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modernAKIS Together for Systems' Innovation

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1. Executive Summary

In recent years, the importance of co-creative approaches in agricultural research and innovation has gained significant recognition, particularly within the European Union (EU)'s research and policy agenda. Researchers play a crucial role in these joint efforts, aimed at generating innovative solutions that are both scientifically robust and socially relevant. However, co-creative approaches come with several characteristics that have significant implications for researchers, especially in terms of the increased demands and expectations placed upon them. These expanded responsibilities can present challenges, creating obstacles that hinder researchers' effective engagement in co-creative processes. It is within this context that Task 1.5 of the ModernAKIS project was conceived, to explore the obstacles that researchers encounter when engaging in co-creative approaches and identifying possible pathways to incentivize and support their participation.

To lay the foundation for this work, the deliverable first provides a conceptual exploration of co-creation, drawing on both EU policy frameworks and broader academic literature. This exploration reveals that co-creation is not a universal concept but rather encompasses a wide range of practices and approaches. Co-creation can take diverse forms, from practical and outcome-oriented efforts focused on producing usable knowledge to more transformative efforts aimed at achieving systemic change. The goals of co-creation can also vary, ranging from immediate problem-solving to long-term societal impact. Moreover, the exploration underscores the importance of understanding co-creation within the broader institutional and socio-cultural contexts in which it occurs.

The document then presents the findings from a targeted literature review that identifies the key obstacles researchers face in engaging in co-creative approaches. The range of obstacles identified across individual, institutional, and socio-cultural levels, highlight the complexity and context-dependence of the obstacles that researchers face. Finally, building on the identified obstacles, we propose strategic pathways to incentivize researchers' engagement in co-creative approaches. The proposed solutions are not meant to be exhaustive but are intended to serve as starting points for further refinement and adaptation in collaboration with key AKIS actors.

2. Introduction

It is now widely accepted that for agricultural research and innovation to deliver greater societal impact, closer collaboration and partnership among researchers, end-users and advisors are crucial. This growing shift towards more co-creative approaches expands the expectations placed upon researchers. In addition to traditional roles, researchers are increasingly expected to assume a range of new roles such as facilitator, knowledge broker, change agent, communicator, compiler of practical needs and a reflexive researcher[1]. However, this expanded role also brings new challenges for researchers, who must navigate the complexities associated with such co-creative approaches while fulfilling their academic responsibilities as well as demands put on them by the system in order to achieve scientific career progression. Understanding the barriers researchers face is thus crucial to find ways to support their engagement in such co-creative approaches

It is within this context that Task 1.5 "Approaches and Practical Incentives to Encourage Researchers' Engagement in Interactive Research Processes" was conceived within the modernAKIS project. The modernAKIS project is designed to support the capacity development of the governing bodies of national/regional AKISs (Agricultural Knowledge and Innovation Systems) and of the key actors of change in these systems. The overarching goal is to facilitate the transformation towards more coherent, effective, and efficient AKISs, capable of driving the sustainable management and use of natural resources in farming and forestry.

Task 1.5 contributes to this overarching goal by focusing on the critical role of researchers as one of the key actors within the AKIS. By analysing the barriers those researchers face in engaging in co-creative approaches, this task aims to identify pathways that can be implemented to encourage and support their engagement in such co-creative processes. The insights gained from this task are thus intended to inform the design of strategic interventions and support mechanisms that can be implemented by key AKIS actors to create a more enabling environment for researchers engaged in co-creative approaches.

This report is structured as follows:

Chapter 3 establishes the conceptual foundation by examining the co-creation as defined in EU policy and research agenda as well as in the broader academic literature.

Chapter 4 presents results from an in-depth desktop analysis of the obstacles hindering researchers' engagement in co-creative approaches at various levels – individual, organizations and communities, broader institutions and policies and social and cultural norms.

Chapter 5 outlines strategic pathways to incentivize researchers' engagement in co-creative approaches, offering several pathways that can mitigate the identified barriers.

Chapter 6 elaborates on next steps for further engaging key AKIS actors with the outputs of this deliverable

2.1. Framing of task, link with other work packages and tasks

Task 1.5 is fundamentally framed by the methodological approach of ModernAKIS - the Transformative AKIS Journey (TAJ) - as outlined in Deliverable 1.1[2]. The TAJ is based on the understanding of change as a systemic process that involves not just individuals but multiple actors

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at multiple levels in a collaborative endeavour. In so doing, the TAJ approach emphasizes 3 key aspects:

- **Multi-actor approach:** TAJ emphasizes the importance of involving a diverse range of actors, including farmers, advisors, researchers, managing authorities, etc. For Task 1.5, while the primary focus in on the barriers and incentives for researchers to engage in co-creative approaches, adopting a multi-actor approach means that the roles and assets of other AKIS actors will be actively explored in the proposed pathway.
- **Multi-level interaction:** TAJ also underscores the importance of interactions across difference governance and operational levels within the AKIS. In Task 1.5, this perspective will ensure that the identified barriers and incentives are examined within the broader context of these interconnected levels.
- **Transformative learning:** TAJ also emphasizes continuous reflection and adaptive learning as key to systemic change. For Task 1.5, this means that the barriers and incentives identified should be seen as part of an ongoing process of critical reflection and adaptation. This iterative process of learning and adaptation will ensure that proposed pathway is relevant.

In terms of linkages with other tasks, Task 1.5 is closely interconnected with several other tasks and work packages within ModernAKIS, where there are opportunities for mutual dependencies and collaborative development. These linkages will be further concretized over the course of the year as we continue to align our efforts. For now, we outline the linkages as follows:

- **WP3,** focuses on building the capacities of AKIS Coordination Bodies (AKIS CBs), other AKIS governing bodies (especially the ones focused on public participation) and other AKIS actors to understand, analyze, transform, monitor, and evaluate their AKISs. The multi-level barriers and incentives faced by researchers, as identified in T1.5 could serve as input in designing the training modules and toolkits. Conversely, feedback from these capacity-building activities in WP3 could also inform and refine and finding of T1.5
- **WP4**, similarly focuses on building the capacities of key AKIS actors through engagement with cross country Communities of Practices (ccCOPs). Its objectives include providing insights, good practices, and models for designing impactful AKIS journeys. Here, we see significant interdependences with T1.5 - findings, on the identified obstacles and incentives, can actively be discussed within the ccCOPs, and members can also contribute with diverse practice-based examples from various contexts. This collaborative approach will enrich the literature-based findings from T1.5, ensuring that the results are grounded in practice.
- **WP 1, Task 1.2,** focuses on gathering and disseminating practice-oriented knowledge aimed at enhancing knowledge flows and developing a well-functioning AKIS, making this information accessible to managing authorities and other AKIS actors. The incentives and practice-based examples identified in T1.5 will contribute valuable insights to these efforts, supporting the broader objective of strengthening AKIS functionality.
- **WP 1, T1.3**, aims to develop a set of AKIS benchmarking indicators. To this end, T1.5 will help to define indicators that assess the effectiveness of mechanisms designed to foster collaboration between researchers and other AKIS actors.

