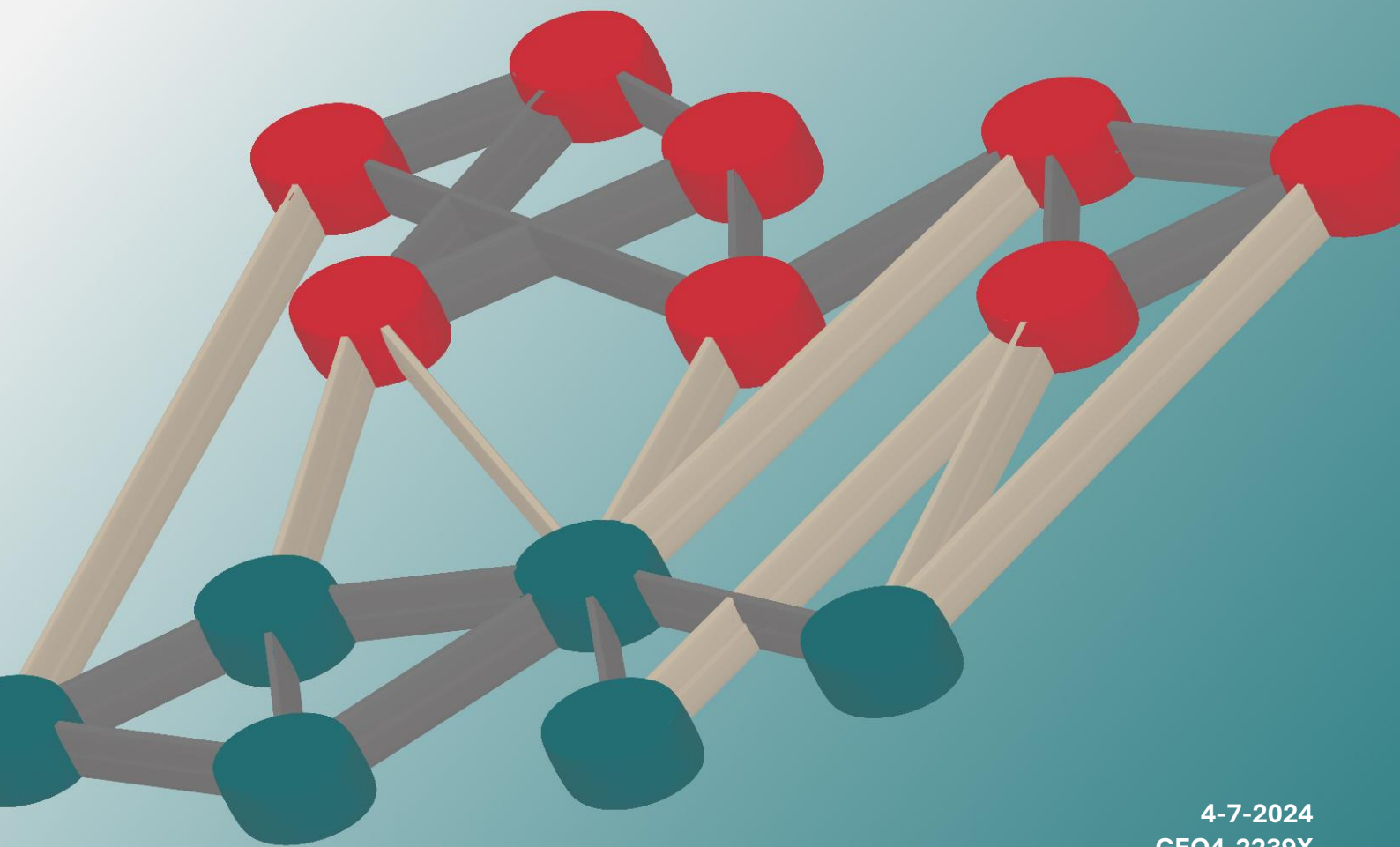


Master Thesis – Master Innovation Sciences

# Mind the gaps: navigating actors and issues in the regional innovation ecosystem



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## Abstract

The current trajectory for the Dutch agricultural sector is highly unsustainable, and change is urgent. The Foodvalley regional innovation ecosystem (RIES), which has developed in the past twenty years as one of the most prominent agri- and food RIESs in the world, could be instrumental in this transition. This research aims to better understand the role of transition intermediaries in addressing particularly overlooked issues within the RIES. To that end, the governance gap approach is employed to understand the role of intermediary organisations in addressing issues faced by the agricultural sector. Two types of governance gaps are distinguished: collaborative (where governance actors work on the same issue in separation) and integrative (where connections between issues are not sufficiently recognised). In a mixed-methods design, quantitative indicators of collaboration were investigated towards a first understanding of the role of Foodvalley. Then, interviews were conducted with eighteen actors in Foodvalley. Collaborative governance gaps were both identified by Foodvalley actors. Based upon interviewees' perceptions of an integrative governance gap, a new interpretation was suggested. An integrative approach is a situation where two issues are interdependent; and experts for either of these issues work together towards an integrated solution. The reason for this alteration is that the agricultural sciences are so interconnected and complex, that no one actor can be knowledgeable on all perspectives. Five types of governance gaps were identified, categorised by the level of collaboration at which they occur – individual, organisational, or between ecosystems – and whether or not the lack of collaboration is intentional. Four intermediary functions were identified through inductively coding interview data: F1. Directing the transition, F2. Network building, F3. Shared knowledge development, and F4. Resource allocation. Collaborative governance gaps primarily require F2, F3 and F4, as intermediaries play a role by building a network and encouraging shared knowledge, potentially by allocating resources (such as funds or research equipment). For integrative governance gaps (in the suggested interpretation), a deeper understanding of the different perspectives on the agricultural sector is required, together with a sustainable vision for the future. Thus, although all functions are important in addressing integrative governance gaps, an essential function of intermediaries in this regard is F1. Transition intermediaries have the potential to be directors, bringing together a network of expert actors, together working towards integrative solutions in the agricultural RIES.

## Preface

Agricultural innovation is one of the great challenges of our time. However, so much has been said on the topic in the media, that it's starting to feel like a buzz-word. To me, at least. Most agree, myself included, that we're not on the right path, that it is important that something changes, and that that change needs to be collective. We have heard this for years; so much so that we may have gotten numb to the warning. We get overwhelmed with our collective problems, yet hear little about developments in the right directions. Real solutions are politically sensitive; and the debate, more often than not, resorts to the seemingly inevitable *tu quoque* platitude. Changing the status quo continues to be a Herculean task.

When I chose the Innovation Sciences master programme, these types of problems were exactly the ones I'd imagined would be discussed: a course that exposes the friction of socio-technical transitions. I am excited that this final product is very much in line with this expectation. The Innovation Sciences field is ever expanding, and I hope that this thesis can be a very tiny contribution to the scientific discipline.

I will save the details for the acknowledgements at the end of this thesis, but I want to thank upfront everyone at Utrecht University, Dialogic, the Foodvalley region – in particular the interviewees, and my personal environment, for giving me all the support I could have wished for. Be it cliché, I literally could not have done this without you.

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# 1. Introduction

The Dutch agricultural sector is amongst the most efficient in the world, but at the expense of the ecological environment (OECD, 2023, p. 13). There is an urgent need for the sector to ‘bring down environmental pressure’, internalise negative externalities, and increase agricultural sustainability. Recognising both the innovative capabilities of the sector and the need for change, the Dutch government has made efforts to provide directions (ibid., pp. 22-25).

Agriculture is subject of two of ten ‘top sectors’ within the Dutch industrial policy framework (NB. ‘Agri & Food’ & ‘Horticulture & Source Materials’). These sectors are deemed particularly promising for national specialisation and to increase national innovative capabilities (Verhagen et al., 2011; Willems, 2011). Recognising the pressing ecological concerns, innovation-driven missions have been established, to provide the Topsectors with directions for change (Ministerie van EZK, 2019, pp. 2, 31). Missions for agriculture range from a creating a resilient ecosystem, promoting sustainable agri- and horticulture, to increasing climate resilience of the agricultural land, and improving food health and accessibility (ibid.; Topsector A&F, 2023). These missions prescribe that the sector should not exceed environmental boundaries, should mitigate emissions, and should partake in a circular economy (Topsector A&F, 2023, p. 5).

A sustainable transition in the agricultural sector is urgent. To that end, Dutch policy in the past years has aimed to facilitate regional collaboration platforms. An example of such a platform is the globally-renowned Wageningen Foodvalley<sup>1</sup>, aiming to bring parties together, encouraging knowledge sharing and co-creation, to identify new opportunities for innovation and enable a transition of the sector. As these platforms are world leaders in the field of agricultural innovation, they are likely to play a key role in the transition of the sector.

In developing a better understanding of these platforms, this research first builds upon the regional innovation ecosystem (RIES) approach<sup>2</sup>. Actors in the ecosystem (i.e. public, private, NGO, scientific, civil society actors) interact through knowledge and resource sharing; they co-specialise, co-produce, and co-evaluate, towards an outcome they could not have achieved separately (Pidorycheva et al., 2020, pp. 628–629). Spatial proximity as an enabler of collaboration and innovation is central to the approach (Lau & Lo, 2015, p. 100).

Knowledge on the RIES is extensive, but lacking in some areas. Following current literature, there is a need to better understand the ecosystem structure (Beaudry et al., 2021, p. 539), ecosystem dynamics (Bodin, 2017, p. 2) and interactions within the ecosystem (Autio & Thomas, 2014, p. 21; Russell et al., 2015, p. 30). Strangely, the RIES approach assumes that collaborations can yield innovation and ultimately transformation – yet fails to identify which and how particular collaborations may be promising. In practice, for renowned ecosystems, it is unlikely that aiming for ‘more collaboration’ in general will reveal these opportunities (Bergsten et al., 2019, p. 28; Bodin, 2017, p. 1). Furthermore, all actors are equally knowledgeable, and some are less inclined to collaborate than others. A more detailed approach is needed as an expansion to the RIES approach, to understand the level of individual collaborations, and identify particularly promising missing ones.

To this end, the governance gap approach is employed, introduced by Bergsten et al. (2019) in a different context. The method, here first applied as an extension of the RIES

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<sup>1</sup> See 3. *Methods* for a more extensive case description.

<sup>2</sup> It is worth briefly noting that this research can be viewed as an independent exploration within the first work package of the REWIRE-project (for more information, see *Annex I: Internship & REWIRE*).

approach, proposes the construction of an actor network, an issue network, and linkages between actors and issues<sup>3</sup>. Two types of governance gaps exist: 1) a collaborative gap, where actors separately work on the same issue, and 2) an integrative gap, where actors work on an issue, but not on an issue closely related to it. The governance gaps approach thus provides a means to operationalise the lack of specific collaborations or integration within the RIES. Identifying these for particular issues, promising collaborations can then be identified in the actor network.

However, although insightful, the identification of these collaborations is probably insufficient to affect change (Bodin, 2017, pp. 1, 7). How those collaborations can be initiated is even more important, practically towards a transition in the agricultural sector, and theoretically towards understanding actor interaction in the RIES. It is likely that a central governing actor is needed (Feser, 2023, p. 1828; Kivimaa et al., 2019, pp. 1062–1063), particularly for environmental problems that require deep structural technological and social changes (Kant & Kanda, 2019, p. 911). To identify these actors, this research employs a transition intermediary perspective. Transition intermediaries are often essential actors in regional development (Feser, 2023, p. 1892). Transition intermediaries are often innovation intermediaries (Kivimaa et al., 2019, p. 1072), which can be understood as ‘organisations that provide a supportive role for collaboration between two or more parties during various stages of the innovation process’ (Howells, 2006, p. 721, via: de Silva et al., 2018, p. 70). Transition intermediaries aim to accelerate socio-technical transitions; they may do so in a specific niche or with a full system perspective (Kivimaa et al., 2019, p. 1068). Essentially, these intermediaries aim to bridge collaborative and integrative governance gaps through encouraging cooperation, facilitating knowledge sharing and aligning actors with a larger goal, thus promoting the transition towards innovative solutions (ibid.; De Silva et al., 2018, p. 80). Discovering promising collaborations, and intermediaries to coordinate these, is a needed addition to understand the structure and dynamics of the RIES.

### **Research framework & question**

The central case in this research is Foodvalley. The final objective is to understand the role for transition intermediaries in addressing particularly overlooked issues in this RIES. Consequently, the research question follows: *what are the collaborative and integrative gaps for issues faced by the agricultural sector within the Foodvalley RIES, and what role is there for transition intermediaries to overcome them?* To answer the research question, this research follows a mixed-methods approach, combining network analysis with interviews of relevant actors in the region. First, so-called innovation networks are established at the actor level for the quantitative indicators co-publication and public-private partnership collaboration- activity. The goal of network analysis is to explore the role of the region, so as to validate its influence, to gain a first understanding of interaction within, and to identify relevant actors in the region to include in the interview rounds. Keyword co-occurrence analysis is complemented by qualitative document analysis, to create a list of the fifteen most pressing issues for the agricultural sector. All findings are refined through interviews with actors in Foodvalley, where the list serves to concretise the issues for which governance gaps may arise in the agricultural sector for interviewees. These interviews are meant to identify the perspectives of actors in

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<sup>3</sup> Issues, here, are understood as problems and challenges that are faced by the agricultural sector. Issues can be faced by some or all of the actors in a RIES. Issues entail a broad range of problems and challenges, e.g. social, technological and environmental. In the context of Dutch agriculture, we may encounter issues such as the protein transition, circular agrifood, regenerative agriculture, land-use change, or the sectoral dependency upon immigrant workers (Foodvalley NL, 2023; LTO, 2022; Pater, 2023; WUR, 2023).

Foodvalley to understand the value of the RIES, collaboration within the RIES, the occurrence of governance gaps in the RIES, and the (potential) role for transition intermediaries in addressing these.

The thesis is structured as follows. First, the theory chapter will lay the groundworks, in terms of theoretical concepts, that the study builds upon. Second, the methodology chapter will outline the mixed-methods approach used in this study, together with some notes on the reliability, validity and research ethics. The results chapter will outline and interpret the results. The discussion chapter will outline the theoretical and practical implications, limitations and implications for future research. Finally, in the conclusion, an answer is provided to the research question.

## 2. Theory

This thesis builds on and combines three different literature streams. At the foundational level, the entity of interest is 1) the RIES. To address current gaps in RIES understanding, 2) the governance gaps approach and 3) transition intermediaries theory is introduced with an emphasis on innovation intermediaries. This chapter will discuss these three, constituting the conceptual framework of this thesis.

