified changes needed for fairness for the case of Spain. In this case, the identified changes emphasized procedural, informational, and distributive aspects. The focus on consumer association and short marketing channels (1) addresses distributive, procedural and informational fairness, by creating more direct links between producers and consumers. Similarly, raising of consumer awareness (2) targets informational fairness, through education about local and sustainable products. Technical changes were also suggested for this use case, with emphasis on efficient machinery (3), sustainable agricultural practices (4), and research on local fruit varieties (5). These changes connect distributive fairness (improved economic outcomes for farmers) with procedural fairness (improved production processes). The multi-stakeholder approach is evident in each change, where implementation involves farmers, public administration, advisors, researchers, processors, retailers and consumers working together. This suggests recognition that fairness requires coordinated action across the value chain, rather than isolated interventions by individual actors.

UC Spain		Key actors	HI, HF	HI, LF	LI, HF	LI, LF	Fairness
1.	Promotion of consumer associationism and short marketing channels. Optimization of technical resources: collective solutions for storage, calibration, etc.	Farmer, public administration, consumer, processor, retailer					Distributive, Procedural, Informational
2.	Awareness-raising work with consumers about the importance and impact of buying local and sustainably produced products	Farmer, public administration, consumer, processor					Procedural, Informational
3.	Use of more efficient machinery	Farmer, advisor, researcher, processor, retailer					Distributive
4.	Transition towards more sustainable agricultural practices	Farmer, public administration, advisor, researcher, processor					Distributive, Procedural, Informational
5.	Research/ increased knowledge of local fruit varieties for their promotion and improvement of yields (e.g. pollination behaviour)	Public administration, advisor, researcher, farmer					Distributive, Procedural
6.	Flexibilization of hygienic-sanitary requirements in processing	Public, administration, advisor, farmer, processor					Procedural

Note: HI – High impact; HF- High Feasibility; LI – Low Impact, LF – Low Feasibility

Table 7. List of co-identified changes needed for fairness (Spain)

The analysis of the co-identified changes across fairness dimensions revealed a significant challenge: many of the co-identified changes require intervention at the policy level. In the

German case for example, seven of the eleven co-identified changes focused explicitly on regulatory and governance aspects, including "fair subsidies for small farms," "origin labelling," "changing market regulations," "regulating retail through cartel office," and "removal of taxation on organic products." Similarly, in the Danish case, stakeholders emphasized on "optimization of regulations" and "ESG reporting requirements," while Lithuanian stakeholders prioritized in "changing the distribution of financial support" and "changing the geopolitical situation." Notably, interpersonal fairness was absent, likely due to stakeholders' reluctance to address sensitive interpersonal issues in multi-stakeholder settings.

The prevalence of policy-level requirements across all cases presented a fundamental challenge: how might we translate these system-level changes into BM design specifications that individual organizations could implement, while acknowledging the constraints of the existing policy environment? To address this challenge, we employed the 'How Might We' approach, a technique used in Design Thinking and Design Science Research to transform problem definitions into suitable design challenges (Asano, 2023; Siemon et al., 2018). By reformulating the co-identified changes into open-ended questions starting with "How might we," we shifted the focus from policy constraints to design opportunities. For example, rather than focusing on the policy-level challenge of "fair subsidies for small farms," we reframed the challenge as "How might we ensure small farms receive fair compensation for sustainability practices regardless of subsidy structures?" This reframing opened the solution space beyond policy dependence to include BMI that could address the underlying fairness need.

Following the "How Might We" reframing, we conducted a thematic analysis to identify patterns across the reformulated design challenges. This analytical approach yielded eight cross-cutting themes that function as design requirements (DR) for the design and development of fair business models for CSA. For business models to be fair, it must fulfil the following DRs:

DR1. Create incentives for farmers. Across all five use cases, stakeholders consistently emphasized the need for economic incentives that fairly reward farmers for implementing CSA practices. This DR translates the policy-level desire for economic support into BM design requirements, directing BMI towards creating value capture arrangements that fairly reward farmers for CSA implementation—such as premium pricing systems, risk-sharing mechanisms and long-term contracts that recognize CSA investments. This is in line with recent studies that highlight the role of financial incentives as a driver to attract farmers to adopt CSA (Pedersen et al., 2024).

DR2. Ensure equitable distribution of benefits and costs. Stakeholders recognized that current value distribution mechanisms often disadvantage certain actors, particularly primary producers. This DR guides the BMI process into redesigning value capture mechanisms, to ensure farmers receive a fair share of sustainability premiums and that implementation costs are distributed proportionally across the value chain. This aligns with studies in the literature that highlight the need for BMs that generate CSA value for all stakeholder involved (Rosenstock et al., 2020) or those that ensure fair distribution of risks, costs and benefits among stakeholders (Mehrabi & Giagnocavo, 2024).

DR3. Support more facilitation towards sustainability. Stakeholders identified the need for supportive facilitation rather than purely regulatory approaches to encourage climate-smart transitions. This DR guides BMI towards creating facilitation mechanisms (e.g. technical assistance, cross-sectoral collaborations etc.) that promote the transition to CSA. Lewis and Rudnick (2019) for example have shown how investments in precision farming tools combined with a well-established public research system can contribute to CSA outcomes. The use of digital advisory services as promoted by policy and advisory communities have been shown to stimulate CSA adoption (Asante et al., 2024).

DR4. Foster engagement and collaboration among stakeholders. Stakeholders emphasized the importance of collaborative relationships and meaningful engagement among value chain

actors. This DR guides the development of structures within BMs that enable meaningful participation from all value chain actors, particularly those with less power. This aligns with recent studies that highlight the significance of multi-stakeholder networks and collaborative business strategies (Isakhanyan et al., 2024) and stakeholder involvement and collaboration in the value chain for successful CSA implementation (Gemtou et al., 2025).

DR5. Improve access to technology. Access to appropriate technologies emerged as a distinct fairness theme. This DR directs BMI toward designing mechanisms that can facilitate access to technologies essential for CSA implementation, such as shared technology platforms, collaborative investment approaches, and knowledge transfer systems. Nevertheless, financial barriers and technological limitations and knowledge gaps continue to challenge the adoption of CSA practices. Overcoming such challenges through improved access to technology is crucial for successful and fair transition to CSA (Konfo et al., 2024).

DR6. Enhance transparency among value chain actors. Transparency emerged as a critical DR across multiple use cases. This DR guides the BMI toward creating transparency mechanisms that make relevant information accessible and useable for all stakeholders, particularly those with limited resources. Gardner et al. (2019) emphasize that, although transparency mechanisms such as digital traceability significantly improve accountability and trust, challenges related to information asymmetry persist, often disadvantaging primary producers, due to their limited capacity to participate equally in information-driven initiatives. Thus, attention to these challenges in the BM design is crucial to promote fairness.