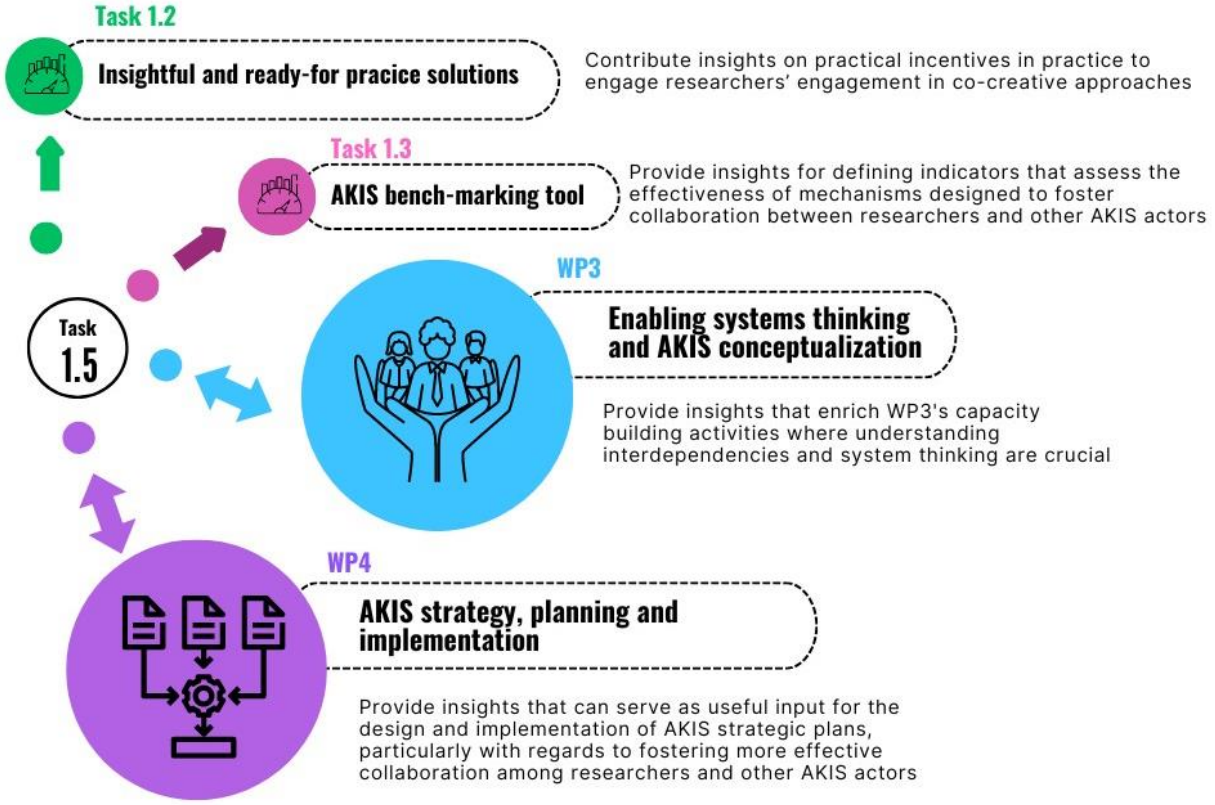

Figure 1 Linkages of T1.5 with other tasks and WPs

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2.2. Methodological approach of task 1.5

T1.5 was developed through an iterative and collaborative process. Following an initial scoping of the work, where we as task leads, elaborated on our own understanding of the task, we engaged task partners in a series of discussions aimed at developing a shared understanding of the task's objectives, expected outputs and key concepts involved. This process was admittedly quite challenging as the diverse perspectives and expectations of task partners necessitated several rounds of exchanges and clarification. Nevertheless, feedback from task partners was instrumental in shaping the direction of the task, particularly in clarifying the goals and refining the scope of this task.

The analysis of obstacles and incentives for researchers to engage in co-creative approaches was primarily conducted through an extensive desktop review of existing literature (For more information on methodology for literature review, see chapter 4). This review provided a comprehensive overview of the barriers and incentives identified in previous studies. Preliminary findings from this review were presented and discussed during the ccCOP3 meeting titled "*How to Enhance Knowledge Flows between Research and Practice*" that took place on April 9, 2024. This meeting offered an opportunity to engage with participants on the conceptual underpinnings of co-creation, as well as the practical challenges researchers encounter. The feedback gathered during this discussion was invaluable in further refining the results.

While this deliverable for now is largely the product of a literature review, it represents only the initial phase of an ongoing process. Over the next year, we plan to actively engage AKIS Coordination Bodies (CBs) and researchers with the findings from this task. This engagement will allow us to further refine our insights, adapt to new inputs, and update this report accordingly. As such, **this report is intended to be a living report, that will be updated as we continue to gather feedback and deepen our understanding of the barriers and incentives that researchers faced in engaging in co-creative approaches.**

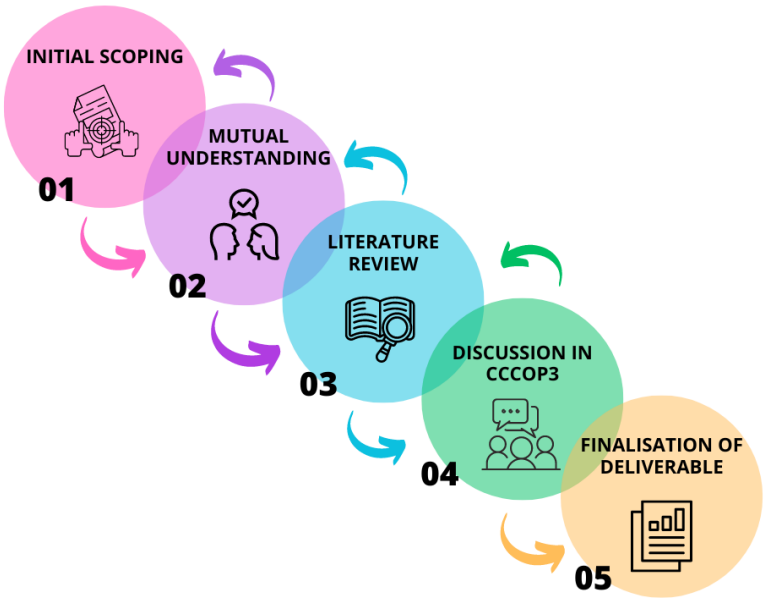

Figure 2 Methodological approach for T1.5

3. Understanding Co-creation

In the last decade, co-creation has emerged as a key notion within the European Union (EU)'s research and innovation policy agenda. This is evident in the proliferation of related engagement approaches such as *open innovation, citizen science, Responsible Research and Innovation (RRI), Multi—Actor Approach (MAA), "Interactive Innovation Model",* etc.[3] These approaches all emphasize the value of involving a diverse range of actors – including researchers, practitioners, policy makers, citizens, farmers, advisors – in the research or innovation process.

The promises of co-creation are manifold. Co-creation is seen as a way to address real-world problems more effectively by integrating diverse perspectives and expertise. It is also believed to foster innovative solutions that are not only scientifically robust but also socially relevant and widely accepted. Furthermore, by promoting a shared sense of ownership of outcomes, co-creation is expected to enhance the update and practical application of research results.

However, co-creation is not an entirely new concept. The present-day significance of co-creation in the EU research and innovation policy agenda, builds on a long history of evolution in science and research policy[3]. Calls to "do science differently" have evolved through various approaches that includes participatory action research, mode-2 knowledge production, transdisciplinary research, post-normal science, civic science, etc[4].

Given this rich history, it is imperative to approach and understand co-creation not just through the lens of current EU policies but also within the broader context of its evolution as a concept. In this chapter therefore, we will first examine how the term is framed and within the EU context. Following this, we will review the broader academic literature to enhance our understanding of co-creation. **Importantly, our goal is not to conceptualise new definitions of co-creation, but rather to develop a more nuanced understanding of co-creation, so that we can lay a well-rounded conceptual foundation for the purpose of this task**.

Box 1: Co-creation of what?

Co-creation is a process that can lead to the generation of various outcomes. It can involve the co-creation of knowledge, where diverse actors collaborate to produce new insights and understanding. Additionally, it can lead to the co-creation of innovations, such as new technologies, products, or services tailored to meet specific needs. Co-creation also extends to the development and refinement of practices, ensuring that they are adapted to real-world contexts and challenges. Thus, what is co-created can range widely from knowledge to tangible innovations and practical solutions.

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3.1. Co-creation in the EU research and policy agenda

As mentioned earlier, co-creation has become a cornerstone of EU's research and innovation policy agenda, promoted through approaches such as RRI, MAA and the Interactive Innovation Model. These approaches all call for the active involvement of diverse actors – including researchers, practitioners, policymakers, citizens, farmers, advisors etc. – in research and innovation processes. RRI, for instance, emphasizes the alignment of research with societal values and needs, ensuring that outcomes are ethical, sustainable, and socially desirable. Similarly, the MAA and the interactive innovation model focuses on bringing together diverse groups of actors with complementary knowledge to produce solutions/innovations that are well-adapted in practice.