### 2.1 Regional innovation ecosystem theory

Innovation is seldom a direct result of one actor; more often, innovation is the result of co-creation, organisations collaborating to produce results more impactful than the sum of their individual capabilities (Gomes et al., 2018, p. 45; Zheng & Cai, 2022, p. 14). Innovation ecosystems are collaboration networks (Long & Hu, 2022, p. 147; Walrave et al., 2018, p. 3) (see table 1). Many diverse actors (i.e. public, private, NGO, scientific, civil society) partake in these collaboration networks, each with their own ‘capabilities, interests and intentions’ (Bodin, 2017, p. 6). In the innovation ecosystem, sharing and recombining knowledge leads to co-evolving capabilities and the co-creation of value (Long & Hu, 2022, p. 147). In other words, in combining their insights, actors specialise, evolve and find new value together (Autio & Thomas, 2014, p. 204). More conceptually, ecosystems can be understood as a set of ‘actors, activities, and artifacts’ (Granstrand & Holgersson, 2020, p. 1). Innovative activity is intensified through a combination of these elements<sup>4</sup>. An ecosystem never serves one purpose. There are always different interests at stake: inter-organisationally, politically, economically, environmentally and technologically (Russell et al., 2015, p. 3).

Innovation ecosystems generally manifest in one of four levels: the 1) national, 2) industrial, 3) enterprise-level and 4) regional level (Long & Hu, 2022, pp. 147–150). National innovation ecosystems are subject to national policy, aiming to increase innovation capability and national prosperity as a result (Suseno & Standing, 2018, pp. 282–283). An industrial innovation ecosystem is an ‘innovation community’ within a particular industry (Long & Hu, 2022, p. 149). The enterprise-level looks from an individualised organisation or network thereof, the aim being to meet customer demand through collaboration (ibid., p. 150).

<b>Author</b>	<b>Innovation ecosystem definition</b>
1 Walrave et al. (2018, p. 3)	<i>‘a network where actors collectively create, deliver, and appropriate value’</i>
2 Grandstrand & Holgersson (2020, p.1)	<i>‘the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors’</i>
3 Russell et al. (2015, p. 3)	<i>‘inter-organizational [sic.], political, economic, environmental, and technological systems through which a milieu conducive to business growth is catalysed, sustained and supported’</i>

Table 1: Ecosystem definitions

This research investigates the regional level. RIESs emphasise the importance of spatial proximity in the likelihood of innovative activity (Long & Hu, 2022, p. 151). Territorial closeness

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<sup>4</sup> Artifacts may refer to knowledge, technologies, capital, resources, products, services and platforms (Granstrand & Holgersson, 2020, p. 10).



offers particular benefits, such as ‘reduced transportation costs, labour specialization and access to suppliers, knowledge and venture capitalists [sic.]’ (Lau & Lo, 2015, p. 100). Through a ‘local concentration of resources and competences in [...] new domains’, regions may specialise, further developing their innovative capabilities in particular domains (Foray, 2014, pp. 492, 497). RIESs develop through regional clustering over time, as knowledge spillover makes regions increasingly attractive to stakeholders in the field (Russell et al., 2015, p. 5). In enabling and encouraging innovative capabilities and efforts, it is assumed that RIESs provide actors with an economically competitive advantage (Asheim et al., 2011, p. 1134; Cai et al., 2017, p. 3).

Regional (or geographical) clustering is one of the five types of proximity that are distinguished by Boschma (2005). Others are social proximity (interpersonal relations), cognitive proximity (shared knowledge base), institutional proximity (the contextual set of norms and values), and organisational proximity (referring to connections between organisations and within them). It is likely that more than one type of proximity will be encountered in this research. For example, it is known that geographical proximity can initiate connections between individuals. However, once these have been established, social proximity may become the dominant force that strengthens these connections (Cassi & Plunket, 2014, p. 950). The five types of proximity are a helpful indexation to report about regional collaboration, as geographical proximity is a given – so that actors are always in proximity – but other types may be present or lacking. Therefore, a more nuanced perspective on the closeness between actors can be provided with this indexation.

There is no clear consensus on the value of the ‘innovation ecosystem’ title vis-à-vis the more traditional ‘innovation system’. Some argue that the term emphasises that competition, in addition to collaboration, is a vital element to understand contemporary innovation (Granstrand & Holgersson, 2020, p. 2). Others argue that ‘ecosystem’ emphasises growth and a transition to ‘dynamic sustainability through internal, self-correcting structural changes’, not from the more traditional ‘top-down intervention’ means of system change (Smorodinskaya et al., 2017, p. 5252). Zheng and Cai (2022, p. 22) emphasise the ability of the ecosystem terminology to capture global cross-boundary interactions, to express the increasing importance of civil society through ‘bottom-up media’, and its emphasis on ‘sustainable development (environmental dimension), equality (social dimension) and a-growth (economic dimension)’. Some use the term rather interchangeably (Reichert, 2019, p. 13).

Others argue that the limitations of the term outweigh the benefits (Oh et al., 2016). The major benefit is the term’s intuitive appeal. Limitations are that: 1) an analogy to biological ecosystems and system complexity is falsely – or at least without evidence – implied, and 2) there are no ways to measure, much less define what the term entails. For this particular research, adding to the issue, the applicability of regions within the system-ecosystem spectrum is far from consistent. Jalilian and Zanjirchi (2022, pp. 236–237) distinguish between national, regional, sectoral innovation systems and innovation ecosystems, *conseq.* the regional dimension is not applied to innovation ecosystems – which are seen as global (or at least boundless) networks. Other authors choose to apply the regional dimension to innovation ecosystems that logically surpass the boundaries that are set by the region (Pidorycheva et al., 2020). The latter is also the proposed line of this research, acknowledging that the RIES is always connected to other regional and national ecosystems, but emphasising it is an identifiable hotspot of regional innovative activity in collaboration and knowledge recombination (Zheng & Cai, 2022, p. 16).

There is a need to understand the structure, internal dynamics and interactions within the RIES (Autio & Thomas, 2014, p. 21; Beaudry et al., 2021, p. 539; Bodin, 2017, p. 1; Russell et al., 2015, p. 30). A network that is not governed by measures to control ways in which entities interact with the larger social and ecological targets may even hinder progress in either (or both) (Epstein et al., 2015, p. 37). To expand towards an understanding at the level of interactions within the RIES, this research employs the governance gap approach by Bergsten et al. (2019). This approach enables the research to map a network of collaborations in the RIES, the problems that actors are working towards solving, and how those problems may be interconnected. Through this overview, then, promising collaborations for particular issues can be identified.

## **2.2 Inside the RIES: the governance gap approach**

The central position of the governance gap approach is that actors are connected, issues are connected, and actors are connected to issues. Actors are organisations who concern themselves with governance of sustainable development issues – these may be community based (e.g. community network initiatives), governmental (e.g. public health offices) or non-governmental (e.g. a university), following the original article by Bergsten et al. (2019). In this research, private firms are also spoken to, as they form an important part of the RIES and potentially of innovative/ sustainable development in the sector. Issues refer to problems and challenges being faced by the sector. Issues may be interdependent, that is to say that a ‘change in one issue also affects another issue’<sup>5</sup> (ibid., p. 29). Governance gaps arise in this inter-network dimension between actors and issues.

When two actors focus on an issue and collaborate towards a solution, this is a ‘collaborative fit’ (see *figure 1*). When they work on the same issue in separation, this is a ‘collaborative gap’. In this particular research, including firms from the private sector, reasons not to collaborate may sometimes be rather obvious – e.g. protecting intellectual property, market competition, or non-profitability of investments. More broadly, collaboration may invoke conflict through actors pursuing their own interests (Jiren et al., 2018, p. 421). Collaboration efforts may be seen by actors as time-consuming, costly, or delaying progress altogether (ibid.). Lastly, at the risk of stating the obvious, if one actor is unknown to the other, no collaboration is likely to arise.

Not all actors are connected to all issues. When one actor works on two connected issues, this is called ‘integrative fit’ (see *figure 1*). When the actor works on one issue but not the other – although the two issues are connected – that is referred to as an ‘integrative gap’. Integration issues may occur because actors simply cannot concern themselves with all issues, as each requires a new expertise. Also, issues may occur on different levels, some of which may fall outside of the scope of operations of a certain actor. Lastly, related to the former, actors may not have the authority to address interconnections between issues. In the context of this research, one farmer may identify an interrelation between supply chain structures and their potential to invest in sustainable alternatives, but is unlikely to have the capacities to change the supply chain configuration (Jiren et al., 2018, p. 428).

Generally speaking, collaborative and integrative gaps are an expression of network inefficiency. For collaborative gaps, two organisations are working towards the same issue in separation. Combining their insights would not only speed up the process, but potentially yield technological breakthroughs through knowledge recombination in the process (Fleming et al.,

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<sup>5</sup> The term issue network is sometimes also employed to describe a group of actors who aim to tackle an issue. However, in this research, the term describes a network of interdependent issues.

2007, p. 130). For integrative gaps, a single actor works on a issue, without addressing an interdependent issue; that is to say: ‘where change in one issue also affects another issue’ (Bergsten et al., 2019, p. 29). Thus, although insights for the one issue may be relevant to the other, this connection is not made, which may ‘undermine an actor’s capacity [...] to foresee, prevent and detect negative spillover effects, which may result in inappropriate management responses’ (ibid.). For example, a closed stable system may decrease nitrogen emissions, but has severe consequences for animal welfare. Addressing the one issue thus challenges another, and recognising these interdependencies is essential towards an integrated solution. It is impossible (and likely less efficient) for all actors to concern themselves with all issues (Jiren et al., 2018, p. 428), so the governance gaps approach aims for the identification of the most prominent missing connections.

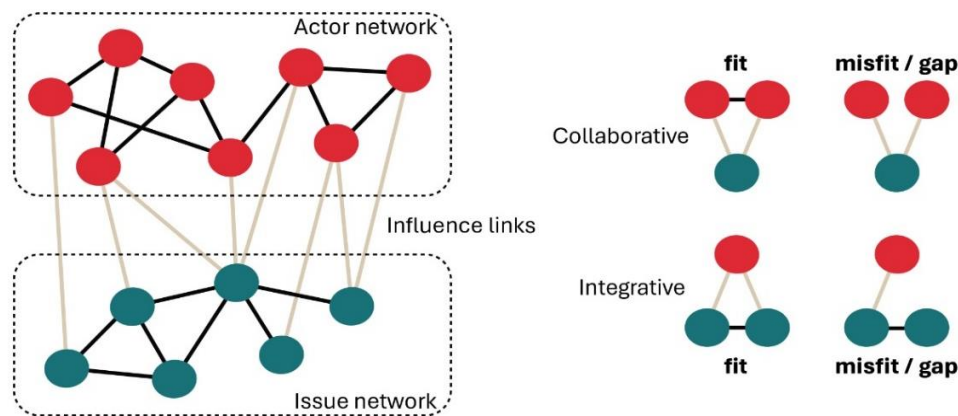


Figure 1: Visualisation of the Bergsten et al. (2019) framework. NB. this is almost a direct combined version of their Figure 1 and Table 1 – all visualisation credits to Bergsten et al. (2019).

A system configuration with few governance gaps represents a system where actors are recognising the way in which social and biophysical issues are connected. This condition is referred to by Bergsten et al. (2019, p. 28) as institutional fit, where ‘institutional’ refers to social-ecological structures. Achieving institutional fit requires for socio-economic structures to be attuned to the biophysical environment. In their context, a high institutional fit implies ‘better conditions for effective governance of sustainability issues’ (ibid., 30).

In the context of regional agricultural innovation, which is clearly different from sustainable development, the term is equally valuable, and implies a transition of the agricultural sector towards a sustainable social-ecological configuration. First of all, many of the issues that the agricultural sector faces are sustainability related. Simultaneously, the socio-economic structure of the agricultural sector is notoriously profit-driven, with little room to manoeuvre for individual farmers. Innovation through collaboration could be one way to unite the socio-economic structure with environmental sustainability, by making sustainable operations equally profitable as their traditional counterparts through technological development. The agricultural sector is facing many challenges, and in that effort, it is not unlikely that some issues are being overshadowed. These issues may be crucial themselves towards a sustainable agricultural configuration, but may also yield particular insights or unforeseen consequences to other issues that the sector is facing. As such, the identification of these issues is of the essence to further enable the transition to a more sustainable configuration of the agricultural sector.

In a world bound by all sorts of restraints – time, financial, human capital, knowledge – the identification of unexploited collaboration opportunities for the most overlooked issues is a logical focus. However, simply identifying these opportunities is not enough to establish new collaborations. Governance gaps, more fundamentally, identify a lack of central coordination (Bergsten et al., 2019, p. 37). Self-organisation is an unlikely solution to the grand, global sustainability challenges that the agricultural sector faces. Initial investments in this organisational activity are likely unprofitable, time consuming, and requires a large trust in collective action (Ostrom, 2009). Hence, it is likely necessary to have one or more designated actors oversee the process and bring organisations together to tackle the large environmental issues that the agricultural sector faces (Feser, 2023, p. 1828; Kant & Kanda, 2019, p. 911; Kivimaa et al., 2019, pp. 1062–1063). These transition intermediaries are established specifically to that end, or were already large, incumbent firms who can take the risk of investment (Kivimaa et al., 2019, p. 1069). Promising collaborations are only valuable insofar intermediaries can be identified to guide the process. Thus, intermediary theory is the final element needed to understand the interactions and dynamics in the RIES, to understand how collaborations occur and can be sustained.

### **2.3 Enabling promising collaborations: transition intermediaries**

Intermediary activity is not limited to innovation necessarily. Often, however, in cases where transitions are achieved through innovation, transition intermediaries are innovation intermediaries (Kivimaa et al., 2019, p. 1072). As was emphasised previously, enabling and enhancing innovation opportunities is an essential RIES characteristic (Asheim et al., 2011; Cai et al., 2017; Foray, 2014; Long & Hu, 2022). Therefore, transition intermediaries in the RIES, for a large part, will likely be focused on innovation. Innovation intermediaries are network brokers<sup>6</sup> ‘that provide a supportive role for collaboration between two or more parties during various stages of the innovation process’ (Howells, 2006, p. 721, via: de Silva et al., 2017, p. 70; Janssen et al., 2020, p. 606). Innovation intermediaries generally receive funds through government programmes, but private funding occurs too (Feser, 2023, p. 1829). Increasingly, intermediaries are self-sufficient through ‘transaction fees and taking co-ownership of innovations in the early phase’ (Katzy et al., 2013, pp. 304–306). Intermediaries aim to facilitate ‘co-creation and co-development’, and to bridge ‘a wide array of knowledge, competency and capability gaps’ (De Silva et al., 2018, p. 70). Innovation intermediaries exist in national, regional and sectoral innovation systems (De Silva et al., 2018, p. 80; Klerkx & Leeuwis, 2009, p. 850). The operational capabilities of innovation intermediaries are dependent upon contextual factors such as the particular technology and industry of concern, location, network configuration, knowledge sharing and transferring, public policy, and innovation culture (Feser, 2023, p. 1845).