DR7. Support consumer education about sustainable choices. Stakeholders across use cases emphasized the importance of educating consumers about sustainable products. This DR directs BMI toward creating meaningful connections between consumers and producers, providing decision-relevant information, and enabling informed purchasing choices. Where scepticism towards sustainability claims and information load persist as barriers, incorporating strategies of authentic storytelling, verifiable sustainability indicators and simplified messaging in the BM design may effectively bridge the gap between sustainable production practices and consumer actions (White et al., 2019).

DR8. Allow the exchange of sufficient and reliable information. Beyond transparency and consumer education, stakeholders identified the broader need for reliable information exchange throughout the value chain. This DR guides the development of BM components that ensure all stakeholders have access to reliable, timely, and relevant information. Caffaro and Cavallo (2020), have recently investigated the role of information source as a driver for adoption of smart farming technology and highlighted the role of formal personal sources of information (cooperative extension agents, consultants) as the most effective level for change in the context of smart farming technology adoption. Ensuring the inclusion of these stakeholders, prioritizing accessible knowledge platforms, and utilizing publicly supported communicated channels that address infrastructural and credibility-related barriers, are therefore crucial considerations in the BM design.

By developing these design requirements, we transformed policy-dependent changes into actionable specifications for BMI. These requirements bridge fairness concerns with practical BM design, ensuring that the subsequent design and development phase can produce BMs that address fundamental fairness concerns, while remaining implementable within the current policy frameworks. Their applicability across diverse agricultural contexts suggest they represent fundamental fairness requirements for BMI in European agriculture. Their emergence across diverse agricultural contexts that apply different policy rules and regulations further validates their useability as design requirements that can guide fair BMI within BEATLES.

The prevalence of the identified policy-related changes can be useful, when focus is turned to specific stakeholder groups. Policy makers should focus on creating regulatory environments that address power imbalances and provide appropriate incentives for CSA practices. The frequent

identification of policy makers as key actors across all use cases highlights their crucial role in establishing the conditions for fair BMI. Farmers and farmer organizations should explore cooperative structures to increase bargaining power, invest in transparent information systems and actively engage in value chain governance. These strategies can enhance their agency towards shaping fair BMs and capturing a more equitable share of value. Value chain actors, such as processors and retailers, should increase transparency about value distribution, develop fair pricing mechanisms that reward sustainable practices, and engage in longer-term with suppliers. These approaches address the distributive and procedural fairness concerns identified across use cases, particularly regarding fair compensation for sustainable practices. Research and advisory services should support fair BMI through knowledge transfer, technical assistance, and facilitation of multi-stakeholder processes. Their role is particularly important for closing knowledge gaps and supporting the implementation of innovative practices and technologies.

6. Conclusion and next steps

This deliverable makes several important contributions to understanding how change management can facilitate fair BMI and how this can be applied to support the design of fair BMs for CSA transition. First, we propose a definition for fair BMs that addresses a significant gap in the literature, regarding the undertheorized concept of fair BMs in sustainable BM and CSA literature. Second, the change management framework developed provides a structured approach for navigating the complex stakeholder engagement that is required for successful implementation of BMI for CSA transition, addressing a significant gap in the existing BMI literature. Third, using the first two phases of the DSR approach, we have identified specific design requirements, which will be used to develop the design and content of fair BMs for promoting CSA transition.

Building on the change management framework and co-identified changes presented in this deliverable, the next phase of the BEATLES project will focus on designing, developing and validating fair business models. This work will be presented in Deliverable 4.4 (Portfolio of business models v2), expected to be delivered in June 2026. The design and development phase will build on the design requirements and will start with the identification of relevant business model patterns from the literature and practice that can potentially address the design requirements. Following the next phases of the DSR approach, the BM prototypes will be developed. These prototypes will specify the fair BM elements: value proposition, value creation and delivery mechanisms, and value capture arrangements that collectively address the design requirement identified by stakeholders. The validation and refinement process will continue to engage stakeholders through co-creation workshops, to evaluate and refine the proposed fair BMs, ensuring that the developed business models remain consistent with the stakeholder perspectives and respond to their needs and concerns.

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Input for the agenda of the 2nd Co-creation Workshop
Business model innovation for climate-smart agriculture

The content of this document has not been published and cannot be shared beyond project activities.
Dissemination level: PhD supervisory team, WP4 Team and, BEATLES partner

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Background

The workshop agenda detailed in this document is work package 4 (WP4) team's input for the agenda of the 2nd annual co-creation workshop and is part of the WP4 task 4.3. Co-creation of changes for business model innovation and task 4.4. Validation of business models. Within these tasks, three co-creation workshops will be conducted addressing three objectives: (1) co-identify the needed changes towards fairness that should be implemented in the selected food systems for the transition towards climate-smart agriculture, (2) prototyping the fair business models, and (3) co-validation of the fair business models.

The workshop agenda detailed in this document addresses the first objective and will form the basis for the co-design of fair business models. To reach the objective, the workshop will explore the stakeholders' position about fair values and will co-identify the changes needed for business model innovation. These activities provide an opportunity for stakeholders to share their perspectives on how to improve fairness in the value chain.

Workshop preparation

Who should attend?

- Stakeholders representing the value chain segments of the use cases (UCs)
- UC leaders as facilitators and WP4 team members as co-facilitators

Set-up

An example of a workshop room and table set-up is visualized in Figure 1.

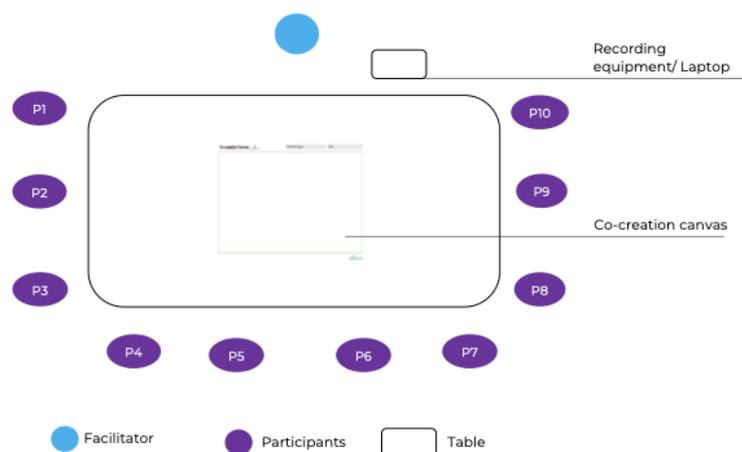


Figure 1. Example of a workshop room and table set-up

Data capture and Informed consent

In a co-creation workshop, a large amount of data is generated presenting a challenging task related to data capture. To effectively document and analyze workshop outcomes, a combination of video, audio, and photographic documentation will be employed. A co-facilitator will be responsible for recording the entire workshop process and ensures that initial results especially those captured using the co-creation canvases are photographed. Before the workshop, therefore, participants informed consent, on the use of the data generated in the workshop and on being recorded, will be obtained.

