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Chapter 1
Introduction

Maria Rosario Partidario, Daniel Keech, and Isabel Loupa-Ramos

Abstract This chapter introduces the rationale and motivation for the book. It highlights the European research project ROBUST *(Rural-Urban Outlooks: Unlocking Synergies)* within which all the investigation that supports the chapters in this book was conducted. It briefly describes the architecture, the themes and the systemic approach to rural-urban linkages and synergies within the ROBUST project. Finally, the structure of the book is described and a brief summary of each chapter is provided.

Keywords Ecosystem services · Rural-urban linkages · Rural-urban synergies · ROBUST research project

1.1 Ecosystems Services and Rural-Urban Synergies in ROBUST

Ecosystem Services (ESS) was one of the five core research topics in the ROBUST European Horizon Research and Innovation project. Over 5 years, from 2016 to 2021, ESS framed discussions about enhancing rural-urban links and potential synergies (https://www.rural-urban.eu). The importance of ESS in ROBUST *(Rural-Urban Outlooks: Unlocking Synergies)* was a recognition of ESS role in political, social and economic territorial development. Among rural sociologists and economists, geographers, engineers and governance specialists, ESS was not initially a theme expected to gain significance in rural-urban discussions. However, right from the project's conceptualization, ESS gained relevance along with the other four

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research topics: new business models and labour markets, public infrastructures and social services, sustainable food systems and cultural connections.

These five core research topics became ROBUST's five Communities of Practice (CoP), established to represent functional relations between rural and urban spatial realities. Evolving discussions confirmed the multi-dimensional nature of ESS related themes, the transversal relationship with the other CoP themes, and the variable types of the outcomes, combining to enhance rural-urban synergies, as the chapters in this book intend to show.

An initial activity of the ROBUST CoP ESS was the development of a joint agenda around five key themes (see Chap. 2). The opportunity to share preliminary results motivated the participation of the CoP ESS research team at the Ecosystem Services Partnership (ESP) Conference in Hannover in October 2019, where a dedicated session on the subject of ESS and rural-urban synergies was held. Commissioning editors at Springer invited the CoP ESS team to propose a book which would represent the CoP ESS research outcomes in ROBUST. Indeed, the literature is relatively sparse in relation to ESS in the context of spatial territorial planning perspectives, and even more limited in exploring the potential for creating synergies between rural and urban spheres. This book is a contribution to such discussions.

This introductory chapter now follows with a description of the ROBUST architecture. This is necessary to enable the understanding of the conceptual and methodological context within which ESS is presented as a function for creating or enabling rural-urban synergies. This is followed by a brief synopsis to introduce the contents of the book.

1.2 ROBUST's Architecture: Living Labs and Communities of Practice

ROBUST, which ran from 2016 to 2021, is the acronym for a European Horizon Research and Innovation project called *Rural-Urban Outlooks: Unlocking Synergies*. In geographical scope, it covered 11 countries in a partnership of 24 members. ROBUST's objectives were transdisciplinary, that is, researchers and practitioners worked together to plan and implement change, and new knowledge was created combining scientific and lay knowledge. The key aim of ROBUST was to strengthen rural-urban linkages and devise governance innovations which promote rural-urban synergies.

This co-productive approach is a crucial characteristic of the ROBUST design. To facilitate transdisciplinary aims, a living lab methodology was adopted. Living labs (LLs) are place-based, iterative experiments (Ballon & Schuurmann, 2015; Voytenko et al., 2016) which operate in real time to try to identify and test solutions. LLs are by now well-known and widely examined in the literature on sustainable transitions, especially in the urban sphere, where they have been applied to find

neighbourhood and community innovations. Indeed, a European Network of Living Labs (ENoLL https://enoll.org/) was established in 2008 to facilitate horizontal learning from this complex but promising methodology.

In ROBUST, a new emphasis was envisaged. Because the LLs were focused on place-specific governance innovations, each LL was coordinated as a collaboration between a research organisation (for data collection and analysis) and a municipal or regional organisation (to implement tested governance innovations).