It is important to note that transition intermediaries ‘co-contribute to specific change processes that are more diverse than what is at play in processes for intermediating innovation’ (Kivimaa et al., 2019, p. 1072). As the research aim is to explore the role of intermediaries in enabling a

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<sup>6</sup> Brokerage refers to a situation where one actor ‘occupies a structural position (bridge, structural hole) between two or more otherwise disconnected actors, [typically involving] an exchange or interaction between the broker [and the actors]’ (Everett & Valente, 2016, p. 11). A broker can unite parties (effectively forming a triad over time) or keep them separate (to maintain the broker position). Consequently, it can be referred to as either *tertius iungens* – the third who joins (*also: collaborative brokerage*), or *tertius separans* – the third who separates (Kwon et al., 2020, p. 1097). Per definition, intermediaries aim for the first type of brokerage, the goal being to initiate collaboration and co-innovation between actors (Fleming et al., 2007). A position of brokerage is a relative one; one organisation can represent a broker in a relationship between two others, whilst simultaneously being brokered in a different connection (Kwon et al., 2020, p. 1110).

transition the agricultural RIES in a broader sense, transition intermediaries form the logical overarching category of intermediary organisations. In the literature on sustainable transitions, multiple categories of transition intermediaries have been distinguished: systemic-, regime-based-, transition-, niche-, process- and user intermediaries (Kivimaa et al., 2019, p. 1067, table 1) (see *table 2*). These are not mutually exclusive; that is to say that an intermediary may partially fit in multiple categories. Differences between these intermediaries manifest themselves at the 1) level of action, 2) way they emerge, 3) goal of inter-mediation and 4) normative position taken by the intermediary towards a) an innovation niche, and b) the neutrality of the intermediary. There is no primary characteristic based upon which an intermediary category may be assigned; the categories depict a general set of characteristics often encountered.

The **systemic intermediary** is often established for to intermediate, and pursues transitions through system disruption (Kivimaa et al., 2019, p. 1067). It is open to all kinds of niche developments, and seen as a neutral facilitator of innovation. Examples of systemic intermediaries may be formal innovation networks and centres, established specifically to advance co-innovation in a scientific field or sector, supporting multiple developments at once. Systemic intermediaries have a wide range of functions, well set-out in the following overview:

*‘1) **demand articulation** (scanning for information/opportunities, foresight through strategic planning, diagnosis through needs/knowledge gap assessment), **network building** (gate keeping [...], match making [...]), **capacity building** (organizational development [...], training and competence building [...]), **innovation process management** (mediating and arbitrating), **knowledge brokering** (matching knowledge demand and supply), and **institutional support** (boundary work between science and practice, institutional change through advocacy, regulation change, and attitudes/practices change)’* (Hannon et al., 2014; via Gliedt et al., 2018, p.1253).

**Regime-based transition intermediaries**, on the other hand, are given their mandate by the dominant regime actors. These organisations are ‘a player in the dominant system’, and aim for a transition through ‘incremental solutions or political aims’ (Kivimaa et al., 2019, p. 1067). For example, one might think of large energy firms advocating for more sustainable energy alternatives. **Niche intermediaries** often develop together with a niche innovation, and aims to further development in that niche (ibid.). The niche is understood as a ‘protected space that allows nurturing and experimentation with the co-evolution of technology, user practices, and regulatory structures’ (Schot & Geels, 2008, p. 538). One might think of an advocacy group between organisations in the niche that is established to support and communicate in favour of a niche technology. **Process intermediaries** are established particularly to intermediate for a process within innovation development that may eventually lead to a transition (Kivimaa et al., 2019, p. 1067). Their mandate lies in governing the day-to-day development and cooperation between organisations. These are neutral actors, typically not invested in one particular niche. Examples of process intermediaries could be sustainability consultants or project managers. Lastly, **user intermediaries** focus specifically at the user-side of innovation – and aim to facilitate and represent users of the technology (ibid.). They generally emerge as an initiative from one or more users. They may or may not be niche specific, based upon the technology that is being used. One might think of user advocacy groups, clubs, or discussion forums.

The intermediary role is highly relevant in the RIES and to the governance gaps approach. Essentially, intermediaries aim to mitigate collaborative and integrative gaps through recognising a need for innovation, aligning actors with a larger goal, encouraging cooperation,

facilitating knowledge sharing, and managing these collaborations in the process (De Silva et al., 2018, p. 80; Klerkx & Leeuwis, 2009, p. 851).

The goal of this research is to establish what role can be identified for transition intermediaries to address governance gaps. To answer the research question, it is necessary to distinguish between these profoundly different types of intermediaries and to address their specific applicability. One type may be better equipped to deal with a specific governance gap than another. For example, seen in the light of the governance gaps approach, systemic and regime-based intermediaries will likely be involved in many issues, as a transition at the system level is the final goal. Also, they probably have a broad range of potential actors to connect others to. Niche and process intermediaries, on the other hand, could well be limited to one particular issue faced by the sector – and know all actors concerned with that one issue. User intermediaries may well be present in the ecosystem, most likely focussing on the particular issues that the group they represent encounters.

	Context/level of action	Emergence	Goal of inter-mediation	Position vis-à-vis niche	Normative position Neutrality/ interest	Example
Systemic intermediary	System level between actors & interests	Established to intermediate	Pursues given goals on a system level; ambitiousness towards disruption to existing system	Outsider to niches, creating space for multiple, alternative niches	Typically regarded as a position of neutral, unbiased facilitator and broker, despite having an interest in stimulating transitions	<i>Formal innovation networks or centres</i>
Regime-based transition intermediary	Intermediating on system level between multiple actors, within mandate given by dominant regime actors	Existing actor subsuming intermediary roles; or established by dominant regime actors to intermediate for transition	Pursues given (sustainability) goals through typically more incremental solutions or political aims	Outsider to specific niches, creating space for multiple, alternative niches	Regarded as a player in the dominant system but pursuing or empowered for change	<i>Large firms advocating for an incremental move to more sustainable alternatives</i>
Niche intermediary	Intermediating between local projects, and/or higher level of aggregation	Often emerging to intermediate when a niche (or TIS) develops	Pursues given (sustainability) goals and from a perspective solutions of a given niche (or TIS)	Insider to a specific niche (or TIS)	Regarded as player advancing a particular niche (or TIS)	<i>Advocacy group between niche organisations</i>
Process intermediary	Intermediating within experimental projects or specific processes contributing to transitions	Typically established/employed to intermediate day-to-day action in transition projects or processes	Implementing context specific priorities, informed by broader transition trajectories	Typically outsider to specific niche	Regarded as a neutral, unbiased 'networker' that does not have specific 'agenda' in the process	Sustainability consultants Project managers
User intermediary	Intermediating between technology (provided) and use, and/or niche technology and dominant configuration	Emerges from amidst users and consumers	Acts as facilitator, representative, or broker of end-use or end-users	Insider or outsider to specific niche	Leans towards user interests (in some cases even as activists)	Advocacy groups User clubs Discussion forums

Table 2 – direct partial copy of Kivimaa et al. (2019, p. 1069, table 1), own additions in *italics*.

### 3. Methodology

This thesis follows a comprehensive research design involving multiple phases and methods, outlined in *table 3*. The research is case-based, and centred around the Foodvalley region of the Netherlands. RIES literature is constituted primarily of qualitative and case-based research (Zen et al., 2023, pp. 18–19). The RIES is a well-described phenomenon in qualitative contexts, but a more structured, quantitative way to capture RIES interactions is novel, adding to the scientific relevance of the method. Phase I of this research is quantitative, investigating collaboration network data (publication co-authorship, public-private partnerships (PPPs) and patent co-inventorship<sup>7</sup>) and the urgent topics in the agricultural sector (keyword co-occurrence and document review). This data is refined in Phase II through semi-structured interviews. Thus, findings of phase I – innovation network data and the issue list<sup>8</sup> – are supplementary to the interviews in phase II. It is not unusual to employ qualitative methods to further interpret quantitative findings (Bryman, 2016, p. 640). Ultimately, by using quantitative data to substantiate and inform qualitative research, this mixed-methods approach is meant to ‘create a research outcome stronger than either method individually [could have]’ (Malina et al., 2011, p. 61). These two phases will be discussed in this chapter in order, but first a brief introduction to the Foodvalley case will be given. Lastly, some comments on reliability and validity, and research ethics will be made.

	<b>Phase I</b> Quantitative network analysis	<b>Phase II</b> Qualitative refinement
<i>Innovation network data</i>	<ul style="list-style-type: none"> <li>• Publication co-authorship (Scopus)</li> <li>• European project cooperation (CORDIS)</li> </ul>	<ul style="list-style-type: none"> <li>• Refined through interviews with Foodvalley actors</li> </ul>
<i>Issue list</i>	<ul style="list-style-type: none"> <li>• Document review (Overton)</li> <li>• Publication keyword analysis (WoS)</li> </ul>	<ul style="list-style-type: none"> <li>• Refined through interviews with Foodvalley actors</li> </ul>

Table 3: Methods overview

#### 3.1 The Foodvalley case

Foodvalley, generally, describes the region of Wageningen and surroundings, and its specialisation in the agri- and food sectors. Foodvalley can be defined precisely as an area stretching 8 connected municipalities in the Netherlands, that together partake in the ‘Regio Foodvalley’ organisation (see *figure 2*)<sup>9</sup>. This notion of the Foodvalley region as an area is strengthened by it being subject to national policy as such; for example, it is one of the Regional Energy Strategies regions as defined in Dutch energy policy (RIB, 2023). As has been established, RIES activity is not limited to this territory; that said, by definition, actors can only be considered part of the RIES insofar as they operate within this area. Of course, cases at the very border of this area should be considered with care,



Figure 2: The Foodvalley region

<sup>7</sup> Patent co-inventorship data did not yield sufficient information to contribute to an understanding of co-innovation in the Dutch agricultural sector or the role of the Foodvalley region, thus was not included in the results section. A brief methodological explanation and the results can be found in *Annex II: Patent network visualisation*.

<sup>8</sup> Exactly as one would expect, the issue list is a list of the most prominent issues the agricultural sector is facing – and is used to substantiate discussion with actors of the occurrence of collaborative and integrative governance gaps. To keep the list somewhat comprehensible, a maximum of fifteen terms was included, each with some further examples of issues placed within the more generalised fifteen terms.

<sup>9</sup> i.e., alphabetically: Barneveld, Ede, Nijkerk, Renswoude, Rhenen, Scherpenzeel, Veenendaal, Wageningen.



as the potential benefits and participation in the RIES is nearly equal for those just outside the border and those inside it.

The combined presence of research and educational facilities (WUR, NIOO-KNAW<sup>10</sup>), prominent innovation intermediaries (Startlife, FoodvalleyNL), incumbents in the agri- and food sector (Unilever, FrieslandCampina), and a multitude of startups highlight the potential for RIES activity. Consequently, this research is not a first-of-its-kind in taking Foodvalley as the central case in innovation ecosystem research. Such has already been done by Hoenen et al. (2018), Crombach et al., (2008) and Tindemans (2008), to name a few. It is safe to say that the area has received attention as a hotspot for agricultural innovation for multiple decades. An intuitive explanation of the influence of the Foodvalley area is the following, provided by Tindemans (2008, p. 285): ‘true, many large research centres of Dutch food and agribusiness companies are not in Wageningen, but the concentration of competences there is such that it would be unimaginable to establish a joint centre for food science [...] elsewhere’.

### **3.2 Phase I: Quantitative innovation network analysis**

Two goals can be specified for phase I. First, to identify collaboration networks in agriculture in the Netherlands and Foodvalley specifically. Second, to understand the urgent topics for the agricultural sector. These two are investigated through different types of data, discussed here in order.

#### **1) Collaboration network data**

Social network analysis (SNA) is fundamental to the governance gap approach and innovation intermediary theory. It has been described as a ‘powerful tool to draw, compare and identify patterns of interactions within and between stakeholders’ (Jiren et al., 2018, p. 423). Social networks consist of a finite number of actors and connections between them (Yang et al., 2016, pp. 7–8). Social network analysis is often used, here too, to identify hubs, communities, and ‘the most influential, prestigious or central actors’ within (Jiren et al., 2018, p. 423; Tabassum et al., 2018, p. 2). In particular, SNA will be relevant in phase I to understand if, and to what degree, organisations in Foodvalley are central to agricultural innovation – as these are the actors with the highest potential of connecting others, within or outside of Foodvalley.

Universities and research institutes are key actors in the RIES (Cai et al., 2017, p. 3). Co-publication analysis is employed to understand the scientific-academic activity in Foodvalley, and the region’s scientific contributions nationally. By connecting authors to their universities, a co-publication network between knowledge institutions (and possibly others) is constructed. Nodes represent knowledge institutions, and edges represent one or more co-publications amongst members of two knowledge institutions. Node size is based upon the node degree; edge sizes are based upon the number of co-publications between two knowledge institutions. This dataset is compiled by using the Scopus SDG2 subfield<sup>11</sup>, filtered for the Agricultural and Biological Sciences subfield as provided by Scopus, with at least one Dutch affiliation, from the past ten years. It was expected that choosing this time interval would yield enough documents to be insightful, indicative of the status-quo yet not too prone to naturally occurring yearly

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<sup>10</sup> NIOO-KNAW, also ‘Netherlands Institute for Ecology’, is the environmental division of KNAW, a non-governmental research organisation providing support for research institutes in a large range of scientific disciplines. Its headquarters are located on WUR campus.

<sup>11</sup> This query is particularly aimed at agricultural innovation; a useful tool in identifying articles relevant to the Foodvalley missions (Elsevier Scopus, 2023).

fluctuations. The search yields 4837 documents. Any source with more than twenty actors involved causes significant network distortion and is eliminated from the database. Gephi is used for visualisation of the network.