Co-creation methodology

What is co-creation and what is co-created in this workshop?

Co-creation is a participatory approach to design and decision-making that involves multiple stakeholders and users (Jones, 2018). Co-creation is an open, active, and creative process in which all relevant stakeholders are engaged and guided through a design process (Ind & Coates, 2013) . A co-creation process usually takes place in a facilitated workshop where participants with different roles come together and offer diverse insights. The output of the workshop is supposed to provide a more holistic view of what a product, service, or in this case business model should include. In the workshop, we make use of canvases which we refer to as co-creation canvases. Canvases are blank documents where users fill out answers to key questions.

How does the workshop output feed into the co-creation of fair business models?

The workshop is the first step to a three-step process to co-create fair business models (Fig 2). In co-creating fair business models, integrating stakeholders' position of fairness in the business model is central. In the first step, participants explore their position towards fairness and co-identify the needed changes towards fairness. During the second step (prototyping) the participants give shape to the changes needed. The third step (co-validation) involves the evaluation of the changes found in the second step.

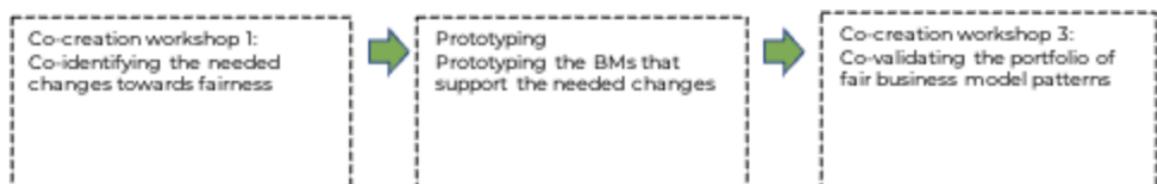


Figure2. Co-creation workshop methodology

Agenda and Guidelines

Checklist

- Workshop protocol;
- Co-creation canvases;
- Markers/Pens;
- Post-its/Sticky notes in blue, orange and green;
- Red dot stickers and green stickers;
- Stakeholder representation per UC value chain;
- Initial list of needed changes;
- Time: 2 hours;
- Recording equipment (Laptop, microphone, phone/camera)

1. Introduction (5 mins)

- 1.1. The facilitator **welcomes** the participants.
- 1.2. The facilitator **introduces** him/herself.
- 1.3. The facilitator **introduces** the agenda and explains the objectives.

2. Exploring stakeholders' position about fairness (30 mins)

- 2.1. The co-facilitator **provides** each participant with the following workshop materials: Co-creation canvas 1 with the Post-its (1 green, 1 orange, 1 blue), and markers or pens.
- 2.2. The facilitator **explains** to the participants that the first task is to answer three key questions individually to explore their position about fairness. Ideas are written down on individual post-its.
- 2.3. The facilitator **emphasizes** that participants are only to use 1 post-it for each question. The facilitator **encourages** the participants that there are no wrong answers.
- 2.4. The facilitator **presents and asks** the key questions individually giving each question time.
ASK: What does fairness in the value chain mean for you? (5 mins) Write the answer on green post-its.
- 2.5. **ASK:** "Do you think that your UC value chain is fair? What makes it fair / not fair? (Orange post-it). (5 mins)
- 2.6. **ASK:** "What must remain (fair) / has to change (Not fair) to make the chain fair for all stakeholders?" (Blue post-it) (5 mins)
- 2.7. The facilitator **places** co-creation canvas 2 in the middle of the participants and **asks** the participants to post their ideas on the Co-creation Canvas 2. The co-facilitator **takes** a picture of the Co-creation canvas 2 for documentation. (5 mins)
- 2.8. The facilitator **asks** for a volunteer to share his/her position around fairness. (5 mins)
- 2.9. **BREAK** (5 min break)

Co-creation Canvas 1: Stakeholder: _____ Date: _____

<div style="background-color: #76923c; color: white; padding: 5px; font-weight: bold;">Definition of fairness?</div>	<div style="background-color: #c85135; color: white; padding: 5px; font-weight: bold;">Is the value chain fair?</div>	<div style="background-color: #3498db; color: white; padding: 5px; font-weight: bold;">Needed changes to make it fair</div>
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BEATLES

Co-creation Canvas 2: Use case: _____ Date: _____

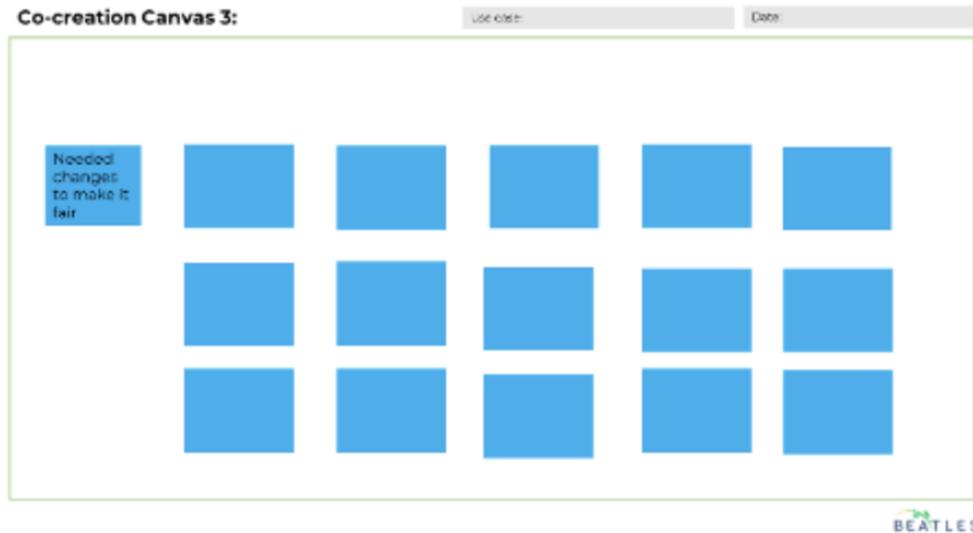
	Stakeholder 1	Stakeholder 2	Stakeholder 3	Stakeholder 4	Stakeholder n
<div style="background-color: #76923c; color: white; padding: 5px; font-weight: bold;">Definition of fairness</div>					
<div style="background-color: #c85135; color: white; padding: 5px; font-weight: bold;">Is the value chain fair?</div>					
<div style="background-color: #3498db; color: white; padding: 5px; font-weight: bold;">Needed changes to make it fair</div>					

