Promoting Transdisciplinary Integration: The Role of Socioeconomic Research Infrastructures.

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Introduction

The need for integration of knowledge is increasingly recognized in the face of complex global challenges, such as climate change, food security, and sustainability. Klein emphasizes that integration is central to interdisciplinary and transdisciplinary work, combining perspectives, theories, methods, and data from multiple disciplines to address complex problems (Klein, 2010). Currently, research in large-scale projects spans a spectrum from multidisciplinary to transdisciplinary approaches, each offering distinct benefits and challenges. According to Tress et al. (2004), the strength of integration varies across research concepts and approaches, ranging from low (participatory, multidisciplinary) to fully integrated (interdisciplinary, transdisciplinary). These varying levels of integration play a critical role in how research infrastructures (RIs) can address complex problems by linking scientific fields and engaging non-academic stakeholders. This integration should be facilitated by a holistic approach that includes a balanced interpretation of sustainability from different disciplines (Šūmane et al. 2018).

Socioeconomic disciplines play a critical role in promoting the integration of knowledge and fostering transdisciplinarity. Nowotny & Gibbons (2010) emphasize the importance of integrating scientific and societal knowledge to address complex problems, arguing for a collaborative approach that includes socioeconomics as a crucial component in knowledge production and stakeholder engagement. Hadorn & Bammer (2010) underscores the role of social sciences in connecting research with societal needs, emphasizing that socioeconomic perspectives are vital for bridging disciplinary boundaries in sustainability science. Bammer further supports this view by arguing that socioeconomic disciplines are essential in integration, aiming to connect research with policy and practice to tackle real-world problems (Bammer, 2013). Julie Thompson Klein also discusses the contributions of social and economic sciences in her work on interdisciplinarity and transdisciplinarity, highlighting their importance in fostering integration across disciplines to address complex societal issues (Klein, 2010). This highlights the indispensable role of socioeconomic disciplines in creating transdisciplinary research that bridges knowledge divides and engages with the complexities of real-world issues.

This paper, developed by researchers from the Socioeconomics Research Infrastructure (RI), part of the AgroServ project, a transnational research consortium, aims to explore and document the role of Socioeconomics as Research Infraestructures during the initial efforts of this Pilot project as they explore existing frameworks and promote the co-creation of pathways

for knowledge integration and transdisciplinarity. The Socioeconomics RI's efforts within AgroServ focus on supporting the objectives of the advancement of integration of knowledge and transdisciplinarity in the context of European Research Consortiums.

The Socioeconomics UTAD through a dual focus has approach these objective, one to collectively evaluate existing frameworks to cocreate a path to integration of RIs and another focused on territorial local implementing living labs, this paper highlights the role of Socioeconomics RIs in overcoming gaps and in promoting transdisciplinary approaches that link diverse scientific fields with stakeholders to co-create solutions to complex agroecological problems in local contexts, such as the Douro vine-producing region.

Approach

To address the objectives of this study, a mixed-methods approach was employed, including a literature review, documentation of processes, and a survey targeting internal stakeholders across various RIs affiliated with multiple research institutions in different European countries. The survey participants included RI access managers, work package leaders, and scientists involved in Transnational Access (TNA) delivery. This diverse group represented a wide range of scientific roles, research backgrounds, and nationalities, providing a dataset for an initial understanding of how different scientific fields engage with transdisciplinary approaches.

The survey was designed to capture participants' disciplinary research areas and their familiarity and engagement with concepts such as sustainable food systems, agroecological transitions, and the One Health approach. Conducted using Google Forms, the survey was distributed via email to relevant stakeholders, with a total of 25 respondents. The collected data allowed for the reclassification of scientific backgrounds and main research areas into broader categories: Life Sciences, Environmental Sciences, Social Sciences, and Engineering & Technology. This classification helped to identify trends within the dataset and how different research areas align with the perspectives promoted by the Socioeconomics RI within AgroServ.

Results and Discussion

The initial analysis of the survey data reveals a correlation between participants' research backgrounds and their engagement with the different approaches to agroecological transitions fig 1. Most participants reported involvement with the perspectives of Sustainable Food Systems and Agroecological Transitions, while fewer engaged with the One Health Approach. This finding suggests a predominant focus on sustainability and agroecological principles within the current scope of the project.