Secondly, the Netherlands has experiences 'steady growth in the number of signed PPP projects' over the last few decades (Wang et al., 2018, p. 305). PPP is meant to be more cost effective, efficient and equitable, and is often employed as a tool for regional development (ibid.; Ibyatov et al., 2019, p. 228). PPP data is employed to understand the degree and regional clustering of collaboration between scientific-academic institutions and firms<sup>12</sup>. European projects are often combinations of knowledge institutions and industrial actors, working together on topics chosen by the EU (opposed to patent data, which provides more limited inventorship collaborations, and publication data, which mostly consist of knowledge institutions). The CORDIS dataset is used, showing all European Union Horizon2020 projects from 2014 to 2020. Of course, there are more PPPs than merely H2020 projects; this particular set was chosen as it is very structured in terms of the topics of projects, and easily accessible. The quantitative analysis should therefore be seen as indicative, not intended towards any absolute statements on the total number of PPP projects in the Netherlands. Projects will be selected based on their EuroSciVoc-path<sup>13</sup>, which is to say that they are classified by the EU in the agricultural field of science (669 in total). Projects are filtered for the presence of at least one Dutch actor (191 remain). A network arises where each node represents an organisation, and each edge represents one or more projects both organisations collaborated in. Gephi is used to visualise the collaborations within the Netherlands, incorporating coordinate data provided by the CORDIS dataset. Node size is based on the degree, edge size is based upon the number of shared projects.

## 2) Issue list

Initially, the goal of this research was to establish an issue network. However, it became clear that a network would be uninformative, as all issues within the agricultural sector are interconnected one way or the other. It was decided that going forward, an issue list would be presented to capture the broad range of issues that the agricultural sector is facing. This issue list would be limited at 15, so that it would be comprehensible. The list is employed in interviews to substantiate the interviewees understanding of issues and consequently in operationalising the governance gaps approach. Two networks were formed: a keyword co-occurrence network and a document analysis keyword network. The issues in the two networks were extracted, yielding a list of 37 for the first and 13 issues for the latter (degree range >14 showing the most central nodes). Recombination towards a list of no more than 15 issues involved the categorisation of topics, both in the keyword co-occurrence analysis and document analysis. Agricultural knowledge obtained in document analysis proved helpful to this end. As one interviewee would later mention, no one indexation is mutually exclusive and collectively exhaustive.

As the first basis of the issue list, Keyword Plus<sup>14</sup> is employed as the keyword co-occurrence indicator in scientific articles, as this is the most appropriate co-occurrence means to describe

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<sup>12</sup> Additionally, this dataset was also used as a discovery tool for potentially interesting actors. Ten actors in the Foodvalley region were identified, four of which would participate in the interviews of phase II.

<sup>13</sup> To be precise, the EuroSciVoc-paths: 'agricultural sciences / agricultural biotechnology' and 'agricultural sciences / agriculture, forestry and fisheries / agriculture'.

<sup>14</sup> Keyword Plus is provided by an algorithm interpreting title and citations keywords within the article (Zhang et al., 2015, p. 967).

the topical structure of a scientific field (Zhang et al., 2015, p. 971). A dataset with articles from the past 10 years and at least one Dutch affiliation was extracted through Web of Science (WoS) subsection 'agriculture' (4203 in total). A period of ten years was chosen, because this would capture topics that are relevant now or at least were so very recently, without being too prone to natural fluctuations and 'buzz words'. These are filtered for WUR publications, as WUR will be a central actor in phase II (2822 remain). Modularity analysis allows for the division of a network into clusters: sets of nodes that are particularly interconnected, and between which there is noticeably less connection (Newman, 2003, p. 8578). Modularity analysis is performed through Gephi, where ten large clusters were identified and color-coded. These clusters were then used to identify common issues amongst many, ideally, similarly oriented keywords. Sometimes this proved true, other times, it was still a matter of identifying singular issues within one cluster.

Document analysis is employed as a second way to understand the urgent topics within the sector. Particularly, policy agendas and research reports on the state of the Dutch agricultural sector were analysed. These documents provide a broad overview of the practical, on-the-ground issues that the agricultural sector is facing, complementary to the scientific issues that were discovered through keyword co-occurrence. The sampling size for document analysis is limited at 15. Overton, the world's largest policy document database is employed with the simple search query 'landbouw' (Dutch for 'agriculture'; from 1/1/2019 onwards)<sup>15</sup>. This search yields 6901 results; the vast majority of which parliamentary documents<sup>16</sup>. Policy reports are filtered and selected manually (15 in the end out of 40 potentially interesting ones) – based upon the degree to which they are agriculture-specific. Documents with a holistic view on the sector are preferred, as this will add to the understanding of the challenges for the sector in the broad sense, rather than focus very specifically on what could be a niche issue. Keywords are identified and registered in a protocol that enables for a network visualisation thereafter (see *Annex III: Document analysis protocol*). Within this network, the most central issues can be identified, to be recombined with the previous keyword co-occurrence issues into one list of fifteen. This list is refined in phase II with the feedback of interviewees, all with relevant experience in the agricultural sector.

### **3.3 Phase II: Qualitative refinement**

The second phase of the research consists of semi-structured interviews (18 in total). Semi-structured interviews are preferred, as this method enables Foodvalley actors to '[give] insights into what the interviewee sees as relevant and important' information about the Foodvalley RIES, governance gaps and the role of intermediaries therein (Bryman, 2016, p. 467). Organisations found in H2020 and publication data in Foodvalley are approached. Companies in the Agri- and Businesspark Wageningen are reached out to – as are large firms prominently present in Wageningen campus. Lastly, through snowballing, (central) actors in the region are asked to point to other actors in Foodvalley. Interviews are numbered and referred to as such, like so: <sup>[1,2,3]</sup>. Generally, a wide range of organisations was included, as can be seen in *table 4*. The one particular organisation type that was not available for an interview was that of large multinational conglomerates with a headquarter in Foodvalley, so that all information on the value of the region for this type of organisation is second-hand, from interviewees who may have been part of the process of getting this type of organisation to Foodvalley.

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<sup>15</sup> Overton defines policy documents as 'documents written for or by policymakers' (Overton, 2024).

<sup>16</sup> These parliamentary reports were often debate overviews, not really yielding any significant insights in comparison to the policy agendas and research reports that were identified.

The interview is structured as follows: 1) the perception of the Foodvalley ecosystem and the role of intermediaries therein, 2) an evaluation of the issue list<sup>17</sup>, and 3) the occurrence of collaborative and integrative governance gaps in the agricultural sector (see *Annex IV: Interview Protocol*). Interviewees are provided definitions for governance gaps, and asked if they recognise them in the context of Foodvalley. Interviews are prone to many types of bias, a reflection upon which can be found in 5.3 *Limitations*.

Interviews are coded in NVivo; first, a structured round of coding in NVivo divides the different phases of the interview (i.e. ‘Collaboration / collaborative activity, initiative, not collaborating, value of collaboration’, ‘Ecosystem perception / Foodvalley definition, intermediaries role, value of regionality’, ‘Governance gaps / collaborative, integrative’ and ‘Topics’. Within these categories, a round of open coding follows, allowing a structured identification of the different perceptions within the thematic structure of the interview. Most categories would contain excerpts from roughly 15 interviews, open coding excerpts ranged anywhere from 29 to 81 per category.

Nr.	Organisation type	SME*	Sector	Brief explanation of org. operations	Interview duration
1	NGO	Y	AF	Start-up accelerator	±1hr
2	PF	N	AF	Agricultural consultancy	±1hr
3	NGO	Y	AF	Network / community building	±1:40hr
4	GO	Y	AF	<i>Not disclosed - privacy</i>	±30min
5	RO	N	AF	Tech. transfer at research institute	±1hr
6	PF	Y	A	Agricultural consultancy	±1hr
7	RO	Y	AF	Private research for large firms	±1hr
8	GO	N	AF	<i>Not disclosed - privacy</i>	±1hr
9	PF	N	AF	Start-up accelerator	±1hr
10	RO	N	AF	AF research group	±45min
11	GO	N	AF	<i>Not disclosed - privacy</i>	±1hr
12	PF	Y	AF	Knowledge sharing	±1hr
13	PF	Y	F	Private research facilitator	±1hr
14	PF	Y	A	Agricultural consultancy	±1hr
15	RO	N	AF	Research organisation for multitude of disciplines	±1hr
16	PF	Y	F	Food treatment resources	±1hr
17	PF	Y	A	Agricultural consultancy	±1hr
18	PF	Y	A	Animal farming machinery	±1hr
RO = research organisation			A = agriculture		
PF = private firm			F = food		
GO = government organisation			AF = agriculture & food		
NGO = non-governmental organisation			* <250 employees		

Table 4: interviewees overview

<sup>17</sup> As ‘issue’ is a loaded word, the term ‘topics’ was used in most interviews.

### 3.4 Reliability & validity

As the research design is quite varying in terms of methods and data, no single comment on reliability and validity can suffice. Generally, however, it is the belief that the research is reliable and valid, with some caveats. Limitations of the research in general are more extensively discussed in *5.Discussion*.

#### 1) Internal reliability

Internal reliability refers to the degree to which researchers within the project correspond in the 'observations and the theoretical ideas they develop (Bryman, 2016, p. 384). One researcher is responsible for this project. Doing a research by oneself causes significant limitations, because internal reliability really is never on the table – there is no one to share data processing and analysis with. Internal reliability as a remedy to individual biases is not an option. At the very least, an extensive documentation allows for tracing back steps, which might expose the path dependency of one's school of thought. Still, it would have been more sophisticated to discuss the findings with others, to challenge biases and complement the others' insights.

#### 2) External reliability

Publication, project and keyword data (phase I) is stable over time and reliable, as the data set is not subject to change over time. External reliability of phase I is high, as it could relatively easily be replicated. Publication and project data are indicative of the Foodvalley area specifically. For the first, WUR and NIOO-KNAW are known actors in Foodvalley. The latter provides coordinate data, which allows for an efficient regional identification. The quantitative metrics in phase I are well established metrics to indicate collaboration, but they are not mutually exclusive – other examples of collaboration could be 'hiring university graduates, personnel exchanges, cooperative joint research, contract research, spin-offs, and joint university-industry PhD supervision (Hoenen et al., 2018, pp. 260–261). The aim is to discover these types of collaborations in phase II, so that the final understanding of collaboration in the RIES is supported by quantitative and qualitative findings, and covers a diverse range of collaboration forms.

Qualitative refining of phase II is more prone to interpretation; but proper journaling of additions, all the while maintaining the general guidelines of protocol increases external reliability. Coding through set categories at first increases external reliability, as these are straightforward categories that do not require a lot of interpretation. Although the protocol generally remains the same, it is also prone to an iterative process of nuanced adaptations, so that the interviews yield the most interesting results.

#### 3) Internal validity

Internal validity refers to the connection between observations and their implications for theory (Bryman, 2016, p. 384). The researcher should wonder about the relation between what is being measured and what that means for the theoretical concepts of concern. The mixed-methods nature is meant to provide a large set of different data to establish a well-substantiated interpretation of the internal dynamics of Foodvalley, the role of intermediaries and governance gaps therein. This type of triangulation is an increasingly popular method to substantiate findings (Bryman, 2016, p. 386). As mentioned, no phase I indicators used are groundbreaking or novel; they are all proven indicators of collaboration, and as such strengthen internal validity.

The interviews of phase II can be considered valid, as concepts were well explained to interviewees. As such, no large translation was necessary between their answers and the theoretical concepts employed in this research. Also, answers were sometimes challenged by

insights from earlier interviews; asking about these conflicting ideas provides an interactive way of interviewing that makes interviewees rethink their position and explain it, increasing validity.

#### 4) External validity

External validity refers to ‘the degree to which findings can be generalized [sic.] across social settings’ (Bryman, 2016, p. 384). As this is a single-case study, external validity is limited. After all, no cross-case comparisons can be drawn within this study. On the other side, no characteristics of Foodvalley have been discovered, so typical or unique that the case is definitely different from other RIESs. Realistically, more research is instrumental to get to a more generalisable understanding of internal RIES dynamics, the role of intermediaries and the applicability of the governance gaps framework in a RIES setting.

### **3.5 Ethics**

Research with human actors is bound by informed consent at Utrecht University (see *Annex V: Informed Consent Document - Interview*). The implications of informed consent are 1) a preceding explanation of the research, 2) voluntary participation that can be withdrawn so long as data is identifiable, 3) informing participants on the outcome, and 4) allowing participants to change answers at any time. Participation is anonymous at the personal level and ideally also at the organisational level. Although patent, publication and collaboration data are not anonymous and might thus be traceable, the initial goal remains to limit traceability.

## 4. Results

The results section thematically outlines the findings on the main topics of research. The order of this results section is as follows: 1) first, we need to understand how Foodvalley is perceived, as a whole, by interviewees. These findings are supported by quantitative findings of phase I. 2) Second, to understand the inner dynamics of the RIES, we zoom in, investigating regional collaboration within Foodvalley. 3) Third, the value of regionality, in particular of in-person communication, is discussed. This exposes the importance of the chosen level of analysis – individual or organisational. 4) Fourth, interviewees' experiences with integrative governance gaps are outlined, where an alternative interpretation of the integrative governance gap concept is suggested. Here, briefly so as to not disrupt the narrative, the issue list will also be outlined. 5) Fifth, interviewees' experiences with collaborative governance gaps are explained. 6) Sixth, in support of the second part of the research question, the role of intermediaries within the RIES will be discussed, particularly their potential to address the collaborative and integrative governance gaps (in the suggested interpretation) through their function in the RIES.

### 4.1 Perceptions of Foodvalley

If we want to understand what happens in the RIES, it is valuable to first understand how the ecosystem is perceived as a whole. Foodvalley is interpreted as an innovative region<sup>[4,5,7,16]</sup>, focused on agriculture and food, where knowledge originates in WUR and is diffused to the organisations in the region<sup>[4,5,7,8,12,17]</sup>. Universities and research organisations often play an important role in innovation ecosystems as 'core innovation agents' (Long & Hu, 2022, p. 148). This is also shown in *figure 3*, demonstrating the dominance of WUR in the publication co-authorship network for the Dutch agricultural scientific field. Evidently, WUR is the most popular Dutch partner of co-publication (inter)nationally. This is no surprise, given WUR's international reputation and specialisation towards agri- and food. Consequentially, WUR's central position in the network makes its presence a unique selling point of the Foodvalley region.

Moreover, WUR was identified as the most prominent H2020-project participant in the Netherlands. With 133 agricultural research projects participated in, a tenfold increase compared to the runner-up, WUR far exceeds any other actor in the Netherlands (see *figure 4.1*)<sup>18</sup>. These findings are backed by the interviews, where the importance of WUR to the interpretation of the Foodvalley ecosystem really cannot be overstated<sup>[1,2,4,7,9,11,16,17]</sup>. Its presence is highlighted in all interviews. Talent, knowledge and the vast availability of startups are the primary reasons that firms may want to move to Foodvalley<sup>[3]</sup>.