BEATLES

3. Co-identifying the needed changes (85 mins)

- 3.1. The facilitators **collect** all the identified needed changes posted in the co-creation canvas 2 and **transfers** them to the co-creation canvas 3. (3 mins)
- 3.2. The facilitator **presents** and **explains** that an initial list of needed changes has also been identified based on the interview conducted last year within the BEATLES project. The initial list of needed changes per UC value chain can be found in the Annex starting from page 12. (5 mins)
- 3.3. The facilitator **explains** that the next task is for each participant to select a maximum of five needed changes from the provided list, that they think can contribute to fairness in the chain. Here the facilitator explains that the needed changes contribute to fairness when they contribute to any of the four types of fairness:
 - *Distributive fairness* – when the needed changes allow for fair distribution of outcomes.
 - *Procedural fairness* – when the needed changes have the potential to improve the perceived fairness of the procedures used to determine these outcome distributions or allocations e.g. when it allows that all stakeholders have a say in decision-making processes and that the procedures used to allocate resources and benefits are transparent and equitable.
 - *Informational fairness* – when the needed changes have the potential to improve the quality of the information provided about the procedures resulting in outcome allocations.
 - *Interpersonal fairness* - when the needed changes have the potential to improve the degree to which people are treated with politeness, dignity, and respect by those executing procedures.

It might be that a value chain segment/stakeholder type has more than 1 representative e.g. 2 farmers. In this case, the facilitator **clarifies** that the two farmers need to form a small group and collectively choose the five needed changes. To facilitate the selection, **ASK:** From the list presented, what needed changes have to happen to improve fairness in the chain? Please select a maximum of five choices. The selected changes will be added to the needed changes identified in the previous task (20 mins)
- 3.4. The facilitator **encourages** the stakeholders to add the five needed changes they identified to the co-creation canvas 3. The facilitator and co-facilitator **remove** possible duplicates. The co-facilitator **takes** a picture of the Co-creation canvas 3 for reporting. (5 mins)



- 3.5. **Dot voting.** At this point, we have reached a critical mass of ideas. Now is a good point to stop and focus on pruning. Dot voting, also called dotmocracy, is a simple tool used to make decisions in a group setting by allowing stakeholders to vote on options represented on sticky notes. Dot voting helps improve decision-making by ensuring every voice of every stakeholder type is heard and considered (Miro, 2024). Dot voting is not a voting system where options with the most votes win. Dot voting is much more participatory, open-ended, and useful for understanding the opinions of people on a wide range of ideas (Diceman, 2010).

Before the voting, the facilitator **reminds** the participants of the purpose and value of the dot voting exercise i.e. to co-identify needed changes that they think can contribute to fairness in the chain. The facilitator **makes it clear** to the participants that they are expected to review, consider, and compare all options first, before sticking their dot stickers to avoid the bandwagon effect i.e. often people will simply add their dot stickers where everyone else has dotted without considering their opinion on all options. Moreover, the facilitator **clarifies** that for stakeholder types with more than one representation, the representatives must discuss between themselves and align where to put the dot stickers.

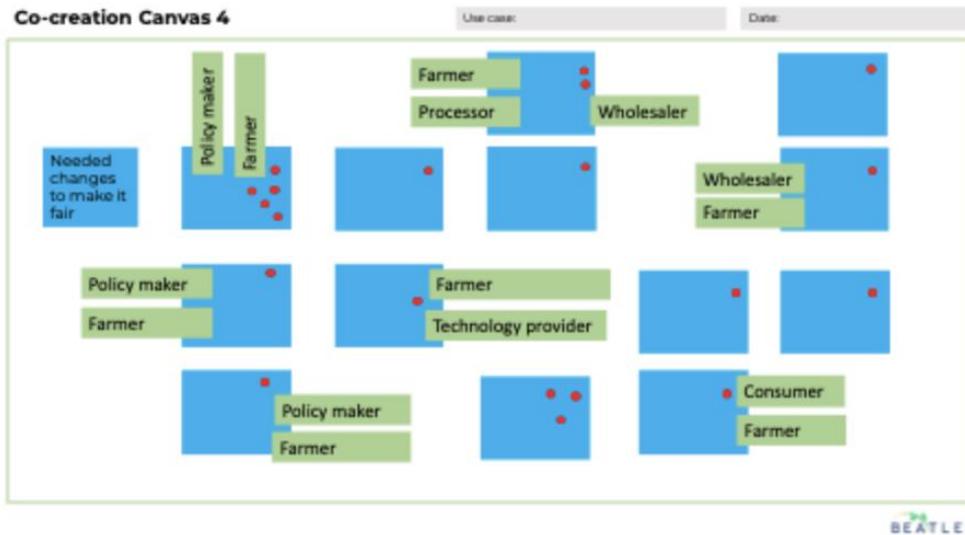
In dot voting, each stakeholder type is provided a number of dots that can be assigned to, in their opinion, the most promising needed change that contribute fairness in the chain. As a rule of thumb, each stakeholder type is given dot stickers equal to a quarter of the total number of options available (Lucidspark, 2024). For example, if there are 12 ideas generated, three dot stickers will be handed out to each stakeholder type.