Within these approaches, co-creation is often understood as a process where diverse actors come together in a joint process of sharing knowledge, developing solutions/innovations and implementing them in practice. The emphasis is on mutual learning, shared feeling of ownership, and the integration of diverse forms of expertise to produce outcomes that are both scientifically robust and practically applicable. However, in practice, the language and terminology used to describe co-creative efforts vary widely. Terms such as "knowledge exchange", "mutual learning", "stakeholder engagement/involvement", "co-design", "collaboration" are frequently used interchangeably with co-creation, sometimes leading to ambiguity in how the concept is operationalised in different contexts.

Food for thought

Does the language or terminology we use to describe co-creation influence how we understand and implement it? While terms like "collaboration" and "knowledge exchange" suggest the involvement of other actors, do they capture the essence of what co-creation implies ?

Despite this diversity in term, co-creation as elaborated in the Horizon Europe Work Program 2023-2025[5,6] has some key features. These include the emphasis on inclusivity, where a diverse range of actors are involved in view of the complementarity of their knowledge; bottom-up process, where the project takes up real challenges faced by farmers/foresters; interactive process, where practitioners and end users are involved through the research and innovation process; and share power and responsibility, where different areas of expertise are respected and acknowledge.

Co-creation, with all of its expected benefits however, is not without its critiques. In a paper by Ruess et al. (2023), where the authors critically analyzed the European policy discourse on co-creation, one primary concern that was raised was the portrayal of co-creation as a "catch-all" solution – a panacea for a wide array of societal challenges. This portrayal often emphasizes the economic benefits of co-creation, such as increased growth, competitiveness, and profitability, while simultaneously framing it as a mechanism for addressing societal challenges. The blending of these economic and societal goals within the discourse creates an impression of seamless compatibility between the two, which may not always be the case.

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Box 2: Understanding Co-creation in the context of the Horizon Europe Work Program 2023-2025

Multi-Actor Approach (MAA): The MAA can be considered an overarching policy approach central to the EU Horizon Europe/Cluster 6 program. The MAA is seen as a form of Responsible Research & Innovation (RRI), aiming to make the R&I process and outcomes more reliable and socially relevant. It emphasizes the engagement of diverse actors – including researchers, farmers, foresters, advisors, food and bioeconomy businesses, consumer associations, NGOs, government representatives – from the project's inception to its dissemination and implementation.

Interactive innovation model: The interactive innovation model is a specific application of the MAA, used primarily in Horizon funded projects such as thematic and advisory networks, living labs, light houses and Operational Groups (OGs). In this model, its focus is on creating new knowledge and solutions through continuous, dynamic engagement among diverse actors. It leverages tacit knowledge – practical know-how and experience – of practitioners to address real-world problems.

Co-creation: Co-creation involves the genuine and sufficient involvement of all actors throughout the whole project: from participation in the development of the project idea, planning and experiments to implementation, communication and dissemination of results and to a possible demonstration phase. In so doing, practitioners and end-users are to be involved, not as a study object, but to use their practical and local knowledge and/or entrepreneurial skills to develop solutions and create co-ownership of results.

Another critique pertains to the deeper normative tensions within the concept of co-creation. On the one hand, co-creation is valued for its potential to generate outcomes that are not only scientifically rigorous but also immediately applicable and useful to end-users. On the other hand, there is an equally strong emphasis on the inclusive and empowering nature of co-creation, which is supposed to democratize the research and innovation process by involving a wide range of actors as equal partners. However, this tension between relevance and inclusivity is not always easy to reconcile. In practice, the drive to produce relevant, impactful outcomes can sometimes overshadow the commitment to inclusivity, particularly, when the focus shifts towards economic imperatives. As a result, the process of co-creation may inadvertently favour those who are more aligned with these imperatives.

Food for thought

Co-creation aims to democratize research and innovation process by involving diverse actors, but are all voices genuinely heard and valued?

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3.2. Co-creation in the scientific literature

Co-creation as a term itself has its origins in the marketing and business literature, where it was popularized by scholars Prahalad and Ramaswamy[7]. They described co-creation as the process of involving customers as "co-creators" of value through the joint development of products, services, and experiences. This approach emphasized the active role of consumers, transforming them from passive recipients to integral participants in the creation process.

Conceptually, however, co-creation also draws from the domains of sustainability science, public administration, and Science and Technology Studies (STS)[3,4]. In these fields, the emphasis has been on the societal impact of research and the need for researchers to engage with actors beyond the institutional borders of academia. Calls to "do science differently" have evolved through various concepts such as transdisciplinary research, action research, mode-2 knowledge production, post-normal science, and more recently, co-production*[4]. These approaches highlight the importance of collaboration across disciplinary and institutional boundaries to address complex societal challenges.

For the purpose of this section, we will focus on the literature from the latter domains, as they offer a deeper and longer tradition of engaging with the principles and practices of co-creation, particularly in the context of societal challenges and innovation beyond the market-driven origins of the term[8,9]. Within this context, we will examine two prevailing uses for the term co-creation[10]. The first one is a more ***analytical (or descriptive) concept*** that highlights important relationships between science and governance that exist at multiple scales and are embedded in social, cultural, and political contexts; and the second one as a more ***practical, normative concept*** whereby those relationships can and should be deliberately managed and enhanced for improving the scientific basis of decision making at project and program scale.

Co-creation as an analytical concept

As an analytical term, co-creation can be traced to the Science and Technology Studies (STS) literature to account for the relationship between science, technology and society[11]. This notion of co-creation is rooted in the work of scholars like Jasanoff (1990)[12] who highlighted that scientific knowledge is not produced in isolation but is deeply embedded in social, cultural, and political contexts. In other words, this perspective challenges the traditional notion of science as objective and detached, emphasizing that scientific practices and outcomes are influenced by societal norms, values, and institutional structures. It also incorporates ideas from post-normal science, which argues that addressing complex societal challenges requires not just scientific expertise but also the active participation of non-scientific actors. Thus, co-creation in this sense is about understanding how knowledge and governance evolve together, highlighting the need for broader societal involvement in shaping scientific agendas and decisions[13]

It is no doubt that this perspective is reflected in EU's research and innovation policy agenda which underscores the need for research and innovation to be co-created with a diverse range of actors.

*Although we use the term 'co-creation' throughout this section, it is important to note that in the domains discussed, the term 'co-production' is more commonly used. Despite the difference in terminology, both 'co-creation' and 'co-production' generally refer to similar processes of collaborative knowledge generation involving multiple actors. As such we use the term "co-creation" throughout this deliverable for consistency

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However, what this analytical concept adds to the understanding of co-creation is that co-creation is not simply a matter of "matchmaking" researchers and other relevant actors to co-create knowledge and innovation[4]; it requires an awareness of the underlying structures that influence how knowledge is produced, shared and utilized. This includes considering the ways in which governance structures, power dynamics, resource allocation mechanisms, and cultural norms shape the co-creation process and its outcomes

> *Co-creation is not simply a matter of matchmaking researchers and other relevant actors to co-create knowledge and innovation ; it requires an awareness of the underlying structures that influence how knowledge is produced, shared and utilized*

Co-creation as a practical concept

In its practical sense, co-creation refers to the intentional act of involving non-scientific actors in the process of creating knowledge and innovation. This idea is not new and has been known by various terms in academic literature, such as participatory research, interactive research, civic science, trans-disciplinarity, and joint knowledge production[11]. All these approaches emphasize the participation of non-scientific actors in research and innovation processes. The goal is to move beyond the traditional model where researchers work in isolation to produce outcomes that are later shared with end-users. Instead it calls for "… an agenda, a call to configure and conduct our knowledge and decision-making process in particular ways"[10] that involves engaging diverse actors and expertise. However, different views exist about why and how to engage non-scientific actors in the research process. For example, Hakkarainen et al. (2022) identify four different nuances of co-creation[14]: (i) outcome-oriented, (ii) practical and pragmatic, (iii) empowering, and (iv) transformative. The "modest" scope of co-creation includes translating (Outcome-oriented) or integrating (Practical & Pragmatic) expertise from various knowledge systems into scientific knowledge. This aims to achieve better scientific impact (Outcome-oriented) or to build adaptability (Practical & Pragmatic) into projects or organizational frameworks, without challenging the traditional hierarchy of science and knowledge. The latter two more "radical" versions value all knowledge systems equally (Empowering) or even strengthens various knowledge capacities (Transformative), rather than just using existing traditional knowledge. For the transformative variant, co-creation aims to change societal and power structures, involving equal partners or co-researchers instead of merely stakeholders or end-users.