We can identify clusters in the Foodvalley region, Utrecht, Amsterdam, Rotterdam and Enschede. The latter four are all connected – some stronger than others – to the Foodvalley region (see *figure 4.2*). The identification of the Foodvalley cluster (of eight organisations and WUR) is important, as it indicates that PPP collaboration in the region is not *just* originating from WUR.

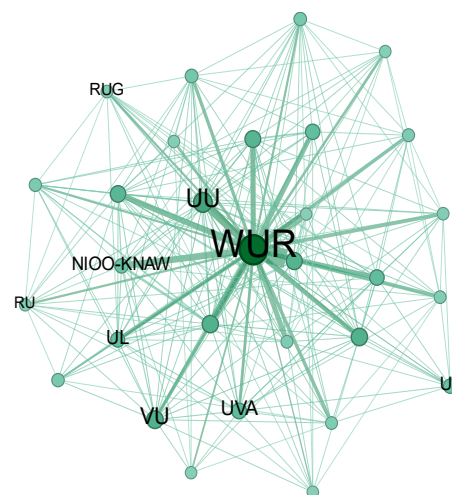


Figure 3: publication co-authorship network

<sup>18</sup> These include projects in which WUR is the only Dutch actor, so not all 133 are necessarily visible from the WUR node in this particular network.

WUR campus has developed over the past 20 years into the most prominent physical manifestation of the Foodvalley ecosystem<sup>[1,7,11,17]</sup> and is symbolic for the coming together of organisations and people<sup>[1,11,17]</sup> and creating an inviting business climate for (inter)national agri- and food oriented firms<sup>[1]</sup>. The modern campus has made the Foodvalley concept and the role of WUR more tactile and comprehensible (see quote below), as a result of deliberate government planning and coordination, nationally and provincially<sup>[8]</sup>.

[7] *‘[...] the creation of a campus, which allowed for the ecosystem that we now call Foodvalley to take [physical] shape’*

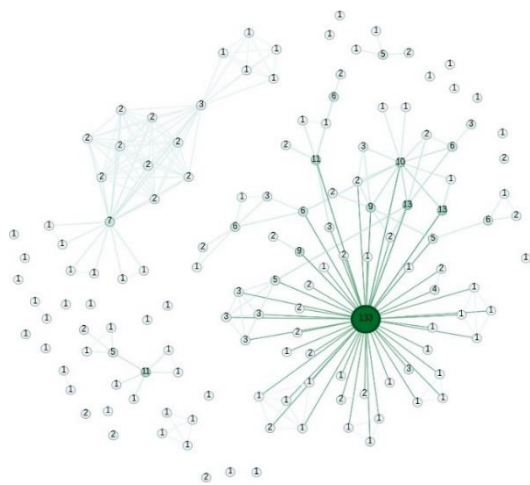


Figure 4.1: PPPs (H2020) in agriculture with at least one Dutch actor



Figure 4.2: PPPs (H2020) in agriculture with at least one Dutch actor (geog.)

RIESs generally provide a diverse range of relevant actors and their resources (Lau & Lo, 2015, p. 100). This is also the case in Foodvalley, where diversity in organisations is central to the definition of most interviewees: WUR, R&D labs, research organisations, SMEs, multinationals, intermediary organisations, startups, NGOs, Provincie Gelderland (from now on ‘the province’), municipalities and farmers. Some organisations experience to be less involved than others<sup>[12,14]</sup>. In this case, usually, organisations do not see a clear relevance, thematic or operational, in participation.

A vast part of the interviewees defined the region in terms of its (international) reputation for excellence in agri- and food knowledge<sup>[2,13,17]</sup>. Terms such as ‘Wageningen’ or ‘Foodvalley’ are understood as legitimate<sup>[12,16]</sup>. The (name of the) region has become a marketing entity as one of the global leading knowledge centres for food- and agri<sup>[3,5,6]</sup>. Innovative activity is by no means limited to the region, but the region builds a reputation, as is highlighted by the following:

[5] *‘You can have all kinds of connections [to other cities], but it is useful to have a signature. Its image and reputation can strengthen a region; more so than that all collaboration should occur in Wageningen, which would be totally unnecessary’*



In short, Foodvalley is understood by interviewees as a RIES with a central role for the university, a diverse range of organisations and a regional reputation of expertise. As the goal is to better understand internal RIES dynamics, a logical next step is in studying the collaborations between actors therein.

#### 4.2 Regional collaboration in Foodvalley

All interviewees agree that Foodvalley is a collaborative region. Vast differences may be distinguished in the degree to which organisations employ the collaborative potential of the region, and how they choose to do so. Generally, three kinds of collaborations can be distinguished: 1) project-based collaboration, 2) secondment of personnel, and 3) shared research facilities.

First, organisations may **collaborate on a formal project base** that is usually accompanied by a clear financing structure<sup>[1,9,13,14,15]</sup>. Applications for financing options or subsidisation are more likely to be accepted if a number of organisations participate<sup>[6,9,13,15]</sup>. Collaboration with another regional organisation may be mandatory for regional financing programmes<sup>[13]</sup>. The goal is complementarity in terms of knowledge<sup>[2,5,6,7,8,17]</sup>, networks<sup>[2,15]</sup>, or research equipment<sup>[8,11,15]</sup>; both organisations contribute capabilities or resources that the other could not<sup>[3,6,14]</sup>. Cooperation increases the project group's influence<sup>[7]</sup>. Such is the case for thousands of farmers for whom a regional level of organisation is often a logical step towards representation:

[11] *'The regional level is the natural level where people meet each other. And also where there is trust to collaborate. So, in this sector, that is the level where you have to operate'*

The second type of collaboration is **secondment**, generally to or from WUR. Those working in the region sometimes undertake partial secondment to WUR to share and gain knowledge, occasionally as PhD-candidates<sup>[13,18]</sup>. Essentially, the university provides for a constant flow of highly educated, young people looking for a job, which is attractive to firms<sup>[3,8,14,16]</sup>. A self-reinforcing mechanism occurs: Foodvalley (WUR) attracts young people interested in the agri- and food sector. During their course, students get attached to the city and the firms active in their sector, potentially through internships<sup>[14,16]</sup>. After university, part of the talent remains in Foodvalley, because of its central position, living conditions, or because they start their career out at an organisation in Foodvalley; thereby feeding a self-enforcing loop of development of the agri- and food sector in the region (see *figure 5*). Interaction between university and industry is a well-known characteristic of RIESs; these 'long term and systemic relationships' make the RIES more likely to develop and sustain over a longer period of time (Asheim et al., 2011, p. 1134).

[8] Policy officer, quoting a multinational food firm that moved to Foodvalley

*'Reason one [for moving to Wageningen]: because it has a university that is educating our future workforce. We want to be close by. Doing so, we can bind them to us and select the best people. So, reason one: the talent that Wageningen houses'*

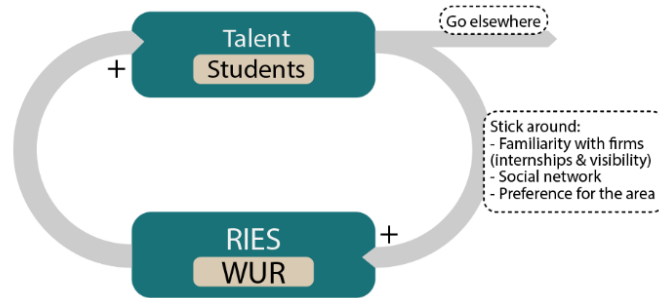


Figure 5: Reinforcing loop of talent in the RIES

Extensive startup facilities that have developed in Foodvalley are also relevant in this regard<sup>[3,8,9]</sup>. Although this is not secondment in the narrow sense, the idea of collaboration through ‘incorporating talent into ones organisation’ is similar. Incumbent firms are eager take opportunities in the niches of agri- or food development, and stay connected through intermediary organisations<sup>[3,8]</sup>.

[3] *‘The corporates are always looking for global developments in the field [...]. They are constantly evaluating: how many startups are there? What are they doing? Are they a threat to us? Are they potentially interesting to us? [...]. The corporates often show that passive attitude; they haven’t really done anything in the past year. They pay us to be around, because they want to know about the latest developments’*

Third, the **shared research facilities** that were established at campus are rather unique to the Foodvalley region<sup>[5,11]</sup>. These were established in collaboration between the province, WUR and the Ministry of Economic Affairs and Climate Policy. By setting up an investment fund, these parties managed to obtain research facilities, too capital intensive for even the largest R&D firms to order themselves<sup>[8]</sup>. Sometimes, an agreement is reached where facilities may be used by startups if they share their findings<sup>[15]</sup>.

#### 4.3 The value of regionality: ‘real’ interpersonal contact

Its emphasis on regionality distinguishes the RIES from other innovation ecosystem configurations. Thus, regionality is a logical focal point if we want to understand collaboration in the RIES. By now, some elements to the value of regionality have already been showcased in the different types of collaboration. The university (and its knowledge) is nearby, as are SMEs, multinationals, intermediaries and startups. Regionally arranged subsidies are profound and appreciated by regional actors. The Foodvalley term carries notable marketing value. WUR fuels a reinforcing loop of talent entering the region. These are all very legitimate reasons to value the Foodvalley region at the surface, but an underlying characteristic that was proposed in the vast majority of interviews must be highlighted here: the RIES facilitates easy, on the ground, in-person communication, as opposed to meeting digitally.

Covid institutionalised working from home. Being in geographical proximity was no longer a prerequisite to organisational work. However, when asked whether digital working could lower the value of regionality for Foodvalley, interviewees generally deny. They highlight the importance of in-person interaction and the ease with which they can visit other actors in the regional innovation ecosystem setting<sup>[2,5,6,7,8,9,14]</sup>. RIES literature generally conceptualises

collaboration in terms of connections between organisations. However, it is the people within these organisations that provide knowledge in the RIES<sup>[7]</sup>. Talking to a university professor will generally yield better insights on ongoing developments than any one publication might<sup>[8]</sup>. The conception amongst interviewees is that individuals stand at the basis of collaboration; before two organisations formally collaborate, at least two people will have been in contact<sup>[8]</sup>. Should these people, or their position in the organisation, change, so does the collaboration itself<sup>[8]</sup>. Trust, an indicator of social proximity, is vital in this regard. It is the experience of interviewees that trust is established more easily in an in-person, regional context<sup>[8,11,15,18]</sup>. More conceptually, geographical proximity encourages social proximity, and resultingly the initiation and continuation of collaboration. This is particularly relevant for startups, where trust is often built through the person that embodies the idea rather than firm results<sup>[14]</sup>.

- [15] *‘Getting it done takes people working with other people; and not organisations with organisations. It takes time to build relations and to get to know the right people [...] What is important more so than the organisation that one works for is who they are; that is what determines capacities and resources, and eventually freedom of movement. That is the most important step towards success’*
- [16] *‘[Sometimes] we have the knowledge on how things should be done differently, but we just don’t want to do it, because I might not get along with you – a silly reason like that. That obstructs these kinds of collaborative processes. So you need personal relations’*

#### **4.4 Integrative governance gaps**

The final issue list (see *table 5*) did not lead to surprising insights, but rather to an acceptably comprehensive overview – one that interviewees in phase II generally agreed with, sometimes with small proposed alterations which were generally incorporated. Both network visualisations and more detailed results can be found in *Appendix I: Formulating an agricultural issue list*. All interviewees recognise the importance of an integrative approach to the issues they were presented on the issue list. During the interview rounds, it quickly became clear that all topics share relations, as they are very much a part of the same sector, as is illustrated by the following:

- [7] *‘The tricky element of biological systems is that anything is connected to anything. No single topic on this list can be seen separate from others [...] It is all connected, which is what makes it so difficult’*

One premise of the governance gaps approach is that integrative governance gaps can theoretically be resolved through an integrated approach where an actor working on one issue recognises interconnected issues and incorporates them into its thinking. Because of the complexity and high interrelatedness of the issues within Foodvalley, interviewees emphasise that a multidisciplinary team is often required to obtain enough knowledge to be able to interpret a problem in an integrative way<sup>[3,6,7,14]</sup>. It is not feasible for one actor to be sufficiently knowledgeable on all interconnected issues. An integrative approach, according to interviewees in Foodvalley, is achieved through the collaboration of different actors who each represent their own expertise. *Figure 6* below is a representation of how integrative governance gaps are initially defined in the governance gaps approach versus how they are experienced by the interviewees in Foodvalley. Originally, one actor is encouraged to take into account the effects of an action on multiple, interconnected issues – they are expected to incorporate the effects upon these different issues into their actions. Integrative gaps following the definition

<b>1</b>	<b>Socio-economic position of different organisations</b>	Business models, periphery living conditions, smallholder farmers, management practises, willingness-to-pay, funding, future perspectives
<b>2</b>	<b>Digitalisation</b>	Big data, information, adoption, precision agriculture, machine learning, remote sensing
<b>3</b>	<b>Animal welfare</b>	Heat stress, illness
<b>4</b>	<b>Circular agriculture</b>	Closing nutrient chains, regional proximity
<b>5</b>	<b>Nitrogen emissions</b>	Ammonia emissions, manure (treatment), livestock buildings
<b>6</b>	<b>Biodiversity</b>	Animals (birds, insects), plants
<b>7</b>	<b>Soil quality</b>	Soil fertility, water carrying capacity
<b>8</b>	<b>Crop protection</b>	Chemical substances, plagues / illnesses
<b>9</b>	<b>Agricultural intensification</b>	Sustainable intensification, ecological intensification, (use) efficiency
<b>10</b>	<b>Ecosystem conservation and restoration</b>	Conservation agriculture, environmental enrichment, ecosystem services
<b>11</b>	<b>Land-use (change)</b>	Housing, renewable energy production
<b>12</b>	<b>Food security and safety</b>	Availability, quality
<b>13</b>	<b>Climate change mitigation</b>	CO2x-emissions
<b>14</b>	<b>Water management</b>	Buffering, situations of water shortage or excessive water, climate change adaptation
<b>15</b>	<b>Genetic modification</b>	Crop protection, yield, weather conditions, CRISPR-Cas

Table 5: issue list

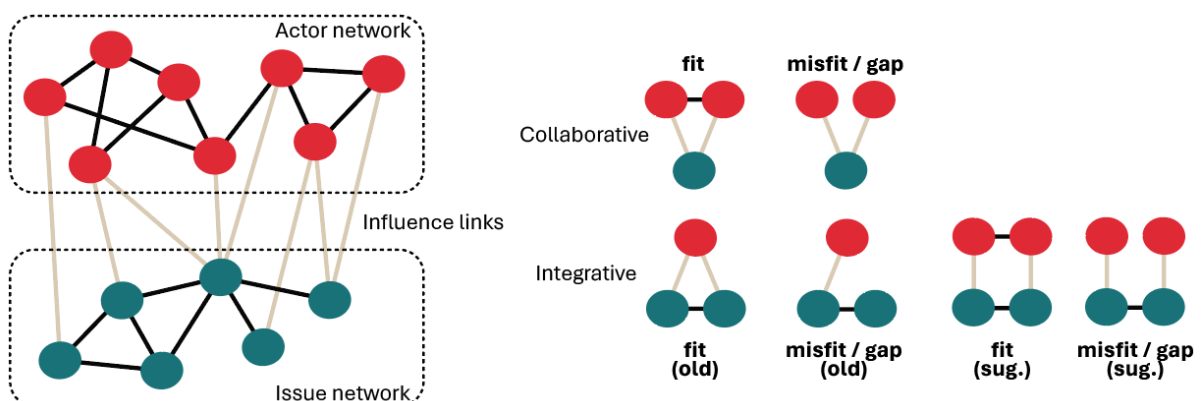


Figure 6: Suggested modification of the governance gap framework, adjusted from *figure 1*

given by interviewees, on the other hand, call for a collaborative connection to be made, because it simply cannot be expected that one actor working on an issue knows all the effects their work may have upon other issues. Following this perception, integrative governance gaps call for a conscientious connecting of actors with complementary expertises. Therefore, this research chooses to follow this suggested perception of integrative governance gaps.