The co-facilitator **hands out** the dot stickers to each stakeholder type. Stakeholders vote by using dot stickers and posting the dots on the post-it note corresponding to the ideas they find promising to pursue. Participants can choose to allocate all their votes to a single idea or distribute them among multiple ideas. This flexibility

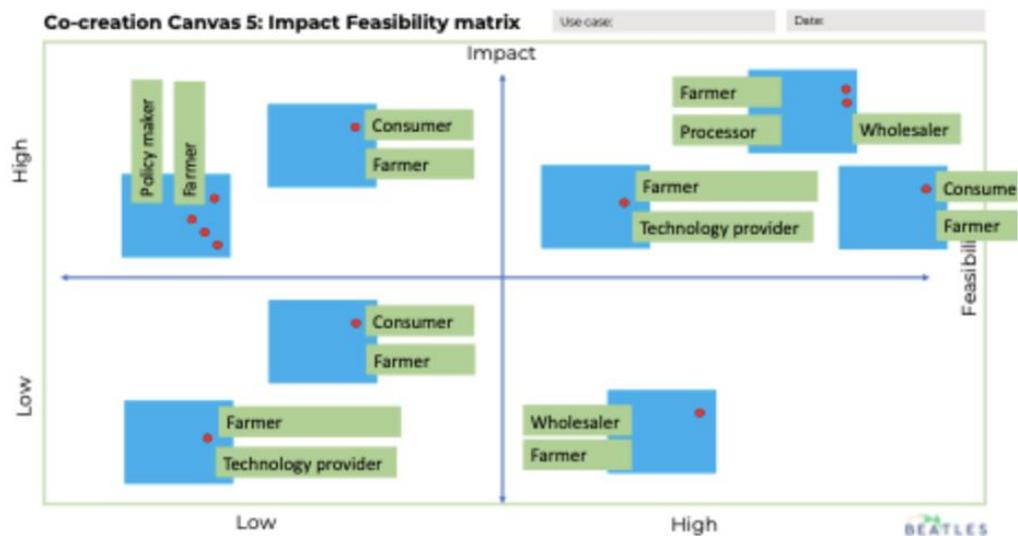
allows the participants to express their preferences more accurately. This process allows every stakeholder type to have an equal say in choosing from the mass of ideas. The co-facilitator **takes** a new picture of the co-creation canvas 3 with the result of the dot voting. (10 mins)



- 3.6. The facilitator **separates** the ideas with the dot stickers and **places** them on the **co-creation canvas 4**. The facilitator **explains** that the next task is to identify which stakeholders can contribute to making the needed changes happen. For this, the participants will be handed out green stickers where they can write their role (as in farmer, processor etc) and will have to place the green stickers to the needed changes they think they can contribute to. The co-facilitator **hands out** the green stickers to the participants. The co-facilitator **takes a picture** of the co-creation canvas 4. (17 mins)



- 3.7.** The participants **seek** consensus on the most feasible and impactful ideas to pursue, by mapping the voted ideas on an impact feasibility matrix. (Impact here refers to the degree to which an idea has the potential in allowing fair distribution of value to all stakeholders. The co-facilitator **takes** a picture of the co-creation canvas 5. (25 mins).



4. Conclusion (5 mins)

- 4.1. The facilitator **thanks** the participants for their active participation and valuable contributions.
- 4.2. The facilitator **summarizes** the main outcomes and learnings from the workshop.
- 4.3. The facilitator **explains** that the workshop output will be used and developed in the next co-creation workshop.
- 4.4. The facilitator **provides** information on how to stay in touch or get involved in future activities.

Annex: Value mapping results

Co-creating fair business models starts with a deeper understanding of value to identify new business model ideas that facilitates fair distribution of value between a focal actor and other firms in the value network. In BEATLES, farmers are the focal actor as adopters and implementors of CSA practices and technologies.

Using data from the interview of stakeholders in each UCs, the simplified value mapping tool – a tool developed to assist firms in sustainable business modeling, has been used to understand what value is being exchanged by identifying value captured, value uncaptured, and value opportunities in the use cases (Bocken et al., 2013). Value captured is “the benefit delivered to the firm and its stakeholders; it includes not only monetary value, but also the wider value provided to the environment and society” (Yang, Vladimirova, et al., 2017, p. 32). Value uncaptured is “the set of benefits that could be captured but has not yet been captured” (Yang, Evans, et al., 2017, p. 1801). Some examples include waste streams in production, underutilized resources, insufficient use of expertise and knowledge, repeated work, the need for experts in certain fields, the need for a platform, underutilization of by-products and poor product and service quality. Value opportunities are “any activities that can capture, create, and deliver new value to the firm and its stakeholders” (Yang, Evans, et al., 2017, p. 1797).

In BEATLES, the identification of value uncaptured and value opportunities is intended to trigger the discovery of new value ideas which are potential innovations in the business model that can facilitate the implementation of climate-smart agriculture and fair distribution of value in the UCs (Yang, Evans, et al., 2017). The list of value ideas was then organized based on the elements of a business model according to Osterwalder and Pigneur (2010) . The figure below shows an example of the value mapping done for a dairy cooperative in Germany.

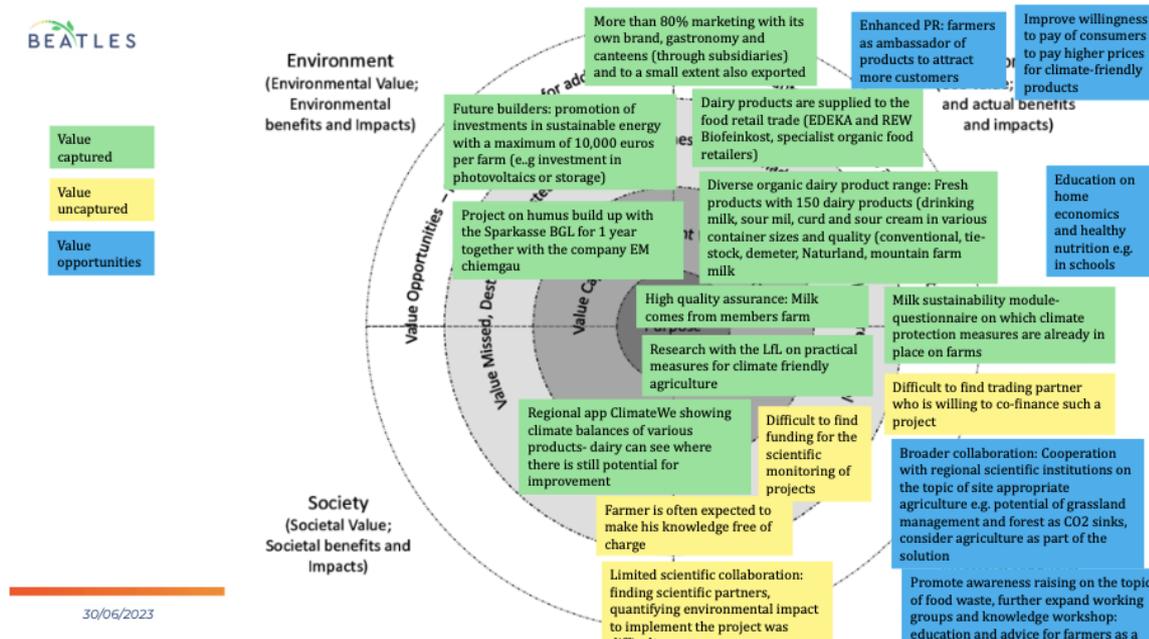


Figure 3. Value mapping for a dairy cooperative

In the following pages, are the summarized result of the value mapping per UC.