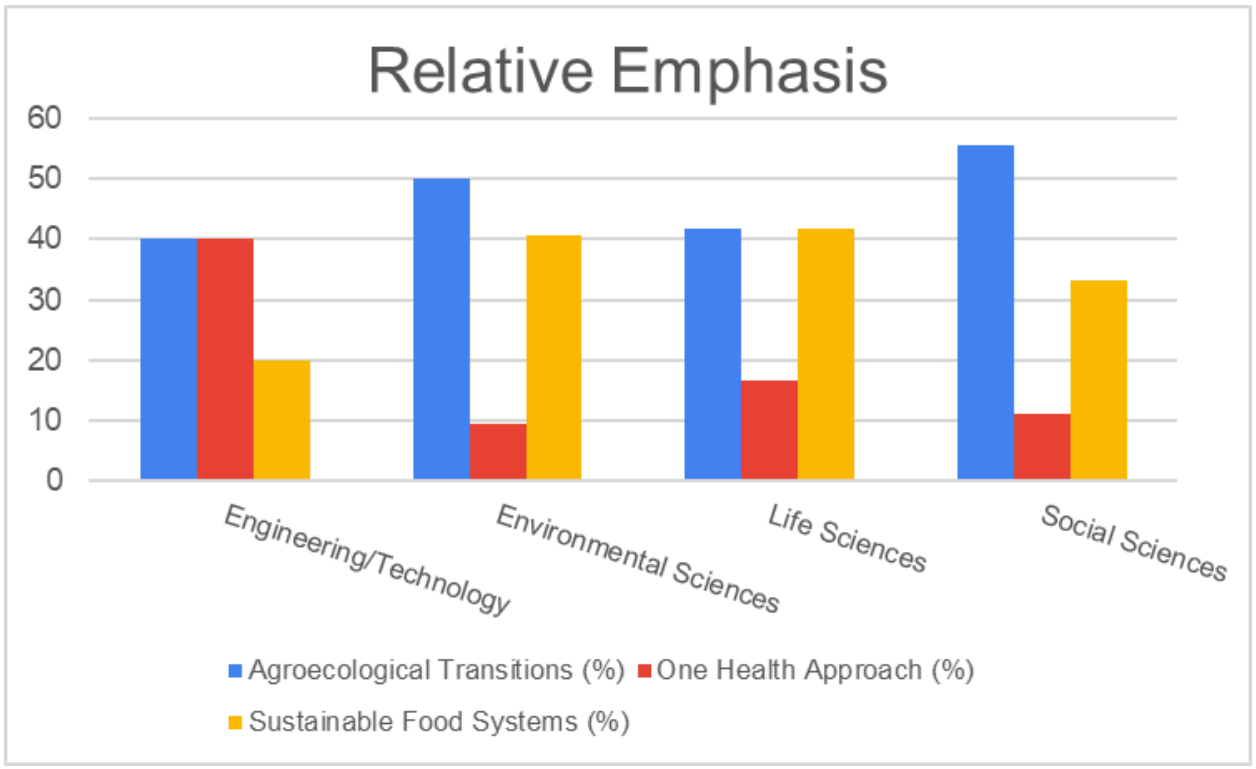

Fig. 1 Relative transdisciplinary emphasis by research background

Participants from engineering and Life Sciences showed the most significant transdisciplinary potential, frequently engaging with multiple perspectives and demonstrating a blending of disciplines such as ecology, agriculture, health, and sustainability. This trend underscores the readiness of these fields to contribute to integrated approaches that address complex agroecological challenges. The involvement of participants from Engineering and Technology also indicated balanced engagement across perspectives, highlighting their potential to support and enhance transdisciplinary work within the project.

The survey also identified several challenges and opportunities related to the integration of knowledge across different scientific disciplines and stakeholder groups. Key challenges include differing terminologies and conceptual frameworks, which can hinder effective communication and collaboration between disciplines. Additionally, the varying levels of familiarity with transdisciplinary concepts among participants highlight the need for targeted capacity-building efforts to enhance understanding and engagement with these approaches.

While the survey provides valuable initial insights, it is not sufficient to fully address the complex issues at hand. Recognizing this limitation, future research will involve deeper qualitative exploration and continuous engagement through co-creation sessions with multiple RIs within the AgroServ consortium. Two such events are already planned to further this initial effort,

aiming to develop more robust frameworks and strategies for transdisciplinary integration. These sessions will allow for in-depth discussions, the sharing of diverse perspectives, and the co-creation of solutions that go beyond what is achievable through survey data alone.

In the context of the Living Lab implementation, initial findings demonstrate the potential of Living Labs as platforms for operationalizing the evaluated frameworks in real-world settings. Our Living Lab serves as a virtual environment that catalyzes agroecological transitions by fostering participatory research and co-creation with regional stakeholders. Its multi-centered approach, involving four demonstrator labs equipped with specialized infrastructures, provides practical research services and methodologies tailored to the socio-economic and environmental challenges of the Douro region. This setup allows the living lab to act as a testbed for developing context-specific solutions that address the unique needs of low-density territories, demonstrating the value of living labs in bridging the gap between academic research and practical implementation.

Conclusions

In the context of the AgroServ project the Socioeconomics RI collaborates extensively with various other RIs to provide support and develop strategies that promote integration. The preliminary results from this research indicate that evaluating existing frameworks and promoting co-creation through socioeconomic and participatory approaches are crucial for advancing transdisciplinary integration. By engaging a diverse range of stakeholders and disciplines, the study highlights the importance of linking scientific research with real-world applications to address complex agroecological challenges. The findings emphasize the need for ongoing capacity-building efforts to enhance stakeholders' understanding and engagement with transdisciplinary concepts, as well as the value of collaborative methodologies, such as the World Café, in fostering shared understanding and co-creation of knowledge.

This research is ongoing and will continue to evolve, involving additional RIs and deeper exploration through co-creation sessions. The upcoming engagement events are expected to expand upon the initial findings, fostering a broader transdisciplinary collaboration within the AgroServ consortium. These future efforts will contribute to refining the frameworks and enhancing the practical application of transdisciplinary approaches in various agroecological contexts.

Learning Objectives:

Delegates will learn about the significance of evaluating and co-creating knowledge integration frameworks, the role of socioeconomic and participatory approaches in linking research with practice, and the practical application of these concepts in living labs. The presentation will enable attendees to explore strategies for fostering transdisciplinarity in their work, promoting collaboration between academia and other stakeholders to co-create solutions to complex

agroecological challenges. Additionally, delegates will gain insights into the challenges and opportunities associated with integrating diverse scientific fields and stakeholder perspectives.

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