The practical perspective of co-creation, as identified in the scientific literature, offers valuable insights into how we can understand and apply co-creation in various contexts. To the authors' interpretation, in principle, the EU's framing of co-creation aims toward more empowering forms, seeking to deeply engage non-scientific actors as equal partners. This higher level of co-creation is certainly an admirable goal. However, as outlined by Hakkarainen et al. (2022), co-creation exists on a spectrum ranging from outcome oriented to transformative. And in practice, studies show that in many cases, many co-creation activities tend to fall towards outcome-oriented end.

Understanding co-creation as a spectrum means that it is difficult to argue that one version is inherently superior to another. Different situations and contexts necessitate different approaches

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to co-creation. In some cases, particularly where broader institutional structures support it, a more modest, outcome-oriented approach may be appropriate. In contrast, in other situations, a transformative approach may be necessary to achieve broader societal change. The value of this

Box 2: Four nuances of understanding co-creation according to Hakkarainen et al. (2022)

Hakkarainen et al. (2022) identify four nuances of co-creation: outcome-oriented, practical and pragmatic, empowering and transformative.

1. **Outcome-oriented:** Outcome oriented co-creation is primarily concerned with enhancing the impact of scientific research by translating expert knowledge into practical applications. Here, actors are valued more as implementers of research outcomes and not because of their knowledge
2. **Practical and pragmatic:** Practical and pragmatic co-creation emphasizes the integration of different knowledge systems—scientific and non-scientific—into research projects. The aim is to make research projects more adaptable and useful but without challenging the traditional role of science.
3. **Empowering:** The empowering version of co-creation seeks to elevate the voices and contributions of all involved partners. It values the experiences and insights of non-experts on equal footing with scientific knowledge. This approach ensures that all actors have a meaningful influence over the direction and outcomes of the research process.
4. **Transformative:** The transformative version is the most radical in its ambition, aiming to change societal and power structures. This approach involves longer time frames and is used as a way towards social transformation, addressing systemic issues and promoting equity

perspective lies in its flexibility, allowing us to understand and apply co-creation based on the specific needs and goals of each situation.

3.3. Implications for this task

So far, we have highlighted the diverse ways in which co-creation is conceptualized, both within the EU research and innovation policy agenda and in the broader academic literature. The EU's framing of co-creation under the Horizon Europe programs emphasizes bottom-up processes that addresses real needs faced by farmers and foresters, integration of practical and scientific knowledge, shared responsibility throughout the entire process, and practical impact. Additionally, we delved into the academic discourses, highlight co-creation as both an analytical and practical concept, with various interpretations ranging from outcome-oriented to transformative.

These explorations provide a nuanced understanding of co-creation that guides us in this task in three main ways:

1. **Co-Creation as a Spectrum:** The conceptual exploration highlights that co-creation is not a one-size-fits-all approach but exists on a spectrum ranging from outcome-oriented to transformative. For Task 1.5, this means that when identifying obstacles researchers face, we must recognize that these challenges will vary depending on where their work falls on this spectrum. For example, barriers in outcome-oriented co-creation might involve practical challenges, such as time constraints or lack of immediate incentives, while transformative co-creation might encounter deeper, systemic barriers, such as resistance to changes in power dynamics or institutional inertia.
2. **Diverse goals of co-creation:** The conceptual exploration of co-creation reveals that it operates on a spectrum, with different approaches serving various purposes, from immediate, outcome-oriented goals to broader, transformative societal change. This diversity in goals is essential to recognize when developing pathways to incentivize researchers' engagement in co-creation. Incentives should not push for a single, "ideal" form of co-creation but rather be adaptable to support the range of objectives that different co-creation efforts may pursue.
3. **Diverse forms of co-creative approaches:** Co-creative approaches can exist in various forms, from those that are geared towards more practice-based knowledge and innovation and those that more research-lead, such as transdisciplinary research and participatory action research. This understanding broadens the scope of co-creation, ensuring that the incentives and pathways that we propose are applicable across a wide range of contexts and objectives.

4. **Context matters:** The success of co-creation is highly dependent on the specific social, cultural, institutional, and policy contexts in which it takes place. What works in one setting may not be applicable in another. Understanding these contexts is essential for designing co-creation processes that are both effective and sensitive to the needs and constraints of all participants.

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4. Obstacles faced by researchers in engaging in co-creation

In this chapter, we present results from a literature review on the obstacles that researchers face in engaging in co-creative approaches. This review is not intended to be exhaustive or comprehensive but rather serves as an initial exploration to identify key obstacles frequently mentioned in the literature. Our intention is to use this review as a foundation for further work in the course of the year, where we will engage directly with researchers to validate, refine and expand upon these initial findings. But before delving into these obstacles, there are a few important considerations:

- **Focus on researchers:** for the purpose of this work, our focus is on the obstacles faced by researchers. However, this focus does not disregard the obstacles faced by other actors like farmers or advisors. To fully realise the potential of co-creative approaches, it will be essential to also address the obstacles faced by other actors in future work.
- **Diversity of co-creation forms:** Co-creation can take many different forms, from the production of usable knowledge and innovation to more research-led approaches like transdisciplinary research, participatory action research, etc. This review considers the diversity of these forms to provide a broader understanding of the obstacles that researchers face.
- **Diversity of co-creation contexts:** Co-creation can also exist in a spectrum which means that the obstacles that researchers face will depend on the co-creation contexts. The obstacles mentioned should therefore not be interpreted as universally applicable across all contexts.
- **Multi-level exploration:** Co-creation is also deeply embedded within social, cultural, and institutional contexts. To capture the complexity of these interactions, we examine obstacles at multiple levels, considering how broader contextual factors can hinder researchers' ability to effectively engage in co-creation

Methodology for the literature review

Our literature review was not designed as a rigorous, systematic review but rather as an exploratory process aimed at identifying key obstacles that researchers face in engaging in co-creative approaches. To do this, we began with a few key papers that provided comprehensive overviews of obstacles to co-creation. These core papers offered an initial set of obstacles and helped us to broadly understand the obstacles that researchers encounter. Building on this initial overview, we the reviewed the references cited in these key papers to further clarify and understand the mentioned barriers.

To ensure we covered a wide range of perspectives, we also conducted targeted searches using specific keywords such as "co-production", "co-creation", "collaborative research", "transdisciplinary research", "participatory action research", "social innovation" and "citizen science". The search was focused on domains relevant to our work, including sustainability science, In addition to peer-reviewed research articles, we also included project reports, particularly those in the context of EU-funded initiative, to capture practical insights and examples

In the end, from a pool of 48 articles and reports, we shortlisted a core selection of 23 papers that were most relevant to our objectives and provided clear insights into the obstacles faced by researchers. In a final step, we structured the barriers identified from these papers according to the nested conceptual framework of co-creation by Wyborn et al. (2019)[4] as seen in Figure 3. By

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categorizing the barriers in this way, we aim to provide a structured overview that reflects the multi-level complexity of co-creation, enabling a deeper understanding of the barriers that researchers encounter across different scales.