Use case: Germany

List of needed changes	
Customer segments (CS)	Value proposition (VP)
CS1: Expansion of organic offers into other public domains: No hospitals offer organic meals, especially senior care	VP1. Better value proposition: How the decision of consumers for products can be detached from the prices of the products and shaped more towards value; How to solve: What consumers are willing to pay in theory for climate friendly products and what they decide for in front of the supermarket itself
CS2: Opportunities to expand organic food offering in school remain unexploited since each school decides its catering independently	VP2. Enhanced PR: farmers as ambassador of products to attract more customers
CS3: More public procurement and gastronomy converted to organic	VP3. Creative food solutions for children
Channels (CH)	VP4. Reduce food waste: Promote awareness raising on the topic of food waste: how to optimize the use of leftover food, especially in buffet situations for several hundred of people, further expand working groups and knowledge workshop: education and advice for farmers as a major lever, but also communication towards customers
CH1. Potential of direct marketing by farmers how can this be supported	VP5. New image for organic: Organic products need new image: cool product designs needed; Image of organic is still a bit dusty and old-fashioned- tried to change the image through a modern menu card but it is taking time, it should be the normality for everyone;
CH2: Use of city's intranet information platform for marketing organic food	VP6. Product distinction: No distinction between regional pasture-based meat and imported meat by government org
Revenue streams (RS)	Customer relationships (CR)
RS1. So far no benefits yet, hoping to be able to offer organic beef with Bavarian organic certificate which will increase their standing as competent regional retailers	CR1. Consumer education: Supporting the consumers to be educated about sustainable food through kitchen parties where the producers can meet the guests and educate
RS2. Feed from food production side products will be a bigger part of the product range if the product is taken up well by farmers. Farmers are so far happy with the feed so far.	CR2. Education on home economics and healthy nutrition e.g. in schools; More conscious consumption is needed
RS3. Reusable packaging	Key Resource (KR)
RS4. Failed project on building up humus and therefore bind CO2 in soil, farmers would get money from the dairy for building up humus and the company would use it as compensation for their emissions	Key partnerships(KP)
RS5: Sales through improved marketing: Marketing / Advertisement for organic products need to change better promotion of sustainable products ; If marketing of organic products is efficient, more farmers will have the financial incentive (and benefit of fair partnerships), more farmers will convert to organic farming	KP1. Broader scientific collaboration: Cooperation with regional scientific institutions on the topic of site appropriate agriculture e.g. potential of grassland management and forest as CO2 sinks, consider agriculture as part of the solution; Improved scientific collaboration: Limited scientific collaboration: finding scientific partners, quantifying environmental impact to implement the project was difficult
Key activities (KA)	KP2. Öko-model region makes more regional processing possible; Öko-model region connects consumers and producers but the potential for deeper collaboration and synergies might still exist
KA1. Improve supply: only some butchers can provide high quantities in organic quality	KP3. Personal exchange with farmers on the topic of breeds: Dual use breeds that do not only focus on increased milk production
KA2. Market development: Many cattle is sold outside of Bavaria – no sense to drive animals first to northern Germany and bring the meat back again	KP4. Collaboration to put positive benefits of organic in the foreground: Strengthening dialogues such as roundtables with farmers to foster better understanding and collaboration; Speed dating for suppliers and gastronomy so that partnerships can be built
KA3. Improve willingness to pay of consumers to pay higher prices for climate-friendly products	KP5. Retailers should put organic and regional meat in their special offers
KA4. Promotion of more robust cows: Fleckvieh, Simmental cattle (tolerant to high temp)	KP5: Improved knowledge exchange: Farmer is often expected to make his knowledge free of charge
KA5. Encouraging more farmers to adopt sustainable practices by showcasing the financial benefits: GHG reduction is often linked to a more efficiency and so reducing GHG emissions leads to more financial efficiency	KP6. Good agricultural advisory is key to put measures into practice
KA6. Breeding improvements	
KA7. Promote forage-based feeding	
Cost structure (CS)	
CS1: Switch to more renewable energy: The mill requires high energy requirement: more energy efficiency	
CS2: Organic standards hard to comply: Wachteleier product failure: were not good on the market, too expensive and the organic standards were hard to comply	
CS3: Financial incentives for farmers to join projects	
CS4: Benefits from conversion to energy sources not felt yet	

Use case: Lithuania

List of needed changes	
Customer segments (CS)	Value propositions (VP)
CS1: No market -have nowhere to sell, low prices for organic produce	VP1: Potential for societal value if market conditions and consumer demands change
CS2: Opportunity to explore niche markets or direct to consumer strategies	VP2: Increased consumer readiness and trust for eco-production: Currently consumers are not ready or trust eco-production
CS3: Lithuania is a big exporter to the middle east and Africa and they are not interested in organic production	VP3: Improved publicity of organic products: Interests is growing but there is lack of publicity
Channels (CH)	VP4: Clear understanding of the added value the sustainability produced wheat creates
CH1: Market for organic products: Currently, around 10% of organic production does not reach the market and is sold as conventional production. Farmers experiences losses	VP5: Looking at where else to use waste – biochar by-products
Revenue Streams (RS)	VP6: Sustainable packaging from compostable material; Alternative packaging is usually very tricky to implement; Depends on the production, but hard to find packaging that meet hygiene standards and would fit in the production line and would be profitable
RS1: Market for organic products: Currently, around 10% of organic production does not reach the market and is sold as conventional production. Farmers experiences losses	VP7: Increased farmers trust in eco-certificate and increased consumption of organic products: Farmers do not trust the eco-certificate; the consumption of organic products is decreasing there is no pressure from consumers
RS2: Eko grains result in lower yields	Customer relationships (CR)
Key activities (KA)	CR1: Building trust among consumers on co-labels, more governmental programs to support the whole market chain, and education
KA1: Improving yields: Very difficult for an organic farmer since organic means smaller yields;	Key resources (KR)
KA2: Farm to fork presents challenges as its not financially viable to mill your own flour; clean your own grain	KR1: Knowledge, training, neutral consultants
KA3: Consultation to farmers	KR2: Trust issues in the robotic and automation systems- data security
KA4: A lot of change or benefits from education they don't see	KR3: Improved financial support: currently there is difficulty in adapting farm operations; Increase support for smart technology: It is hard to invest in smart technology: It is expensive and returns from very slowly; Increased support for CSA practice implementation: It took 2-3 years to implement each practice
KA5: Solar solutions and other environmentally friendly practices	KR4: More smart equipment - tractors
KA6: Needs better local regulations on how and where he can take the compost from and how and where to use it	KR5: Technology to clean and dry grain without chemicals
KA7: Looking into strip technology	KR6: Micronutrient fertilizers. New seed varieties that are more sustainable and resilient; Looking into compost - replace inorganic fertilizer
Cost structure (CS)	KR7: Increasing capacity of solar power plant - existing ones meets only about half of the electricity demand
CS1: Tax reductions	KR8: Looking into digital technologies - robotics
CS2: Compensation for higher actual costs	Key partnerships
CS3: Economic barriers hinder the move to more environmentally friendly practices	KP1: New initiative//project to support digitalization / robotization of the small farms
CS4: Governmental regulations and compensations	KP2: Secure long-term suppliers as well as the quality of the grain
	KP3: Policy for education, building trust and government programs to build better market conditions for sustainable production
	KP4: Special agreements, contracts between the farmer and the exporter