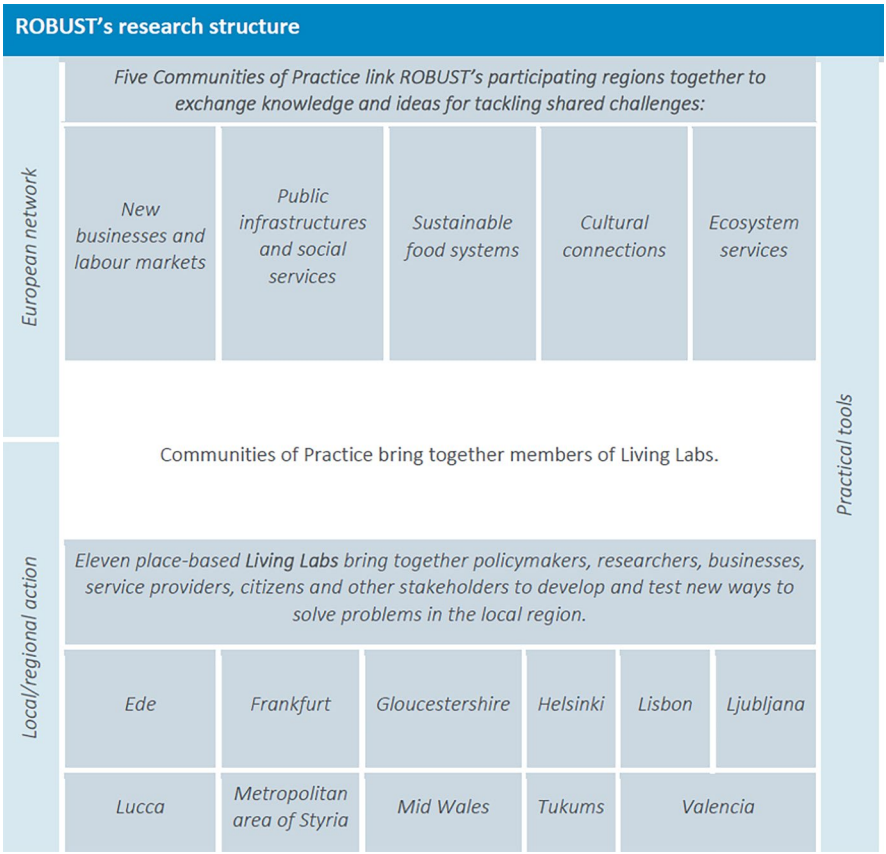
Table 1.1 below provides an overview of the 11 LLs and shows the pairs of local partners who co-ordinated each LL. The partnership was completed by two overarching partners with project-wide remits.

To facilitate the sharing, exchange and comparison of experiences, findings and solutions between different LLs, ROBUST also created five thematic Communities of Practice (CoP), organised according to five categories of functional rural-urban relations as outlined (see Table 1.2, below). A CoP refers to a group or network of people who share a common interest, practice, concern, problems or passions (Wenger et al., 2002; Barston & Tusting, 2005). By participating in a CoP people

Table 1.1 Living labs in ROBUST

Living Lab (country)	Partners	
	Research	City/Municipal/Regional
Ede (Netherlands)	Wageningen University	Ede Municipality
Frankfurt Rhein-Main (Germany)	PRAC—Policy Research and Consultancy	Regional Authority Frankfurt-Rhein-Main
Gloucestershire (UK)	Countryside and Community Research Institute, University of Gloucestershire	Gloucestershire County Council
Helsinki (Finland)	Natural Resources Institute, Finland	City of Helsinki
Lisbon Metropolitan Area (Portugal)	Instituto Superior Técnico, University of Lisbon	Lisbon Regional Coordination and Development Commission
Ljubljana (Slovenia)	Oikos Developing Consultancy	Ljubljana Regional Development Agency
Lucca (Italy)	University of Pisa	Province of Lucca
Mid Wales (UK)	Aberystwyth University	Welsh Local Government Association
Styria (Austria)	Federal Institute for Less Favoured and Mountainous Areas	Regional Management of the Metropolitan Area of Styria
Tukums (Latvia)	Baltic Studies Centre	Tukums Municipality
Valencia (Spain)	University of Valencia	Regional Government of Valencia
2 Project-wide partners responsible for knowledge exchange and policy development		
ICLEI—Local Governments for Sustainability (learning dissemination, publicity)	PURPLE—Peri-Urban Regions Platform Europe (policy)	