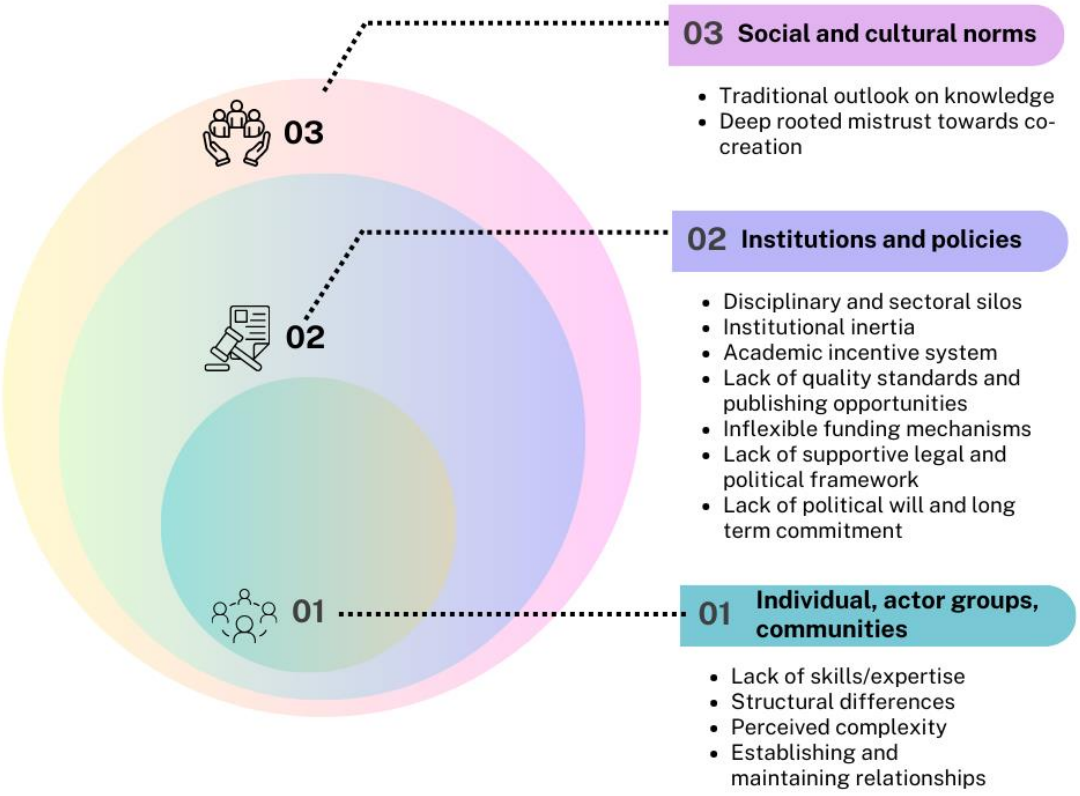

Figure 3 Overview of barriers faced by researchers in engaging in co-creation

4.1. Obstacles at the level of individual, actor groups and communities

In this subsection, we explore the obstacles that researchers encounter at the level of individuals, actor groups and communities when engaging in co-creation. These barriers stem from the practical and relational dynamics of co-creation and can significantly influence the success of collaborative research efforts. Specifically, we address challenges related to lack of skillset and expertise for co-creative research, establishing and maintaining meaningful relationships with non-academic actors, the perceived complexity of co-creative approaches and structural differences between researchers and their collaborators.

Lack of skillset and expertise for co-creation

Description: Engaging in co-creative research requires a unique set of skills that go beyond traditional academic training. To this end, many studies highlight that researchers often lack the skill sets and expertise that are essential for effective co-creation[15–17], such as interpersonal skills,

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facilitation skills, networking skills, negotiation skills. Additionally, studies highlight that some researchers, particularly those with some experience or background in doing qualitative research feel more comfortable to engage in co-creative approaches. This is because co-creative research fits relatively well with their training which often involves being reflexive, dealing with uncertainty and engaging with the messy realities of people's lives.

Effect: The lack of these essential skills can pose substantial challenges in co-creation efforts. Researchers without strong interpersonal and facilitation skills may struggle to effectively engage with other actors, leading to miscommunication, misunderstandings, and reduced collaboration. Similarly, those who are not well versed in participatory research methods may find it difficult to design and implement co-creative projects that effectively integrate diverse perspectives and knowledge systems.

Managing conflicting expectations

Description: Researchers engaging in co-creative approaches often face the challenge of managing conflicting expectations among the diverse actors involved[18,19]. These conflicting expectations can be particularly challenging for researchers to navigate, especially when they are expected to balance the rigorous demands of academic research with the practical, sometimes immediate, needs of other actors. Often, the expectations of other actors are also influenced by the specific social, cultural, and institutional contexts in which they operate, further complicating the management of these differences. Managing these conflicting expectations requires strong negotiation skills, which many researchers may not have developed as part of their traditional academic training. Additionally, there is often a lack of effective tools and methods to support researchers in aligning these differing expectations and facilitating consensus-building among stakeholders.

Effect: The difficulty in managing conflicting expectations, combined with a lack of negotiation skills and methods, can lead to significant obstacles in the co-creation process. Researchers may find themselves stretched between maintaining scientific integrity and meeting the practical demands of stakeholders, resulting in frustration, delays, and a potential compromise in the quality of the research.

Establishing and maintaining relations with non-scientific actors

Description: The kind of engagement that is expected in co-creation approaches often requires establishing and maintaining meaningful relationships with non-scientific actors. Developing these relationships is often complex and challenging, requiring substantial time and effort over long periods[15,20,21]. In addition, researchers often cite the limited networking and partnership opportunities available to them, which makes it difficult to build partnerships with non-scientific actors. For early-career researchers, this challenge is even more pronounced due to their limited experience and few opportunities to build strong networks[20]

Effect: Researchers struggle to establish networks with non-scientific actors such as farmers, advisors, businesses, civil society organisations. This lack of established relationships results in

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difficulty in establishing trust and cooperation, making it harder to initiate and sustain collaborative efforts. Additionally, due to the limited opportunities to establish new networks, researchers end up engaging the same non-scientific actors in subsequent projects. This can lead to diminished effects of co-creation efforts over time, as the same perspectives and inputs are recycled rather than introducing new viewpoints and innovative solutions.

Lack of engagement to take responsibility

Description: In co-creative approaches, the success of the process heavily relies on the active engagement and shared responsibility among all involved actors. However, researchers often face challenges when other actors do not fully engage or take responsibility for their roles in the co-creation process[16]. This disengagement can stem from various factors, such as a lack of understanding of the co-creation process, competing priorities, limited time or resources, or a perception that the research outcomes are not directly relevant to their immediate needs. Additionally, other actors may be hesitant to take on responsibilities due to unfamiliarity with the process. This lack of engagement and responsibility-taking disrupts the collaborative dynamic that is essential for co-creation, placing a disproportionate burden on researchers to drive the process forward.

Effect: When other actors in the co-creation process do not fully engage or take responsibility, it can lead to significant challenges for researchers. The burden of sustaining momentum, ensuring progress, and achieving meaningful outcomes often falls disproportionately on researchers, leading to increased stress and frustration

Structural differences between researchers and practitioners

Description: Structural differences between researchers and practitioners often create significant barriers in co-creation processes[22]. Researchers typically operate with the logic that prioritises fundamental knowledge, academic autonomy and a neutral perspective. This approach involves conducting thorough literature reviews, developing hypothesis and designing rigorous methodologies. In contrast, practitioners focus on practical experience as the basis for problem formulation and immediate action. Practitioners are driven by the urgency to address real-world problems quickly, leading to mismatch in timelines and expectations between researchers and practitioners.

Effect: These differences often result in frustration and tension. Practitioners may become impatient with the slower, theoretical approach of researchers, whiles researchers may feel pressured by the need for rapid, actionable outcomes. Such divergences in research logic and timeline can hinder the development of a cohesive, collaborative working relationship, ultimately affecting the success of the co-creation process.

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4.2. Obstacles at the level of institutions and policies

At the level of institutions and policies, researchers face a range of structural and systemic barriers that can significantly constrain their engagement in co-creative approaches. These obstacles are rooted in the ways academic and research institutions are organized, governed, and incentivized, as well as in the broader policy frameworks that shape research activities. Key barriers include disciplinary and sectoral silos that hinder interdisciplinary collaboration, institutional inertia that limits support for non-traditional research methods, and academic incentive systems that prioritize traditional metrics of success. Additionally, the lack of quality standards and publishing opportunities for co-creative research, inflexible funding mechanisms, and the absence of supportive legal and political frameworks further exacerbate these challenges. The lack of political will and long-term commitment to fostering co-creative research processes serves as a significant impediment.