Consequently, the challenge then becomes connecting the right actors with complementary expertises, rather than connecting one actor to multiple issues. This challenge is similar to that of collaborative governance gaps, where actors are connected so as to not work on the same topic in separation. Both require a connection between actors to be made. In both cases, a governance gap now entails a situation where two actors should be connected, but are not. For integrative governance gaps, these are actors with complementary expertise, who could together work on an integrative solution. For collaborative governance gaps, actors are working on the same issue, but doing so in separation, leading to an inefficient situation where resources could be used more effectively through collaboration.

Integrative governance gaps in the original definition were hard for interviewees to operationalise, given the discrepancy between their view on an integrative approach and the general definition; and the complexity of issues and their interdependencies. Hence, the qualitative data derived from these interviews is not satisfactory for an analysis and categorisation of the integrative gaps (in the previous interpretation) within Foodvalley.

Collaborative governance gaps, on the other hand, proved more understandable and yielded clearer results. The perceptions of collaborative governance gaps therefore give the clearest overview of the types of governance gaps that can be identified in Foodvalley. Because collaborative governance gaps and integrative governance gaps (in the suggested interpretation) are of a very similar nature, reasons why collaborations would or would not occur are likely very similar. Thus it is expected that the collaborative governance gaps identified are largely transferable to integrative governance gaps in the suggested interpretation.

#### **4.5 Collaborative governance gaps**

Most interviewees could give their views on collaborative governance gaps and whether or not it applies in the agricultural context. The general experience with collaborative governance gaps is that collaboration has improved over the past decades in the Foodvalley region, so that less work happens in separation. Still, interviewees were often able to mention one or more examples of issues where collaboration falls short. Not all interviewees understand collaborative activity at the organisational level – gaps were also identified at the individual (or personal) level, and between ecosystems. As such, we can identify collaborative governance gaps at three levels: individual, interorganisational, and between ecosystems. Collaborative governance gaps at the three levels can be unintentional or intentional – when collaboration is consciously avoided. A matrix can be drafted of the collaborative governance gaps that were discovered (see *table 6*). The five types of gaps will be discussed in order of level of collaboration.

	Level of collaboration		
	Individual	Inter-organisational	Between ecosystems
Intentional	<ul style="list-style-type: none"> <li>• Personal relations</li> </ul>	<ul style="list-style-type: none"> <li>• Competition</li> <li>• Intellectual property</li> <li>• Risk adversity</li> <li>• Not profitable</li> <li>• No interest</li> </ul>	N.A.
Unintentional	<ul style="list-style-type: none"> <li>• Unknown operations</li> <li>• Personnel change</li> <li>• Contextual conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Unknown operations</li> </ul>	<ul style="list-style-type: none"> <li>• Unknown operations</li> <li>• Distance</li> </ul>

Table 6: governance gap type and cause matrix

At the individual level, collaborative governance gaps arise when persons who work on the same topic do not interact. They may do so intentionally, when personal relations are not supportive of collaboration. In such a situation, the potential value of collaboration is known, but does not weight up to the investment that personal collaboration would take for interviewees (see first quote). Logically, unintentional collaborative governance gaps at the personal level may occur when people are unaware of the other. A particular instance where individual collaboration is unintentionally hindered is when there is a personnel change, because of which interests and motivation of the responsible person within an organisation may change (see second quote). Related to this second point, there are of course many other contextual life changes that could lead to an unintentional end to a promising interpersonal collaboration.

[14] *‘Sometimes I have to conclude that we have the knowledge on the collaborative action that is needed, but we just do not want to [on a personal level]. Could be because I don’t like you, a silly reason like that.*

[8] *‘So that is an obstacle: the choices made within firms. But even at another level: that of persons, egos. If one organisation changes their representative, development may evidently slow down, or speed up. These are things you see and experience. It is partially a people’s business’*

At the organisational level, intentional collaborative governance gaps arise, particularly with regards to market functioning. These gaps are largely identified as a result of including the private sector in interview rounds, as they are an important part of Foodvalley. Competition between firms was the primary reason<sup>[2,7,17]</sup>. A firm might choose to protect its intellectual property<sup>[17]</sup>, particularly when that firm considers itself the top of the field<sup>[18]</sup>. One small firm remarked that it experienced particular troubles in getting in contact with WUR, which proposedly would be inclined more often to collaborate with bigger firms<sup>[12]</sup>. On the other hand, a firm that does not show repeated, ongoing commitment may lose its reputation in the ecosystem<sup>[15]</sup>, making others less inclined to collaborate, which may be part of the explanation for this remark. Collaboration can also be avoided as an expression of risk adversity. Most prominently, a clear sentiment of an unreliable government was posed, which makes it difficult for farmers to trust that an agreement and collaboration over multiple years will be upheld<sup>[3,12]</sup>. According to multiple interviewees, lack of a long-term vision by the government poses a significant financial risk of investments to farmers who could invest in sustainable alternatives.

[17] *'The government is notoriously unreliable. Every four years the administration shifts, so it is very difficult to offer a long-term perspective. They try [...]; but conditions change if the political winds turn. So, as a farmer, what do you do? Join in immediately? Or wait it out, participate a little, see what happens?' [ 'I'd say the latter' ]. 'I'd say so too'.*

Lastly, at the level between ecosystems, one instance of an unintentional collaborative governance gap has also been defined. Foodvalley is not the only agri- and food knowledge cluster in the world. Another one is located in Denmark. The following quote is a good illustration of an international collaborative governance gap.

[8] *'I was in Denmark a few weeks ago. When they explained what they were working on, I concluded those were also the things that are being researched here [in the Foodvalley region]. I'm thinking: talk to each other: 'if you do this, we'll do this', so that together we can get further; which is a testament to the importance of proximity'*

This particular quote calls for more proximity between the two knowledge clusters. 'Proximity', here, captures elements of geographical, social and organisational proximity that we find in the Foodvalley RIES. Denmark was used as an example with a similar institutional and cognitive base, so that, if anything, the Danish configuration is in cognitive and institutional proximity to the Foodvalley RIES. The importance of proximity, said in the context of a conversation about the value of regionality in the Foodvalley region, refers to the importance of bringing clusters, therefore organisations, and therefore people, together and having them interact in the same area.

#### **4.6 Intermediaries in Foodvalley**

This research aims to understand the role of intermediary organisations and their potential to address governance gaps in Foodvalley. Solving collaborative and integrative governance gaps (in the suggested definition) comes down to the connecting actors. In the case of collaborative governance gaps, actors who work on the same issue need to be connected, to avoid double or inefficient work. In the case of integrative governance gaps (in the suggested definition), actors with complementary knowledge or issues of concern are connected – rather than aiming to have one actor incorporate complementary knowledge it may not even have access to. First, a brief overview will be given on the identified intermediary organisations and their roles. Then, an overview will be provided of the functions that were identified for these intermediary organisations through open coding of the interview data.

##### **4.6.1 Intermediaries overview**

In Foodvalley, four main intermediaries were identified based upon interview data. Most intermediaries work together closely. Sharing a building on campus enables for better coordination and (informal) communication<sup>[1,3]</sup>. The intermediary role is diverse and differs for varying organisations. Smaller intermediary organisations exist, but these four were consistently mentioned when discussing intermediary activity.

- The first intermediary (**IM1**) was established by the province – from whom it still receives a large part of its funding. The organisation aims to establish a vision for the future of agri- and food, and identify the most pressing topics in an (inter)national context. It aims to identify why some innovations cannot be scaled up onto the market, and how this might change. Doing so, it speaks to many organisations at different points in the product chain, to oversee

the interests of individual parties. Bringing together these interests, the organisation aims to facilitate a collective action that benefits all parties. IM1 can be considered a first line intermediary, as intermediary activity is its primary focus and reason to be.

[IM1] *‘So creating collaborations, for the most part, is the responsibility [of IM1] in the division of tasks [between intermediary organisations]’*

IM1 is a systemic intermediary (for reference, see *table 2 in 2. Theory*) (Kivimaa et al., 2019, p. 1069). First of all, it was established to this end, and creates space for multiple niches at once. The intermediary formulates its own goals, that it pursues on a system level. Disruption of the existing system through navigating interests in the supply chain is the final goal.

A systemic intermediary is generally understood as a ‘neutral, unbiased facilitator and broker, despite having an interest in stimulating transitions’ (ibid.). The IM1 board is a partial composite of representatives from multiple organisations in the ecosystem, which can be considered symbolic of its aim to understand different perspectives and building a network<sup>[8]</sup>. Most organisations speak neutrally or appreciatively of IM1. The organisation itself explicitly states that it forms its own agenda and is not influenced unfairly by any particular participant. Occasionally, however, smaller organisations in the region feeling overshadowed by the larger ones, that ‘set the course’<sup>[12]</sup>. The effects that this may have on trust is further illustrated by the quote hereunder.

[16] *‘I notice that they have shifted more towards lobbying and political influence than the mere stimulation of innovation. But that is just my perception.’*

- The second intermediary (**IM2**) was established in collaboration between the provincial and the national government. It focuses on the Eastern region in the Netherlands, in particularly the business climate for SMEs. In the context of Foodvalley, it aims to make the region an attractive place for new organisations to settle. It also plays a role in business and trade development, and in financing interesting projects. Many interviewees worked with IM2 at some point in their career, which yields the impression that the actor is central to the Foodvalley network and well-known and appreciated within.

IM2 can be understood as a process intermediary; it was established to fund interesting projects and enhance the economic climate, is an outsider to specific niches and an unbiased networker. IM2 promises to be a ‘soft landing’ service and provides advise to organisations planning to settle in Foodvalley.

- The third intermediary (**IM3**) is a start-up accelerator that was initiated by a collaboration of IM1, IM2, a provincial governance actor and the university. IM3 is highly relevant, not just to startups themselves, but also to those who could provide startups with any particular service they might need in the development phase<sup>[13]</sup> – such as laboratory facilities or an office – or for multinationals who are interested in tracking new developments, and even might eventually be inclined to take over the firm<sup>[8]</sup>.

IM3 can similarly be understood as a process intermediary; it ‘intermediates day-to-day action’ for ‘experimental projects’ (ibid.). It is an outsider to any one specific niche, but chooses to support start-up organisations in their efforts on a wide range of agriculture and food science innovations.



- Fourth, WUR (**IM4**) can be identified as an innovation intermediary of sorts. If one were to configure a network of collaborations in Foodvalley, the university and research organisation would likely be the most central node. With over 7000 employees, one could imagine the sheer number of network links that the sum of all researchers would yield. Being an intermediary is not the primary goal, which would be education and research. Therefore, IM4 is a second-line intermediary. Having said that, the organisation has been instrumental in developing the ecosystem:

[7] *‘The attitude and resulting activities of [IM4] have really contributed to the intensification of the ecosystem, in all kinds of ways. The clearest example of course are the efforts towards building a campus, which has given shape to the ecosystem we now call Foodvalley. The director at that time spent a lot of time and energy in getting the ecosystem up and running’*

Numerous initiatives under IM4, or closely related to it, might be considered separate intermediary organisations. These were sporadically mentioned in interviews. Thus, intermediary activity from IM4 will likely be highly diverse, often informal and organic<sup>[2,3,17]</sup>, but sometimes arranged through programmes or divisions within the organisation.

IM4 can be understood as a regime-based transition intermediary of sorts: the organisation is well-established in the ecosystem, and chooses to fulfil an intermediary role at times, allowing for multiple niches at once (ibid.). The comparability is not perfect, as IM4 does not necessarily aim for ‘incremental solutions or political aims’ exclusively, and is not an ‘outsider to specific niches’ in the sense that parts of the organisation likely do operate at the niche level. As its main goal is not intermediary activity, IM4 will be referred to as a second line intermediary.

Organisation	Intermediary type	1 <sup>st</sup> or 2 <sup>nd</sup> line	Brief description
IM1	Systemic	First	NGO established to formulate a vision and strengthen the Foodvalley region, working towards a sustainable transition in agriculture and food
IM2	Process	First	NGO established to strengthen the business climate in the Foodvalley region (a.o.)
IM3	Process	First	NGO established to accelerate startups in the Foodvalley region
IM4	Regime-based	Second	University and research organisation specialised in agriculture, food and environment.

Table 7: overview of primary intermediaries in Foodvalley

#### 4.6.2 Intermediary functions

Inductively, through coding the interview data, four functions for intermediaries in Foodvalley were established as the major themes within the intermediary role category. This part follows the structure of these four functions and their subfunctions: F1. Directing the transition, F2. Network building, F3. Shared knowledge development, and F4. Resource allocation.

##### F1. Directing the transition

Some intermediaries have a directory role in defining the transition. They are not mere facilitators, helpdesks or meeting hubs. The two most prominent intermediaries in Foodvalley

(IM1 and IM2) get to formulate their own goals<sup>[1,3]</sup>. In both cases, the province monitors if the activities of these organisations yield the impact they are meant to. For IM1, formulating a long-term vision and writing a strategy are activities at the very core of their organisation; evidently, given the fact that it has clearly stated its ambitions in three missions that it will aim to facilitate innovation in. The aim then is to align different participant goals with those of IM1.