Use case: Spain

List of needed changes	
Customer segments(CS)	Value propositions(VP)
CS1: Agrotourism customers	VP1: Reusable and compostable plastic packaging: currently difficult to implement but more expensive and requires delicate storage.
Channels (CH)	VP2: Cost saving value proposition: Initiative to create networks with other association or consumer groups to reduce mileage and improve prices failed due to organizational factors
CH1: Collective warehouse and apple sizer - reduce transport of organic apples	VP3: Reduce food waste and reduce mileage for office staff travelling to storage space
CH2: Collective refrigerated storage and sorting of apples in proximity	VP4: Reduced pollution from machinery by improving soil aeration
Revenue streams(RS)	VP5: Guided tours and tastings: Introduction of agrotourism activities
RS1: Shorter chain: Potential for making and selling their own cider directly through their rural house	VP6: Efficiency and responsiveness: Improve knowledge of the demand for products to avoid food waste and have sufficient product available for each order
Key activities (KA)	Customer relationships (CR)
KA1: Improved crop programming; Less Overcrowding of harvest: overcrowding leading to reduced market value and not meeting demands; establish timetables for fruit collection, mainly to avoid that the fruits arrive at the chambers at a high temperature, and this causes a contrast shock to the chambers due to cooling which increases electricity consumption exponentially	CR1: Building consumer appreciation of the product through workshops
KA2: Workshops: Exploring collective cider production workshops with potential funding and collaboration with other interested parties in the region	Key resources(KR)
KA3: Post harvest natural treatments	KR1: Use of more efficient machinery: Grading machines, machines in the application of plant protection products; machines for separating pallets according to fruit category
KA4: Better pest management: Currently Losses due to mice damaging the crops; Improvement in harvested produce quality – fungi problem; Reduction in plant protection products; Use of plant protection treatments in a programmed basis: Antiphytosanitary and antipest nets to reduce pesticides and reduce water from fruit trees	KR2: Financial support: Implement computerized management for order management, stock control, and storage. Financial support is required for digital investment; Specific aid for the acquisition of machinery or infrastructure: Subsidies for equipment/ in infrastructure: Specific aid for the acquisition of machinery or infrastructure: Subsidies for equipment/ in infrastructure:
KA5: Fertigation with organic fertilizers, which improve productivity and nutrient efficiency; Treatments for fungi in apple tree production	KR3: Better use of green roofs: Use of green roofs at present only one lane has been tiled; solar panels
KA6: Research and development: Acquire knowledge on pollination of traditional varieties to improve yields and engage in cider production; Improved knowledge about varieties: current lack of knowledge about varieties; Lack of knowledge of the species that would be best suited for the area and management of these species; One variety (wrong foot) was chosen, and the trees are currently too vigorous, unstable production; Introduction of bee hives to encourage pollination - high risk of stings; Looking into foliar ozone and doing research on it	KR4: Outcomes from research not always implemented in practice when not appropriate and require extra costs
KA7: Establishment of some old or traditional varieties seeking a better agroclimatic adaptation and therefore a more efficient use of resources	Key partnerships (KP)
KA8: Ground covers: reduction in the use of nitrogen fertilizers when leguminous plants are used.; Sown vegetation covers with different species preferably legumes	KP1: Initiative to create networks with other association or consumer groups to reduce mileage and improve prices failed due to organizational factors
KA9: A prior process with all apple growers in Navarre is necessary to give orientation to CSA initiative	KP2: Organization such as INTIA is needed in Navarre to provide the sector with new ideas for processes that companies can advance and improve their day-to-day operations; Continued technical support from INTIA
KA10: Reduction in bureaucracy: There is too much bureaucracy limiting agricultural work: do not see progress	KP3: Improved organization of producers: lack of organization of producers resulting from lack of understanding of both parties
Cost structure (CS)	
CS1: High cost of pumping otherwise application is not feasible	
CS2: Improve energy efficiency in the refrigerated storage of products	