Disciplinary and sectoral silos

Description: Traditionally, study programs and research activities are often bound to specific scientific disciplines, each with its own agenda, framework and strategy. This compartmentalisation goes beyond disciplines where universities often operate in isolation with other sectors, creating significant barriers to effectively bringing diverse actors together[17,23,24].

Effect: The existence of disciplinary and sectoral silos leads to a lack of opportunities for researchers to establish and build networks with other actors. This barrier is related to the earlier challenge faced by researchers in building and maintaining relationships with non-academic communities. This silo discourages the exchange of knowledge and ideas across fields, reducing the potential for innovative solutions, that co-creation aims to achieve.

Institutional inertia in providing support

Description: There is often a mismatch between the enthusiasm for co-creative approaches within academic institutions and their actual ability to provide the necessary support[17,20]. Researchers frequently express frustration over the lack of institutional support to engage in "non-traditional" research methods. This includes for example, the lack of pedagogical support through training programs and workshops on transdisciplinary research methods, soft skills, etc. Financially, researchers often lack flexible funding mechanisms that allow for long-term, in-depth engagement with non-academic actors, covering costs such as travel, community engagement activities, and compensation for stakeholder participation. Structurally, institutional policies also do not accommodate for the complexity inherent in working with non-academic actors, including flexible timelines, administrative support for managing collaborative projects, etc.

Effect: Such inertia can stifle innovation and hinder the progress of co-creative research. Researchers find themselves lacking the necessary pedagogical, financial and structural support to engage in co-creation effectively. This leads to frustration and eventual disengagement among researchers.

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Academic incentive system

Description: The current academic incentive system heavily prioritises traditional metrics of success such as the number of publications, the impact factor of journals in which those publication papers appear, the number of citations and the amount of research funding acquired. Such a system is not favourable for the collaborative and time-intensive nature of co-creative approaches, which may not lead to a high volume of publications but can generate significant societal impact. Researchers, especially those early in their careers, feel pressured to focus on these traditional outputs to advance their careers, which can discourage them from engaging in co-creative approaches that require extensive stakeholder engagement and produces outcomes that may not fit neatly into conventional academic metrics[17,20,25,26].

Effect: This emphasis on traditional metrics can result in researchers being disincentivised from participating in co-creative approaches, as these efforts may be seen as a diversion from the activities that are more directly rewarded in academia. The focus on fast publications can lead to a prioritisation of short-term research projects that yield quick results, at the expense of more meaningful, long-term collaborations with non-academic actors. This can perpetuate a disconnect between academic research and real-world applications, limiting the potential for research to contribute to societal change

Lack of quality standards and publishing opportunities

Description: Another significant barrier is the lack of practical operational criteria for assessing and evaluating the quality of co-creative research[19,27–29]. Unlike traditional research, co-creative research often produces outputs that are not easily quantifiable, such as process impacts, changes in group dynamics, or shifts in stakeholder attitudes. The absence of clear quality standards and guidelines for this type of research makes it difficult to assess its impact accurately. Furthermore, researchers face challenges in publishing co-creative research results in prestigious disciplinary journals, as these journals often favour more conventional research outputs[28–30]. Participatory research, with its context-specific findings and non-traditional outputs, is frequently viewed as less rigorous or less generalizable, leading to fewer publishing opportunities in high-impact journals.

Effect: The lack of established quality standards and the difficulty in publishing co-creative research can further marginalize this approach within academia. Researchers find it challenging to gain recognition for their work, leading to decreased motivation to engage in co-creation. Without appropriate avenues for publication and recognition, the valuable insights and innovations generated through co-creative processes risk being overlooked or undervalued, ultimately reducing the visibility and influence of co-creative research within academia but also in policies.

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Inflexible funding mechanisms

Description: The current funding mechanisms often do not align with the nature of co-creative approaches[20,23,31]. One significant challenge is that funders typically expect well-defined research questions to be articulated in grant proposals. However, in co-creative approaches, these questions are often developed jointly with stakeholders during the early stages of the project. This discrepancy makes it difficult to secure funding for genuinely collaborative research. Additionally, existing funding structures generally require that all three key stages of co-creative research – problem framing, problem analysis, and exploring impact – take place within the confines of two- or three-year project timeline. This rigid timeframe does not accommodate the iterative and often time-consuming nature of co-creation, where building relationships, trust and mutual understanding is essential and cannot be rushed.

Effect: The misalignment between funding requirements and the needs of co-creative research can hinder the development of effective collaborations. Researchers may feel pressured to prematurely define research questions or compress critical stages of the research process to fit funding timelines, which can compromise the quality and relevance of the research. Furthermore, the short project durations imposed by current funding models may limit the ability to fully explore the impact of co-created solutions, resulting in incomplete or less impactful outcomes.

Complicated legal and regulatory framework

Description: Complicated legal and regulatory frameworks is another barrier to effective co-creation[32]. Co-creative research often requires a level of flexibility, adaptability, and cross-sector collaborations that existing legal and policy structures are not designed to accommodate. For example, legal frameworks governing intellectual property rights, data sharing, and research ethics are sometimes not well-suited to the collaborative and participatory nature of co-creation. Moreover, the regulatory environment may not adequately support the participation of non-academic actors in research processes e.g. funding regulations that limit the ability to allocate resources flexibly.

Effect: For researchers, the absence of a supportive legal and regulatory framework can create significant challenges in engaging in co-creative research. Navigating unclear legal guidelines and restrictive regulations can lead to frustration and delays, discouraging researchers from pursuing co-creative approaches.

Lack of political will and long-term commitment

Description: A significant barrier to co-creative research is the lack of political will and long-term commitment from policymakers and funding bodies[19]. Co-creation processes often require sustained engagement and resources over extended periods to achieve meaningful outcomes.

However, the political landscape is frequently characterized by short-term agendas and shifting priorities, which can result in inconsistent support for co-creative initiatives. This lack of long-term commitment can lead to interruptions in funding, policy reversals, or a failure to implement the findings of co-creative research effectively.

Effect: The absence of political will and long-term commitment can severely undermine the effectiveness of co-creative research. Without consistent support, projects may struggle to maintain momentum, leading to incomplete or unsustainable outcomes.

4.3. Social and cultural norms

Social and cultural norms represent a deeply ingrained set of beliefs, values, and practices that shape how research is perceived, conducted, and valued within different communities and societies. These norms significantly influence the willingness and ability of researchers to engage in co-creation processes. While often subtle and implicit, these societal expectations can create powerful barriers to innovation and collaboration, particularly when they conflict with the principles of co-creation.

Traditional outlook on knowledge

Description: A significant barrier to effective co-creation is the traditional outlook on knowledge that prevails in many academic and societal contexts[22]. This perspective privileges theoretical knowledge, often produced within universities, over practical knowledge that is grounded in real-world experiences. In research collaboration, universities are frequently positioned as the leading partners, and their theoretical contributions are often viewed as superior to the practical relevance offered by non-academic actors. This hierarchy of knowledge creates power imbalances within co-creation processes, where non-academic actors are seen as less capable or less important contributors. However, this traditional outlook can also work in the opposite direction: practitioners, who may have deeply ingrained perceptions of researchers as the ultimate authority on knowledge, might defer to them, expecting them to provide all the answers.

Effect: The dominance of a traditional outlook on knowledge can significantly undermine the effectiveness of co-creation efforts. Power imbalances can lead to tokenistic involvement of non-academic stakeholders, where their contributions are undervalued or merely used to validate pre-existing academic frameworks rather than genuinely shaping the research process. Additionally, when practitioners defer to researchers instead of actively contributing their practical knowledge, the co-creation process can become skewed, limiting the diversity of perspectives and potentially reducing the relevance and applicability of the research outcomes.

Deep-rooted mistrust toward co-creative approaches

Description: In many Eastern European countries, another barrier that is cited is a prevalence of deep-rooted mistrust that remains as a remnant from past historical and social factors. Research

shows that there is a general scepticism towards co-creation approaches in Central and Eastern European countries. This scepticism can significantly hinder the willingness of actors and communities to engage in co-creative processes.