Table 1.2 ROBUST's research structure—living lab and CoP networking



learn through involvement in (inter-)action, communication, and negotiation (Barston & Tusting, 2005). Based on regular interactions (face-to-face as well as online) the participants may discover new ways of seeing the world, and learn collectively how to better address or deal with the issue at stake by recruiting a shared repertoire of resources and practices. This volume presents, in many respects, the collective repertoire of the CoP for Ecosystem Services.

Each LL was encouraged to prioritise three of the five functional rural-urban relations to focus on in their areas. Those choosing the same themes thus formed a CoP.

The potential of transdisciplinary (TD) research for tackling sustainability challenges at different scales and in different contexts is increasingly recognised (Jahn et al., 2012; Lang et al., 2012; Scholz & Steiner, 2015a, b; Wickson et al., 2006). Acknowledging these potential benefits, ROBUST was designed according to the principles of transdisciplinary (TD) research, which include the joint definition of the challenges to be addressed and of the overall research plan (research and

practice partners cooperate at the project design phase), as well as the joint implementation of the research. This method of working helps to achieve outcomes that satisfy actors from both science and practice, and that will contribute to a process of change. Moreover, in line with the TD literature, fostering co-learning and reflexivity and encouraging flexibility in the ongoing work were central to the ROBUST approach (at both the living lab and CoP level).

Living labs are one common way of working in a TD fashion. They bring actors from science, policy and practice together. ROBUST combined this approach with CoPs, the latter as a mechanism to generate and broker co-learning across and between living labs. The CoPs are less about local context and more about identifying common learning, in terms of lessons and issues at a thematic (or functional) level to support rural-urban synergies. This constitutes an important relationship between the Living Labs and the CoP. As per the living lab process, each CoP worked according to three key CoP characteristics (see Wenger, 1998, 2000), namely:

- Mutual engagement (innovation agenda and communication strategy);
- Joint enterprise (common issues for the group to work on together); and
- Shared repertoire (common learning and joint resources co-produced by each CoP).

Table 1.2 shows the ROBUST research structure of the eleven living labs and the five CoPs. Five living labs collaborated in the CoP of Ecosystem Services which included Lisbon, Frankfurt, Ede, Gloucestershire and Lucca.

1.3 About This Book

The aim of this book is to take stock of the prolific amount of research findings, collected as part of ROBUST, on the role of ESS in establishing rural-urban linkages, and enhancing subsequent synergies. The identification and exploration of such synergies is a particular aspect that has not been explored in the literature of ESS, or spatial planning, both in rural or in urban domains. As such this book represents a significant contribution to the existing literature and we hope it will further stimulate the identification and implementation of ideas and applications of ESS in practice, concerning rural-urban synergies.

The starting point for this book was the synergistic capacities of ESS explored, developed and tested, in five living labs. These cases help to show how ESS can offer significant support for the idea of the continuity of territory, contradicting the conventional divide between urban and rural spaces. Five core themes were adopted to explore the relevant functions whereby ESS could lead to rural-urban synergies. These were:

1. Circular Farming engaging ESS in rural urban synergies
2. Community Partnerships engaging ESS in rural urban synergies
3. Mapping ESS supply and demand for rural urban synergies

Table 1.3 CoP ESS research and innovation agenda (RIA) priorities

1. How ESS might reinforce rural-urban relations?
2. How can multiple ESS be prioritised or balanced in a particular region, which of them are key, and are they equally important?
3. How do different communities use ESS, what ESS indicators are useful?
4. What governance and planning models and better practices (public and private) enable the delivery of ESS?
5. What participatory measures help to engage people with ESS uses (e.g. gardening, bird watching, among others)?
6. How do we discuss the unknowns of ESS (i.e. account for uncertainty) as a result of climate change, rural population dynamics, land use changes over time, among others?