Use case: The Netherlands

List of needed changes	
Customer segments (CS)	Value propositions (VP)
CS1: Healthcare: short organic chain in healthcare did not have the desired result, positive side effects but not many organic products in healthcare	VP1: Sustainable products are available
CS2: Catering sector: Promote more sustainable products in the catering sector	VP2: Champion biodiversity: Organic agriculture to champion biodiversity more aggressively
CS3: General public: A reliable consumer base for sustainable products	VP3: Nature-inclusive agriculture (encourage cooperation between land managers and farmers)
Channels (CH)	VP4: Improved product quality: Loss of customers, by choosing to sell products that may not meet the appearance standards, some customers have been lost
Revenue streams (RS)	Customer relationships (CR)
RS1: Realize a revenue model for nature-inclusive agriculture (encourage cooperation between land managers and farmers)	CR1: Customer education: Clients / customers are increasingly demanding information on where potatoes come from
RS2: Rewarding farmers for social performance; compensation from the entire chain is crucial	CR2: Climate theme as a label still difficult to substantiate to consumers: questions If customers are willing to pay more for a sustainable product
Key activities (KA)	Key resources (KR)
KA1: Introduction of CSA technologies: There is awareness of CSA but no concrete technologies introduced yet; Strip cultivation; Follow up strip farming project to ensure continuity; Carbon farming; Robotization- weed weeding robot as an experiment in organic farming. Did not work "plug and play", requiring more exploration and effort to make operational; Precision agriculture: Other work with data e.g. image recognition; Self-learning algorithms e.g. hoeing and plant recognition	KR1: Green manures
KA2: Nitrogen measuring biomass with sensors on the sprayer and using this to control nitrogen applications – not picked up by other growers	KR2: Smaller/ Smart resource use
Better prediction about the outcome of crossing: Varieties can sequence	KR3: Investment for sustainability: Short-term investment needed for sustainability, with returns seen only in the long term
KA3: Making actual emissions transparent	KR4: Access to test / pilot farms showing CSA success
KA4: Market development	KR5: Data communicable
KA5: Continue to learn and persevere also in the field of new crops	KR6: Green energy: Promote a shift from fossil fuel to green energy sources
KA6: Takes action on innovation only when necessary, e.g. drop irrigation because it is getting drier	KR7: Independent research
KA7: Regenerative agriculture	Key partnerships (KP)
KA8: More time-moment- quantity-specific work in cultivation (plant specific technologies)	KP1: Joint promotion. Too little money is spent on promoting sustainable products. Coming to a compromise together in the chain
KA9: Refinements: breeding should be used in the right way	KP2: Business model must be supported within the chain
KA10: More and more research is needed as more questions arise. Independent research is becoming more important as companies get bigger and get more work, they need support	KP3: Collaboration: Colleges are working with FoodDelta Zeeland on a project to prevent food waste
Cost structure (CS)	KP4: Advocate for long term policies to facilitate better investment decisions
CS1: Large financial investments required for climate-smart agriculture	KP5: Govt. steps over the fact that solutions mentioned in policy document e.g. Dutch sweetpotato, are difficult to implement
CS2: Transitioning to biobased economy, albeit facing challenges related to costs	KP6: Difficult to keep advisers on their feet because there are few growers who grow organically
CS3: Increased support: Lack of initiators and insufficient investment - robot; Investment in precision farming	KP7: Need for long term policy and a clear agricultural vision
CS4: Compensation schemes	KP8: Within this project, the focus on NL is on 1 value chain. Need to look beyond the potato chain - approach has to come from the cropping plan
CS5: Working on possibility of tax reservation for weather extremes	
CS5: Drip irrigation - trials of 5 years but does not provide enough added value for the grower	

Use case: Denmark

List of needed changes	
Customer segments (CS)	Value propositions (VP)
CS1: Local community: Interest from local community in the possibility of buying eggs and vegetables	VP1: Able to offer organic at the same price despite increasing cost: received a silver brand (canteen management)
Channels (CH)	VP2: We believe it is a good business case to bridge the gap between producers, labelling schemes, and consumers
Revenue streams (RS)	VP3: Reduce food waste: Processing and marketing of unsold vegetables; Reducing waste and surplus production. Providing more local job opportunities
RS1: Farmers don't benefit financially from reducing the climate footprint of their livestock production	VP4: Zero emission concept: system that relies on automated vacuum pump to flush slurry: for frequent flushing
RS2: Need for financial incitement to implement and practice CSA	VP5: Data ownership: Own field data that is obtained it should follow the owner not the subscription or provider technology and data storage
RS3: Organic products are under pressure due to higher price	Customer relationships (CR)
RS4: There needs to be a "carrot" for performance (maintain CSA) and not only to implement but also for operation in the long term	CR1: Registration of waste on plates/monitoring guests plate: provide awareness about food waste
RS5: Meat producing companies to motivate the livestock farmers to produce more climate-smart: bonus fee provided to farmers who have invested in climate-smart technologies	Key resources (KR)
Key activities (KA)	KR1: Development of the biomass dryer: technological and financial challenges
KA1: Use of marine protein to replace zinc and perhaps use biostimulants	KR2: More biogas on the hands of farmers
KA2: ARA ecorobotix sprayer can undergo further development to be used for precision fertilization	KR3: Funding to complete the production kitchen under construction
KA3: Have flock of sheep to grass on the fields in the autumn	KR4: Increased support: a software program for handling logistics when moving and applying slurry: too expensive for the individual farmer
KA4: Documentation requirements for manufacturers. You must be able to say how much you produce, deliver, requirements for the form of production	KR5: Locally sourced feed: Feed is organic but comes from other countries: better to buy it locally or close by
KA5: Breed selection of pigs: housed outside most of the year	KR6: Knowledge: Obtain expert knowledge and get the best use of field and soil data: many systems are not able to talk together, and valuable data is lost
KA6: Offering the technology that reduce methane emissions from slurry storage tanks to livestock farmers throughout Europe and even outside of Europe	KR7: Lease option: Herd reduced: lease option from the municipality was lost: now mostly a hobby production
KA7: Would be smarter to avoid ploughing but farmers only do this if there is a benefit	Key partnerships (KP)
KA8: Weed is an issue in CA- difficult to combine with CSA and organic: have no good solution yet to reduce amount of pesticides	KP1: Cooperation with municipality
KA9: Iterative process of improving business practices and offerings: Failed initiatives are rarely wasted because its adjusted based on practical experience and feedback	KP2: Financial resources and commitment from producers, labelling schemes, and retailers as well as consumers starting to use our services
Cost structure (CS)	KP3: A volunteer local association to help with the farm work
CS1: Introduce a subsidy scheme motivating farmers to invest in climate-smart solutions; Incentive schemes must be implemented to motivate farmers to invest in climate-smart technologies ; Subsidy scheme to motivate farmers to invest in climate-smart solutions for agriculture; More subsidy schemes are required as the prices for new technology is far and many farmers are willing to implement new technology but financial liquidity are challenging for many farmers; if farmers can apply for subsidy for investing in climate-smart technologies both PURROT and the biomass dryer would have a large market potential; Fair allocation of subsidies; Subsidies often are allocated to what is hot and new: in 2020 subsidies and support schemes were only given to acidification of slurry. Technical verifications are not prioritized	KP4: Collaboration with suppliers
CS2: Agricultural financial support is not supporting climate-smart initiatives	KP5: Network building: currently Difficult to get agreement in the group
CS3: Organic products are increasing in costs	KP6: Big challenge for small suppliers as requirements for registration is increasing. Sale is very difficult because its difficult to make agreements as they often drown in paperwork
CS4: Expense of establishing fiber network to the farm turned out to be too expensive	KP7: More active political interaction: encourage to a more climate-optimal operation
CS5: Big interest in PURROT technology from farmers and biogas plants and wastewater treatment plants. Farmers decide not to buy because there is no strong incentive for them to invest	KP8: Challenge with second paddock: problematic when people start associations with lack of knowledge about animals and environment
	KP9: Little interest in establishing joint purchase e.g. Vegetables from local farmers
	KP10: Form associations: Could use expensive learning to help other start similar association