Effect: For researchers attempting to engage in co-creative approaches in Central and Eastern Europe, this deep-seated mistrust presents a significant obstacle. It can make it challenging to establish the trust and cooperation needed to build effective partnerships with local stakeholders.

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5. Pathways to incentivize researchers' engagement in co-creation

In the previous chapter, we explored a range of obstacles that researchers face when engaging in co-creative approaches. Building on this analysis, the purpose of this chapter is to explore potential pathways that could incentive researchers to overcome these obstacles and more actively participate in co-creative approaches. It is important to note that our goal is not to provide an exhaustive or detailed list of incentives. Rather, we aim to offer a set of initial starting points that can be the basis for stimulating further discussions and reflections among key AKIS actors. We also acknowledge that some of the incentives proposed here may already be in practice in some member states or institutions. Therefore, another objective of this chapter is to lay the groundwork for collecting good practical examples that will further enrich this document.

Our approach in proposing these pathways is deeply rooted in the AKIS perspective. This means that we recognize that barriers and opportunities for researchers to engage in co-creation do not exist in isolation; they are shaped by the broader relationships and interactions between diverse AKIS actors/actor groups. As such, the pathways we propose are designed to leverage the assets and capacities of these diverse AKIS actor groups. This systems approach will ensure that the proposed pathways are holistic and can lead to more impactful outcomes.

The pathways are structured around the key obstacles identified in Chapter 3. For each obstacle, we suggest design options that could be implemented by different AKIS actors, recognizing that some barriers may be most effectively addressed within a single AKIS subsystem, while others might require more integrated, cross-sectoral approaches. Furthermore, we understand that the feasibility of these design options will vary. Some may be relatively straightforward to implement within a short time frame, while others may require more significant investments of time, resources, and systemic change, making them long-term goals.

Finally, it is important to highlight that the incentives proposed in this chapter were particularly inspired by two key reports, which have provided valuable insights and recommendations on how to support and institutionalize co-creative approaches.

- **Royal Irish Academy, *Better together: knowledge co-production for a sustainable society,* 2021**[33]**:** this report draws on close to 50 case studies of co-production research for sustainability to provide an key levers for building capacity and capability for knowledge co-production
- **SCNAT, *Lighthouse Programmes in Sustainability Research and Innovation, 2023*[34]*:*** outlines several options for how funding programs can be designed to support the special requirements of research and innovation for sustainable development

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Pathway 1: Addressing the lack of skillset and expertise for co-creation

Short description:

The lack of skillset and expertise for co-creative approaches – such as facilitation skills, communication skills, networking skills, conflict resolution skills, etc., emerged as one of the major obstacles facing researchers. However, this challenge is not unique to researchers but also affects other actors engaged in co-creation processes. Therefore, any effective incentive or intervention should target a broad range of actors, ensuring that all participants in co-creation—researchers, advisors, policymakers, and others—are equipped with the necessary skills to collaborate effectively.

Governments 	Design option 1: **Include soft skill training as part of national or regional competency frameworks** Develop and promote competency frameworks that include essential skills for co-creation, guiding universities and research institutions in designing curricula and training programs
Funders 	Design option 1: **Funding for capacity building trainings within projects** Allocate separate funding to support workshops, training sessions, and courses focused on building the necessary skills for co-creation Design option 2: **Inclusion of capacity building requirement in funding criteria** Introduce criteria that encourage or require applicants to demonstrate how they will develop the skills necessary for co-creations within the research and innovation project as part of the funding application process Design option 3: **Funding for setting up repositories** Provide funds to establish a centralized repository of training materials and methods. This repository would serve as a valuable resource for all actors engage in co-creative approaches, providing access to a wide range of tools, guides, case studies, and best practices related to co-creation.
Universities and education institutes 	Design option 1: **Workshops and training sessions on soft skills and participatory research methods** Provide dedicated workshops and training sessions that focus on developing the essential soft skills required for co-creation. These sessions should also cover integrative research methods, ensuring that researchers are equipped with the methodologies needed for effective knowledge integration. Design option 2: **Mentorship programs for early career researchers**

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	Establish structured mentorship programs within institutions, where experienced researchers with a background in co-creative approaches mentor early-career researchers. These programs should focus on building the mentees' confidence and expertise in engaging with non-academic actors, navigating institutional challenges, and applying participatory research methods. Design option 2: **Redesign of university curricula** Consider redesigning their curricula to integrate training in transdisciplinary and participatory research methods and soft skills
Research communities 	Design option 1: **Establishing Communities of Practice** Establish and nurture Communities of Practice (CoPs) focused on co-creation. These CoPs would serve as platforms for researchers to share experiences, exchange best practices, and collaboratively develop their co-creative skills.
Advisory services and Innovation Support Service (ISS) providers 	Design option 1: **Collaboration with universities to provide joint training** Partner with universities to offer joint training sessions that combine academic knowledge with practical insights, ensuring that all actors are well-equipped to engage in co-creative processes.

Pathway 2: Addressing disciplinary and sectoral silos

Short description: Disciplinary and sectoral silos present significant barriers to effective co-creation, as they limit opportunities for researchers to collaborate with other actors and exchange knowledge across fields. To overcome these silos, it is essential to foster cross-disciplinary and cross-sectoral collaboration. This requires creating more opportunities for interaction, knowledge sharing, and joint problem-solving among diverse actors within and outside the academic sphere.

Governments 	Design option 1: **Encourage multi-sectoral partnerships** Promote policies that encourage partnerships across different sectors, such as agriculture, industry, and academia. By creating frameworks that make it easier for organizations from different sectors to collaborate, policy makers can help reduce the barriers that silos create.

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Funders 	Design option 1: **Incentivize Cross-Sectoral Collaboration** Develop specific funding calls that require or highly encourage collaboration between different disciplines and sectors. By providing financial incentives for projects that bring together researchers, practitioners, industry professionals, and policymakers from diverse fields, funders can help break down silos and promote integrated approaches to problem-solving. Design option 2: **Support networking platforms and information hubs** Support the creation and maintenance of digital and physical networking platforms that facilitate interaction between researchers and other stakeholders. These platforms can serve as information hubs where various resources like videos, articles, policy briefs are published as well as a platform for various actors to find and network with each other[33].
Universities and education institutes 	Design option 1: **Promote transdisciplinary programs** Develop and promote transdisciplinary programs and courses that encourage students and faculty to engage with multiple disciplines. By fostering an educational environment that values and supports transdisciplinary work, universities can help reduce the rigid boundaries between disciplines and sectors. Design option 2: **Create Transdisciplinary research centers** Establish research centers that focus on transdisciplinary and cross-sectoral collaboration. These centers can serve as hubs for bringing together researchers from different fields to work on common challenges, providing resources and support for transdisciplinary research. Design option 3: **Create positions that bridge different institutes, faculties and departments** Create positions in domains so broad as to encompass the physical and social sciences as well as the humanities.
Advisory services and Innovation Support Service (ISS) providers 	Design option 1: **Act as Intermediaries** Act as intermediaries between researchers, practitioners, and other stakeholders, helping to translate and integrate knowledge across sectors. By facilitating communication and collaboration between different actors, they can help bridge the gaps created by disciplinary and sectoral divides. Design option 2: **Facilitate Cross-Sectoral Workshops and Training** Organize workshops that bring together stakeholders from different sectors to discuss and address common challenges. Design option 3: **Support Collaborative Innovation Projects** Support and facilitate collaborative innovation projects that require input from multiple sectors. By providing the necessary tools, resources, and expertise, they can help ensure that these projects successfully integrate

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	knowledge from diverse fields and sectors, leading to more effective and innovative solutions.

Pathway 3: Addressing academic incentive systems that does not reward co-creative approaches

One of the most significant barriers to researchers engaging in co-creative approaches is the current academic incentive system, which traditionally rewards individual achievements, such as publications in high-impact journals and securing competitive grants. This system often overlooks the collaborative and process-oriented nature of co-creative approaches, which involves diverse actors and produces outcomes that may not fit neatly into traditional academic metrics. To foster a more supportive environment for co-creation, it is essential to reform incentives structures within universities, research institutions, and policy frameworks to recognize and reward co-creative approaches.