4. Multi-scale planning for ESS in rural urban synergies
5. Payment and compensation schemes for ESS in rural urban synergies

These five themes reflected the way in which research and practice partners in the CoP ESS translated the ESS conceptual model that is shared in Fig. 2.6 of Chap. 2. The various chapters in this volume address these topics but also other cross sectoral themes. Table 1.3 shares the research and innovation priorities that assisted the community of practice (CoP) dedicated to ESS in the ROBUST project.

The book is structured in three main parts: first the core research themes in ESS for rural-urban synergies are set out, addressing theoretical contributions of research teams in the CoP ESS, and including four of the five themes above. The second part of the book presents emerging topics resulting from operationalising ESS in practice, effectively the outcome of collaborations between research and practice partners developing ESS applications in their living labs. The third part of the book considers the cross-cutting, horizontal issues which reveal the debates across and between CoPs (in other words, between the CoP ESS and the other four CoP in ROBUST), and where additional value was brought to endorsing ESS in rural-urban synergies.

Each chapter in the three parts, plus the conceptual Chap. 2, were blind peer-reviewed by a duo of internal (ROBUST research colleagues) and external reviewers, who were independent European academics with ESS expertise and not connected to ROBUST.

1.4 Synopsis of Chapters

The first Part, on core research themes in ESS for rural-urban synergies, covers the issues of assessment and mapping of ESS in territorial planning, multi-scale and multi-level planning for rural-urban synergies, the role of community partnerships in the provision of ESS and finally the theme of payments for ESS (PES) and the potential PES have on creating synergies in rural-urban connections. In particular payments for ESS remains an important and still underdeveloped concern. In

Chap. 3 Rovai and colleagues consider ESS assessment in landscape and spatial planning, reviewing methodological approaches, challenges and the role of experts in delivering assessments, using case-studies to illustrate the assessment and the mapping in three living labs: Lucca, Lisbon and Frankfurt. In Chapt. 4 Partidário and colleagues address the use of multi-scale planning, and multi-level planning to enhance rural-urban synergies based on ESS, identifying main gaps in the existing science-policy analysis. They conclude by re-emphasising the relevance of multi-scale and level considerations of ESS within spatial planning. In Chap. 5 Galli and colleagues investigate community partnerships as individuals organised for collaborative action that manage ecosystems to deliver services. The authors review several cases to illustrate such actions in living labs in Italy, in the Netherlands, in Germany and in England. They also highlight which ESS appear more commonly in community initiatives, review the governance of such partnerships in terms of their organisation and funding, and identify which rural-urban synergies were stimulated by such partnerships. Finally in Chap. 6 Keech and colleagues examine rural-urban synergies in the context of land and water management interventions and how these are promoted by PES. In reviewing the PES literature, the authors draw on 10 European case studies and find that the most successful PES schemes are cross-sectoral, multi-scalar in their impacts and represent a correction of prevailing market relations linked to subsidy dependencies.