## F2. Network building

The most-heard element of the operations of intermediary organisations is overwhelmingly that of network building. All intermediary actors pronounce a clear willingness of connecting any two parties<sup>[1,3,5,10,15]</sup>. It is evident that it is important to understand the different positions of stakeholders and their interests<sup>[1,3]</sup>. IM1 was established because there was a need for more collaboration between organisations in Foodvalley (see first quote). Some interviewees do not feel included or facilitated in finding collaborations<sup>[2,12,13,14]</sup>. Generally, these organisations do not show a proactive attitude towards the intermediaries either.

IM1 aims to solve large challenges by bringing together parties and organising communities, which are set groups of organisations that meet-up regularly for a longer period of time (see second quote). Formulating a problem and a vision is an important step in community forming, as a common mission is required to understand and trust the intentions of others. In such a community, once established, actors are more likely to trust each other; at this point in time, they have known each other for years<sup>[8]</sup>. The intermediary can utilise the collective influence of the group to affect change<sup>[11]</sup>. In agriculture specifically, if an intermediary organisation can align many individual farms, the project may reach significantly more impact; particularly if a front-runner can demonstrate the results of the initiative<sup>[8]</sup>. This is more easily achieved regionally, where people meet in their day-to-day practises<sup>[8]</sup>.

[8] *‘All the firms, institutions and organisation were largely present – there was a university, there were financing options, there were SMEs; but collaboration was suboptimal. Every actor was chasing their own needs’*

[IM1] *‘How can you connect supply and demand, and proof to the market that a certain innovation is a viable business option. That is our primary concern, and we work with many organisations to find the answer. We aim for solutions where the answer lies in collaboration to solve the collective problem’*

No problem that agriculture is facing can be brought down to merely farming operations<sup>[3]</sup>. In network building, intermediaries need to take into account actors all over the supply chain.

[IM1] *‘The solution almost always lies in the supply chain. The farmer is willing, but the chain will need to pay for the efforts, or take more risks. Transitions happen when the rest of the chain starts to move. That is the danger of focussing on the agricultural side too much; all operations happen across the chain’*

Lastly, with regards to network building, intermediaries play a central role in attracting new actors. Their very existence is already of value in representing the region and maintaining and marketing its reputation as the best place for an agri- or food organisation to settle<sup>[8,13,16]</sup>. These may be incumbent actors, but also start-up firms looking for a region to develop through start-up accelerators.

### F3. Shared knowledge development

Knowledge is central to the perception of Foodvalley. Most prominently, logically, intermediary organisations play a role in knowledge developments through their initiated research projects or collaborations<sup>[3,5,8,15,16]</sup>. Second, business actors specifically see a role for intermediaries in staying up-to-date with current developments in which they may not be partaking<sup>[2,6,17]</sup>. They seek a platform for knowledge sharing, and doing so through thematic meet-up events is mostly proposed as a good way of doings so<sup>[2,9,17]</sup>. An intermediary may connect interested, international organisations to the relevant actors in Foodvalley; a port of entry, if you will, providing explanations about the region, its developments and its actors<sup>[16]</sup>. Interestingly, IM1 explicitly does not organise large scale networking meet-ups, as there are many already and it does not feel like their organising would make a significant impact. Third, a knowledge-centred organisation like IM4 can make immediate impact by sharing what it deems interesting or urgent<sup>[3,5,10]</sup>; it may do so through informal ties of its employees to other ecosystem actors<sup>[3]</sup>, but also more formally through its corporate value division. Shared knowledge development is particularly relevant for integrative governance gaps, as these situations require a multidisciplinary, knowledge (recombination) based approach.

### F4. Resource allocation

Some resources, necessary for innovation, are impossible for individual organisations to realise. First and foremost, for most businesses, considerations for a project stop as soon as there is no business interest or subsidisation<sup>[2,3,13]</sup>. IM2 plays a prominent role in funding innovative projects in the region, and is broadly recognised in that role<sup>[2,6,8,16]</sup>. The shared research facilities that were mentioned earlier as one of the unique selling points of the Foodvalley region were set up by the national and provincial government, IM1, and IM4<sup>[8]</sup>. More types of research facility sharing do occur; some firms offer up their equipment if they no longer need it<sup>[8]</sup>, or trade facility use for the data of the respective research<sup>[15]</sup>. This function is particularly relevant in a situation of collaborative governance gaps, where actors may see risks in investment and fear losing competitive advantage. Lastly, resource allocation is relevant in attracting and facilitating start-ups.

Function	Sub-function
F1	- Formulate a long term vision for the sector
Directing the transition	- Formulate common problems and missions
	- Integrate potential participant goals
	- Attract new actors through representation of the region
F2	- Connect actors with complementary knowledge
Network building	- Organise communities
	- Organise collective action initiatives
	- Incorporate the full supply chain
	- Attract new actors through representation of the region
F3	- Initiate research projects or collaborations
Shared knowledge creation	- Encourage knowledge sharing
	- Provide updates on developments in the sector
	- Share findings of own research and operations
F4	- Funding
Resource allocation	- Shared research facilities

Table 8: overview of intermediary functions identified in interviews

## 5. Discussion

A transition in the agricultural sector is urgent. This research employs the governance gaps approach to understand how innovation intermediaries in an agricultural RIES may encourage collaboration towards a more efficient, effective, potentially integrative and sustainable outcome in the sector. In the discussion chapter, the implications that the results yield for theory and practice will first be discussed. To understand the value of the research, it is equally important to understand its limitations – an extensive overview of which will be provided in this chapter. The challenges set out in the introduction are not solved by this research alone. If anything, it has exposed a need for further research into this particular conceptual combination of RIES and innovation intermediary theory and the governance gaps approach. Therefore, this chapter ends with some notes on implications for future research.

### 5.1 Theoretical implications

The research started with the notion that RIES literature falls short in understanding the structure and dynamics of the ecosystem. The central assumption is that regional collaboration can trigger co-innovation and ultimately transformation – but the RIES approach fails to identify which particular collaborations may be promising and how so. To that end, this research took the Foodvalley case and analysed it at the level of participants of the ecosystem. The Foodvalley case can be understood both as a unique case, it being the major agricultural RIES in the Netherlands and world-famous for its endeavours, and an exemplifying case (Bryman, 2016, p. 62), in terms of its typical RIES characteristics such as geographical proximity (Lau & Lo, 2015, p. 100), knowledge spillover (Russell et al., 2015, p. 5), and evidently regional specialisation through a ‘local concentration of resources and competences’ (Foray, 2014, pp. 492, 497). Findings are not generalisable over RIESs, in the sense that the socio-economic, cultural, political, temporal, and geographical dimensions (to name a few) will likely differ from other RIES configurations. Also, the agricultural sector is unlike any other, so other RIESs should be understood in the light of their respective sector. The theoretical implications of this particular case pose an addition to governance gap literature in the context of RIES. They illustrate one possible configuration of RIES structure and dynamics, and a potential role for innovation intermediaries therein.

In particular, the goal was set out to identify governance gaps in Foodvalley and understand the potential role for intermediaries in addressing and solving these. First, the findings add to the understanding of the governance gaps framework and its applicability in other settings. Second, these findings yield particular consequences for the understanding of the intermediary role. These implications will be discussed here in that order.

#### 5.1.1 Implications for the governance gap approach in a RIES context

The case of the agricultural Foodvalley RIES is very different from other contexts in which the governance gap approach was applied. This posed two consequences for the way in which the method could be applied in this research. First, interaction in the RIES builds upon personal networks. The reinforcing loop of *figure 5* is exemplary in that regard; people study in the region, they stick around, as do their acquaintances – before you know it, an informal network arises, different for each person within any firm. Based on the qualitative findings, we may further assume that in the case of the RIES, this divide is extra prominent as regional proximity enhances the chances of getting to know others. Trust, an indicator of social proximity, is more easily initiated at the regional level; in line with the literature, it stands at the basis, and is the result of, successful collaborations between individuals in the RIES (Balland et al., 2015, p.

913). Thus, in line with Cassi & Plunket (2014, p. 950), regional proximity is an initiator of social proximity, that becomes more important in the long term. These findings also imply that the organisational level is insufficient to capture the full extend of RIES activity. There is a need for more understanding of the informal, individual dimension of collaboration in the RIES.

Within a the RIES setting, where issues are highly interconnected and complex, actors encourage collaboration when aiming for an integrative approach. Integration is seen more often as a coming together of different actors with their own expertises, together working towards a solution, than the original definition of integration within one actor. The latter is infeasible for the complex field of agricultural development. One can wonder whether issues in a RIES are not too interconnected, to the point that integration would imply incorporating every other issue – in which case the quantitative network approach would lose much of its value in identifying particular integrative governance gaps.

Upon reflection, the Foodvalley case – perhaps the RIES in general – proves a difficult subject of research when employing the governance gaps approach, especially if one were to quantify the networks as Bergsten et al. (2019) have successfully for sustainable development issues in Ethiopia. One can wonder whether the informal, personal networks in the RIES are not too large and complex to realistically quantify. Similarly, biological systems are complex and interdependent by their nature; with regards to applicability, a lot will depend upon the possibility to connect and separate issues. The identification of particular issue- and actor-specific governance gaps may require issues to be more distinct than they were in the agricultural RIES. Perhaps, this takes a sector where issues are more diversified and less interconnected.

### 5.1.2 Implications for intermediary theory

The results section establishes that many transition intermediaries, first- and second-line, exist with the regional ecosystem, each fulfilling a specific responsibility, so that no two intermediaries are the same. The indexation by Kivimaa et al. (2019, p.1069, table 1) proved useful, but in the case of IM4, the university and research organisation, unsatisfactory. It was eventually categorised as a regime-based transition intermediary, the definition of which is that they are likely to ‘pursue given (sustainability) goals through typically more incremental solutions and political aims’. Generally, intermediation from IM4 served a less clear-cut goal, and to say it is incremental change, rather than disruption oriented, feels awkward. Also, the university (or parts of it) work at the system and the niche level, so that no distinction can truthfully be made there. The authors are clear that the typology represent common, average modes, and may change from intermediary to intermediary. However, given that universities often play a central, second-line intermediary role within RIESs, it could be worthwhile investigating options of splitting the regime-based transition category in two, in which one refers to the current definition (for example: ‘incumbent regime-based transition intermediary’) and the other refers to knowledge institutions who may take on a second-line intermediary role at times (e.g.: ‘scientific regime-based transition intermediary’).

Four intermediary roles were identified inductively from interview data: F1. Directing the transition, F2. Network building, F3. Shared knowledge development and F4. Resource allocation. Comparing these four to the functions of innovation intermediaries by Hannon et al. (2014): ‘network building’ and ‘innovation process management’ were incorporated in F2. ‘Knowledge brokering’ and ‘demand articulation’ (partially) fit in F3, insofar as all entail analysing the available knowledge gaps therein, and potential for knowledge sharing. ‘Capacity building’

could have been identified as a separate function through interview data, retrospectively, but was incorporated in the four defined functions – as capacity building for start-ups was a specific goal of one intermediary and entails knowledge development, network building and resource allocation, thus seemingly fitting multiple functions already. ‘Institutional support’ through ‘advocacy, regulation change, and attitudes/practices change’ was not identified as such, but perhaps a logical explanation for this can be found in the fact that many of the intermediary activity is initiated by the national and provincial government, so that transition intermediaries in Foodvalley naturally work together closely with policy makers. Also, transition intermediaries in Foodvalley carry out a message towards more sustainable alternatives in agriculture and food, but advocacy as such has not been emphasised in the interviews.

Most noticeably, however, F1 does not seem represented in the intermediary function overview by Hannon et al. (2014) to the degree that it is prominent in Foodvalley. Although their ‘demand articulation’ does have the components ‘visioning’ and ‘strategic planning’, the proposed ‘directing the transition’ terminology may be more appropriate to capture the extent to which intermediaries in Foodvalley set out and direct towards a sustainable scenario for the long-term future. After all, articulating a demand does not necessarily imply that intermediaries are taking a highly proactive role in achieving this demand. In cooperation with the national and provincial government, some intermediaries in Foodvalley really are ‘directors’ or leaders at times – IM1 most prominently with regards to the urgent sustainable transition in general, but also IM2 from a business climate perspective, and IM4 from an academic point of view.

Apart from the identification of intermediary functions in Foodvalley, the primary novelty of this thesis lies in the connection to governance gap thinking. Following the suggested integrative governance gap definition, the key to solving governance gaps is always to connect the appropriate actors. In the case of **collaborative governance gaps**, that boils down to making sure that no work is done in separation, when more could be achieved in combining efforts. This could be done by intermediary organisations operating both at the systemic or the niche level. This requires effective network building, shared knowledge development and resource allocation (F2, F3 & F4). Those at the systemic level may have more oversight of efforts in the region, but those at the niche level may know more specifically which organisations are working on the same issues. For **integrative governance gaps** (in the suggested definition), it is about bringing together those actors with complementary insights. The usual suspects here are clearly the intermediaries operating at the system level, as they will be better equipped to connect a more diverse set of actors. In addition to the other three functions, identifying integrative governance gaps clearly asks for transition directing. The transition intermediary has to understand where integration is required, what perspectives should be included and to what end.

Evidently, the governance gap approach can provide intermediary theory with a categorisation of lacking collaborations that may require different types of intermediary actor. Such a framework allows for more understanding of inner-RIES dynamics at the level of individual actors and collaboration between them.

## 5.2 Practical implications and societal relevance

A sustainable transition in the agricultural sector is urgent. Dutch policy in the past years has aimed to facilitate regional collaboration platforms to that end. As such, it only makes sense to briefly explore the implications of the results for policy makers and intermediary organisations in a RIES setting. Generally, three main practical findings are proposed for policy makers and transition intermediaries to take into account. First, the way in which collaboration is

operationalised – between persons or between organisations – matters. Second, integrative solutions are likely discovered through bringing together experts in the agricultural field. The issues it faces are so interdependent and complex that actors are unlikely to achieve this integrative understanding by themselves. Lastly, the role of the university is essential in shaping a RIES. It is only sensible to move universities to the forefront of RIES development.