Governments 	Design option 1: **Integrate co-creation into national research evaluation frameworks** Incorporate co-creative approaches into national research assessment frameworks, ensuring that researchers and institutions are evaluated not only on traditional academic outputs but also on their engagement with non-academic actors and the impact of their work on society. Design option 2: **Develop policy frameworks to support positions that bridge different institutes, faculties and departments**[33,34] Create policy frameworks that encourage and support the establishment of academic positions, like professorships, specifically dedicated to transdisciplinary research. By formally recognizing and funding these roles, policies can ensure that transdisciplinary and co-creative research is given the same level of prestige and career advancement opportunities as traditional disciplinary research.
Funders 	Design option 1: **Create dedicated funding for co-creative projects** Establish specific grants or funding that are exclusively aimed at co-creative research projects. These funding opportunities should emphasize the importance of co-creative approaches with non-academic actors and provide additional resources for the time and effort required for effective co-creation as well as training opportunities.

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Universities and education institutes 	Design option 1: **Revise promotion and tenure criteria** Revise promotion and tenure criteria to explicitly include co-creative research activities. This could involve recognizing contributions to collaborative projects, community engagement, and the societal impact of research as valid criteria for academic advancement. Design option 2: **Establish annual awards for excellence in co-creative approaches** Introduce annual awards to recognize researchers for their contributions to co-creative initiatives, such as effective actor engagement or impactful transdisciplinary projects. These awards, which could include monetary prizes, public recognition, or additional research funding, can help shift academic culture to value co-creation, encouraging researchers to pursue and excel in collaborative efforts. Design option 3: **Establish novel forms of academic careers**[33,35] Formalize new career roles, such as integration experts, who specialize in facilitating interdisciplinary and sectoral collaboration. These roles would bridge the gap between academic research and practical applications, providing clear career paths for those excelling in co-creative research.
Research communities 	Design option 1: **Lobby for novel forms of academic careers**[33] Lobby for the recognition and institutionalization of new academic roles, like integration experts, within universities and funding bodies. This can include organizing workshops and discussions to highlight the importance of these roles in co-creative research and collaborating with institutions to propose new career frameworks that reward co-creative approaches

Pathway 4: Addressing funding mechanisms that do not match the nature of co-creative approaches

Short description: Funding mechanisms play a critical role in supporting co-creative research, yet traditional models often fall short in accommodating the unique demands of these approaches. A comprehensive overview of innovative funding mechanisms can be found in reports such as the SCNAT, *Lighthouse Programmes in Sustainability Research and Innovation*. In this chapter, we highlight only a few of those key design options that align funding structures with the collaborative and iterative nature of co-creation.

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Funders 	Design option 1: **Introduce flexible, long-term funding schemes**[33] Offer flexible execution periods, advance payments, and simplified cost options (SCO). These measures help accommodate the iterative nature of co-creation. Additionally, allowing for easy modification of project milestones and aligning funding with project life cycles can better support adaptive processes. Funders could also consider reallocating unused funds from other beneficiaries to ensure resources are optimally utilized. Design option 2: **Support Multi-Stage Application Processes**[33] Implement a funding process that includes an initial exploratory phase with seed funding, followed by full funding for projects that demonstrate strong potential for co-creation. This multi-stage approach would reduce the risk for researchers and funders alike, allowing for the development of co-creative initiatives before committing significant resources. Design option 3: **Fund extended pre-proposal development phase**[33] Support co-creative research by providing dedicated funding for extended pre-proposal development phases. This allows researchers and stakeholders to collaboratively refine project ideas, establish strong partnerships, and co-design research objectives before the formal proposal submission. By investing in this initial phase, funders can help ensure that projects are more aligned with the needs of all actors involved, leading to more robust and impactful outcomes
Universities and education institutes 	Design option 1: **Facilitate access to diverse funding sources** Help researchers identify and access diverse funding opportunities that are better aligned with co-creative approaches. This could include setting up internal support offices that specialize in grant writing for collaborative and transdisciplinary research. Design option 2: **Promote transdisciplinary research through internal funding** Encourage transdisciplinary collaboration by offering internal grants and funding opportunities for projects that bring together researchers and actors from different disciplines and sectors. This can help to seed co-creative initiatives and build a track record that can then attract external funding.
Research communities 	Design option 1: **Provide resources for navigating complex funding landscapes** Offer resources and training for researchers on how to navigate and apply for funding opportunities that support co-creative approaches. This could include workshops, guides, or mentorship programs that help researchers build the skills needed to secure and manage flexible funding.

Pathway 5: Addressing lack of quality standards and evaluation metrics for co-creative approaches

Short description: Co-creative approaches often require different evaluation metrics compared to traditional research projects, as they involve diverse actors and aim for broader societal impacts. The lack of appropriate quality standards and evaluation metrics can make it difficult to assess the true value and success of co-creative research. Addressing this gap is essential for recognizing and supporting co-creation as a legitimate and valuable approach to address sustainability challenges.

Funders 	Design option 1: **Develop and implement broader evaluation metrics** Expand evaluation frameworks to include qualitative indicators that capture the depth and quality of stakeholder engagement, the integration of diverse knowledge systems, and the societal impact of research outcomes. Design option 2: **Recognition for deliverables valuable to non-scientific actors** Recognize and value diverse forms of deliverables that are relevant to non-scientific actors, such as policy briefs, community workshops, and toolkits. These deliverables, although not typically academic, play a crucial role in ensuring that research outcomes are accessible and useful to a broader audience. Design option 3: **Inclusion of formative evaluations** Integrate formative evaluations into the funding process. Formative evaluations allow for continuous feedback and adjustments during the project lifecycle, ensuring that the co-creative process remains adaptive and responsive to stakeholder needs. This approach not only improves the quality of the outcomes but also enhances the collaboration and engagement throughout the project.
Universities and education institutes 	Design option 1: **Institutionalize evaluation metrics for co-creative approaches** Develop and implement institutional guidelines that recognize and reward contributions to co-creative research. This can include metrics that evaluate the effectiveness of stakeholder engagement, the relevance of research to societal challenges, and the practical application of research outcomes

Research communities 	**Design option 1 Develop best practices and guidelines for evaluation** Collaborate to develop best practices and guidelines for evaluating co-creative approaches. These guidelines should provide clear criteria for assessing the success of co-creative projects, focusing on the quality of collaboration, the inclusivity of the process, and the relevance of the research to societal needs.

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6. Conclusion

In this deliverable, we explored the obstacles that researchers face when engaging in co-creative approaches, drawing insights from a targeted literature review and conceptual analysis. We identified key barriers at multiple levels, including individual, institutional, and broader socio-cultural contexts, and proposed pathways to incentivize researchers' engagement in co-creation, emphasizing a systems perspective aligned with the AKIS framework.

Looking Ahead

As we move forward, the following tentative steps are proposed to actively engage project partners and key AKIS actors with the outputs of this task:

Dissemination: We will widely communicate the key messages and outputs of this deliverable in engaging formats to project partners through a series of factsheets. Additionally, the findings will be presented at the upcoming project meeting to ensure all partners are aligned and informed.

Collection of good practice cases: In collaboration with Task 1.2, we will work to collect concrete examples of good practices that address the obstacles mentioned in this report. This will involve identifying and documenting successful cases where the proposed incentives have been effectively implemented, providing practical examples for wider adoption.

Validation with researchers: The obstacles and incentives identified in this report will be further discussed and validated with researchers and other AKIS actors involved in co-creative approaches. This will be done through a series of ccCOP meetings, in collaboration with WP4. Insights gathered from these discussions will be used to refine and enhance the findings of this report.

Integration of existing toolkits: During the preparation of this deliverable, several existing toolkits on co-creative approaches were identified. These will be reviewed and integrated into WP3, ensuring that the tools and resources developed within the project are enriched with proven methodologies and practices.

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