The second Part of the book reflects on the emerging topics resulting from putting ESS into practice. Five chapters share results of engagement between research and practice partners developing ESS applications in their living labs. Chpater 7 is a unique chapter in this volume, written by an experienced planning professional responsible for spatial planning in the FrankfurtRheinMain region of Germany. The chapter reveals the rural-urban dualism as a basis for the application of ESS in German spatial planning, which appears to adhere to territorial binaries—the urban as a place for living and working, the rural as a location of agriculture and nature. By addressing the concept of inner and outer space, quite unique to the German system, and illustrated in FrankfurtRheinMain, Henke supports the protection of rural areas as substantial suppliers of ESS from urbanisation. In Chap. 8 Loupa-Ramos and colleagues provide an example of how green infrastructures, integrated in the municipal spatial planning (municipal master planning) in Setúbal, Portugal, represent the continuous supply of ESS in the territory. ESS, in fact, ensure the linkage between rural and urban territories and facilitate spatial synergies. In Chap. 9 Dax and colleagues address cultural ESS in the context of multi-local living (MLL), which in itself represents a form of rural-urban interaction. A contrasting analysis is conducted in Finland and in Austria where different cultural backgrounds and historically different reasons are connected to cultural ecosystem services. In Chap. 10 Keech and Blockley bring an example of regulating ESS through flood risk governance in the lower river catchment of the Severn, Britain's longest river. The chapter outlines the complexities of flood risk management in Gloucestershire, describing locally specific flood policy and protection challenges in the light of a changing climate and plans for urban expansion. Finally, Chap. 11 considers the land sparing—land sharing policies in the Netherlands and in Britain, with Oostindie and

Keech addressing contemporary ESS governance challenges and how these affect rural-urban dynamics.

The third Part reveals debates that occurred across CoPs on cross-cutting and horizontal issues, in other words, between the CoP ESS and the other four CoP in ROBUST. In Chap. 12 Knickel and colleagues relate the CoP Business models and labour market to the CoP ESS. The authors argue that ESS can be seen as assets in developing individual businesses and local economies, making lifestyles and economic systems more environmentally and socially sustainable. The authors' analysis focuses on how different kinds of value are created through ESS. The business models considered range from organic farming and regional quality labels to ecotourism and the valorisation of food heritage and green lifestyles. In Chap. 13 Vercher and Ruiz-Martinez relate the CoP on Sustainable Food Systems to CoP ESS. The authors highlight rural-urban interdependence through the ESS of food provisioning. The authors scrutinised information on specific activities, goals, innovations, governance arrangements, and actors involved in each of the food policies in the Valencia Living Lab, as well as the relationships between the emerging food policies and ESS, concluding that farmers need be better integrated in decisions that affect the delivery, support, regulation, and cultural dimensions of ESS. Finally, in Chap. 14 Goodwin-Hawkins and colleagues return to cultural ESS to relate CoP Cultural connections with CoP ESS. The authors highlight the role of cultural ESS in creating territorial human well-being benefits, going beyond the conventional idea that urban dwellers derive benefits from rural "containers" of ESS. In the chapter, the authors see rural-urban relations as a locus for cultural ESS that reveal complexity and multiplicity, interdependency and inequity. Using case studies in Italy and Wales, they highlight the potential for trade-offs, inequity and contestation, contributing to a research agenda on territorial well-being.

Besides these three parts the book includes four additional chapters, two preceding and two following these three parts. This Introduction is followed in Chap. 2 with the theoretical support for the book. In it, the editors explore the concept of ESS, the evolution of the concept, as well as the relevance of ESS in the context of socio-ecological systems, before embarking on the discussion of the functions of ESS in rural-urban connections and relationship with the ROBUST overall theoretical framework. A triple-looped conceptual framework is proposed to explore the rural-urban linkages and synergies and explain how ESS contributes to the rural-urban dynamics.

Following the three parts, a converging chapter on EU policy frameworks for ESS key policies, anchored in the overall framework of the Green Deal, create an opportunity for endorsing the existing EU policy context for ESS for rural-urban synergies. The policies are analysed in relation to being implicit or explicit (general and specific) in their handling of the three CICES categories of ecosystem services: provisioning services, regulations and maintenance services, and cultural services, and in relation to how they enable rural-urban synergies. The book closes with a concluding chapter, summarising how this volume contributes to overall knowledge on the role of ESS in creating rural-urban synergies.

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