#### 1) Consider the collaboration scope

This research strongly indicated that collaboration happens at all levels. As such, it is probably worthwhile reconsidering the scope of collaboration, and rethink the effects that this scope has on the consequential – intermediary – policy. Connecting organisations formally requires a vastly different setting than connecting any two individuals might – even if only because individuals speak more freely at events if they do not feel like representatives of their organisations. Thus, first, it could be worthwhile exploring collaboration opportunities more from the personal point of view through knowledge meetings, instead of always operating at an organisational level. Second, intermediary policy can explore options to invest in the personal connections, or social proximity, that occurs within their participant pool. If people are more connected at the personal level, collaboration is more likely to occur through willingness and trust. Geographical proximity can be used to the intermediaries advantage. Right now, social proximity is generally the result of years of collaboration; it could be worthwhile to explore options to connect individuals personally at an earlier stage of community forming.

#### 2) Connecting experts towards integrative policy

The agricultural transition is too complex for any – at least most – individuals to fully grasp. Therefore, integration efforts are likely more successful if experts in a number of disciplines work together. Additionally, asking any organisation to rethink its operations in terms of its many diverging side-effects is infeasible. As it cannot be expected that actors are able to change their operations based upon many different interdependent issues, an initiative is likely more successful if it is designed from the ground up from an integrative perspective. Policy aimed at one particular issue may cause undesired side-effects and tunnel vision, which lead to short term thinking and investments that solve one issue and cause another. Ideally, policy integrates the interdependencies of issues in agriculture from the get-go by connecting actors and their expertises. Intermediary organisations are especially interesting to include in this process, because of their large network and community-building capacities.

#### 3) The university is essential

The role of the university is absolutely vital in attracting new businesses. It is the engine behind talent creation and often the reason why individuals first set foot in the region. This particular university was one of the primary drivers of ecosystem development in the first place. Consequentially, the thematic focus of the university is well aligned with the thematic focus of the RIES. Policy aiming for RIES development might consider initially supporting the university in developing an environment to which ecosystem actors may be attracted (e.g. start-up programmes, research facilities, regional funding options). The university campus is a perfect location for the (centre of) the RIES to develop. It is unlikely that Foodvalley would have developed into the same ecosystem without WUR. Consequentially, any other (specialised) universities might inhibit this same potential.

### 5.3 Limitations

The limitations of this research are somewhat extensive due to its mixed-methods nature. As was discussed in the methods section, the mixed methods approach is aimed at increasing overall understanding of the theoretical phenomena through complementary insights from quantitative and qualitative data. Opponents of mixed methods research may argue that that is short-sighted. Two such arguments are the 1) embedded methods argument, and the 2) paradigm argument (Bryman, 2016, p. 636). In short, both arguments come down to the assumption that every method carries inherent ‘epistemological and ontological commitments’ (ibid.). At first glance, an epistemological divide may have existed between the two phases: the first presupposes that the RIES can be identified in terms of data, the latter in terms of the interpretations of those who participate in it. Ontologically, the same world view and theoretical phenomena were upheld in the two phases. The assumption of the embedded methods argument is that of full commitment to one or the other epistemological orientation, but there is no need for such rigidity. In this research, findings of phase II build on phase I, all the while acknowledging that they are, purposefully, different and should be interpreted as such. Limitations to both the quantitative and qualitative part will be discussed below, followed by limitations of the data collection as such.

A second noteworthy element to the research design is the single case. The implications following from this one case have been highlighted in *5.1 Theoretical implications*, but it makes sense to briefly also discuss the multiple case alternative - which would have been infeasible for this research project, all else staying the same. The value of a multiple case study could have been extensive, as patterns between cases might be distinguished. In Foodvalley, every intermediary organisation has found a role that fit in the current configuration. From this one case, however, it is uncertain to what degree path dependency might have played a role in the development of the RIES configuration and dynamics. Also, as is often the goal of multiple case research, multiple cases would have contributed to ‘theory building [...] and establishing the circumstances in which a theory will or will not hold’ (Bryman, 2016, p. 67).

#### 5.3.1 Quantitative limitations

The quantitative elements of this research were: publication co-authorship-, public-private partnership- and publication keyword-data. This data is largely traceable, and overviews have been presented in the methodology section. Importantly, no conclusions as such were derived from the quantitative component, but rather it served as an exploration and supplementary foundation to the qualitative phase II. Limitations of the keyword analysis can be found in *Appendix I: Formulating an agricultural topic list*.

- **Sampling.** Queries have been carefully drafted, registered and described in the methods section, but could well be debated. The question to ask is whether the agricultural category (be it in terms of SciVoc or Scopus SDG2) covers the true extent of innovation in agriculture. However, all data sources are well-known, reliable and comprehensible data registers. All data types are well known indicators of innovative collaboration. As such, within the scope of this research, it suffices for the quantitative data to be indicative, rather than to necessarily be a complete representation of all agricultural innovation – which would likely be infeasible.

- **Visualisation.** The way in which networks are visualised can vary, and the researcher is charged with a responsibility to make sure the networks provide the fairest visualisation. The overwhelming role of WUR in the networks of *figures 3 and 4* proved particularly challenging, as the outlier value made differences at lower node levels barely visible. To that end, a non-linear



scale for degree size was employed. Logically, not all nodes could generally be included, so that filtering through node degrees was required.

- **Analysis.** The findings from the network analysis were relatively straightforward, and did not yield major conclusions, apart from the central role for WUR. However, the many subdivisions of WUR were generalised, so that an understanding of the collaborations within WUR was difficult. This problem does not just exist between divisions, but also between the two organisations Wageningen University and Wageningen Research – that together form WUR. As one of the main findings of the qualitative results was that it is inappropriate to understand WUR as one organisation, it would have been insightful retrospectively to also include WUR subdivisions into analysis – but not realistic in the given timeframe.

### 5.3.2 Qualitative limitations

The document analysis and interview round were the two qualitative components of this research. Limitations of the document analysis can be found in *Appendix I: Formulating an agricultural topic list*. Consequently, this part particularly concerns the interviews.

- **Sampling.** Interviewee sampling was rather opportunistic. Within the sample group, plenty of variety – governmental, private, NGO, university; regional & national – exists between interviewee organisations. The main problem with the interview sample lies in actors that were not interested in participation. The sample is representative in the sense that all actors deal with the RIES one way or the other; but not all roles within the RIES have been represented in the research outcome. Large multinationals and agricultural representative organisations proved difficult to reach and mostly unwilling to participate. In the case of multinationals, some interviewees collaborated closely and were able to express the position of these firms when they settled in Foodvalley. Even though this is not a direct way, and is prone to interpretation bias of the interviewee, this still provided some insights into the public position that these multinationals took when choosing Foodvalley as their base of innovative operations. It is unfortunate that farmer representative organisations did not respond, as their role in the RIES is connecting those working in agriculture with the innovative region. As such, they might have been able to provide more insights into the position of farmers, the issues those working on the ground are facing, and the circumstances under which they would be open to collaborate and co-innovate. This deficit is partially absorbed by the document analysis, where the perspectives for farmers were often central to the discussion. Still, the role of farmer representatives in Foodvalley cannot be included and interpreted but in general terms and indirectly through interviews with intermediaries, potentially subjective to their own role.

Secondly, with regards to sampling, it quickly became clear that upholding a strict agricultural boundary in Foodvalley would be difficult. Most actors are concerned with food and agricultural science. As such, with the sample size in mind, this research has been lenient in the degree to which actors concern themselves with the agricultural sector in the narrow sense. In retrospect, the agricultural focus may have been problematic from the start, as Foodvalley is not just an agricultural RIES, but rather an agri-food region– what's in a name.

- **Data collection.** The interview rounds were very informative, but some caveats should be addressed. As the topics – governance gaps and the regional innovation ecosystem Foodvalley – are rather complex, the choice was made to address the topics and ask interviewees about their experiences. This is inherently suggestive and prone to social desirability bias – when the interviewer evidently travels an hour to speak to an interviewee, they want to give them

something useful. All in all, the estimation is made, based upon interview data, that interviewees were comfortable enough to admit when they did not encounter a phenomenon or thought it would not be applicable to the Foodvalley case.

Second, about a third of the interviews was spent discussing the topic list, which would not get to be as important as was initially planned. Hence, in retrospect, the interviews should have been redirected earlier on in the process, as more insightful questions could have been proposed.

Third, although attempting to minimise its effects, there is of course interviewer bias – the interviewer, subconsciously, is looking for interesting findings. The semi-structured setup made that a protocol was there to be followed, but allowed for follow-up questions. This leaves room for an extensive questioning without losing track of the protocol, thus mitigating, but not solving interviewer bias.

- **Data analysis.** First and foremost, coding is a subjective process. It helped to categorise answers to the different parts of the results – so as to not arrive at one incoherent list of topics, but rather have a more identifiable topic range per interview section. The downside of open coding within these sections is that codes can exist in multiple sections, which poses challenges of its own and requires an attentive and structured approach.

Coding can also cause a lack of context, which can lead to a misinformed interpretation. However, because the data existed of ‘just’ 18 interviews, that the researcher had taken part in, then transcribed, and was then coding (during which one reads the interview another number of times), a good understanding of the different conversations was established, so that the researcher knew the context of a quote and could not interpret it in isolation.

An evident limitation is that there was no coding reliability measure in place; that is to say, no combining interpretations reiteratively. Although inter-coder reliability poses challenges of its own, having all interviews interpreted by the one researcher is a weakness, as it increases the likelihood of confirmation bias with regards to the specific research, and more broadly interpretative and cultural biases in interpreting information.

### 5.3.3 Reflexivity

Specific methodological limitations have been mentioned above, but on a more general level, it is sensible to note that the researcher has his own ‘cultural, political and social context’ (Bryman, 2016, p. 388). That context will have impacted the findings of this research. First of all, the innovation sciences programme often emphasises the importance of collaboration for innovation – it has proven difficult, counterintuitive to say the least, to let go of this presupposition in this research when interviewees denied such importance. Secondly, the agricultural sector is undergoing an intense debate regarding the issues at stake, and the researcher has his own political views in this regards too. Third, as a student, the researcher has presuppositions on the role of universities and researchers, and a deeper understanding for one actor that is not there for others.

A first step in addressing this contextual bias is keeping proper registry of the research steps, to continually provide reasoning throughout the research. This makes the quantitative part of this research highly traceable. Second, when interviewees challenge the current conception, asking for further elaboration helps to understand how other points of view may exist. Semi-structured interviews also allow for cross-checking whether the researchers interpretation in the moment is correct. The main limitation of this research, in terms of researcher bias mitigation, lies in all steps after data collection. Particularly, it would have been better to include multiple actors in

the coding rounds, and in deriving conclusions out of the interview data. Within this particular research, that was not feasible, which can only be understood as a serious limitation.

#### 5.3.4 Implications of limitations

All in all, plenty of limitations exist for this research, and it should indeed be seen in the light of these limitations. However, that does not yield the full investigation worthless, quite the opposite. Any method comes with caveats, and any researcher with biases. Having outlined these here, the research can well contribute to the understanding of inner-RIES dynamics, in particular the role for transition intermediaries in addressing governance gaps. It is by no means a definitive answer, but rather an exploration. More work is needed, some of which will be outlined below.

### 5.4 Implications for future research

Logically, generalisability may be increased through work into other RIESs (both in and out of the Netherlands, both agricultural and otherwise), so as to distinguish commonalities in RIES structure and dynamics. However, at a more theoretical level, this research has exposed three more fundamental avenues for future research.

#### 1) Quantifying governance gaps in the RIES

First of all, this research attempted a quantification of governance gaps through establishing an actor network, issue network, and actor-issue linkages. This plan was reevaluated after it turned out that an issue network would be likely be uninformative. Ideally, issues are more distant and diversified, so that the network is not one large cluster. To this end, biological systems are likely too interconnected. That said, other sectors may be more modular in terms of their operations, so that clusters in issues can naturally occur in between supply chain links or technological compartments, for example. Another option would have been to include directionality in the issue network, so that issues can also be distinguished based upon the direction of their effects. Lastly, an issue network drafted based upon keyword co-occurrence may suffice if scientific collaboration is specifically what is being researched, as the network will logically be the shared result of the interconnections that publishing researchers identify. Once the scope of actors moves towards a sector, however, it is not a given that the interconnections hold for other actors, perhaps particularly those with on the ground, practical experience.

The actor network and actor-issue linkages require an unrealistic administrative burden in the scope of this project. That is not to say that it is not relevant to try and quantify collaboration in the RIES. The informal collaboration networks of individuals are important to understand how connections truly arise in the RIES. It is interesting to understand how the RIES operates in numbers, as patterns may be exposed that go unnoticed in personal experiences. Such an approach would likely require more manpower or a smaller, more comprehensible RIES. Of course, collaborations can also be understood as connections between organisations, but that quickly becomes problematic for a number of reasons, to be highlighted in the next part.

#### 2) The collaboration scope

It has been reiterated that the level of analysis taken for collaboration in the RIES is of the essence, particularly in the case of large organisations such as universities or multinationals. Thousands of employees interact in the RIES, each with their own specific network based on previous professional collaborations, a shared history or any other common denominator. Really, these organisations cannot truthfully be understood as one actor in the ecosystem, but should be understood as a multitude of entities interacting.

This is best illustrated by the case of WUR, which consists of a multitude of research groups. One research group might interact with some others, but never with all others – that'd be impossible. In line with multilevel research by Vacchiano et al. (2022), research groups may benefit from status and prestige in attracting individuals. Large research groups yield more indirect connections than small ones, and are shown to yield more success to individual researchers (ibid.). It is in the nature of scientific development that different opinions may oppose, and WUR is no exception. It is possible, if not likely, that people with opposing views – because of a different scientific background, for example – work in separation. Collaborative governance gaps may well exist within the organisation.

Thus, one way to uphold the organisational level while incorporating this nuance would be to look at divisions within the organisation; another would be to investigate personal networks in the RIES. Finally, it is also possible to incorporate the level of the organisation by speaking to multiple actors within one organisation until saturation is reached, if the size and cooperative activity of the organisation allows for it.

### 3) Development over time

This research really has not tapped into RIES development as such. An understanding of the development of the RIES could help chart inner-RIES dynamics and their development over time. Interviewees often mentioned that Foodvalley now is different from Foodvalley ten years ago. It is not unlikely that intermediaries have different roles in different stages of RIES development. An understanding of RIES dynamics in an established RIES requires an understanding of how it became so. A longitudinal research design could be instrumental in exposing phases of RIES development and interactions within.

## 5. Conclusion

The central question in this research has been: *what are the collaborative and integrative gaps for issues faced by the agricultural sector within the Foodvalley RIES, and what role is there for transition intermediaries to overcome them?* In short, to this end, a mixed-methods approach was employed of quantitative network indicators, document analysis and an interview round.

Qualitative data did not support the initial conceptualisation of the integrative governance gap. The concept was revised, in line with interview data. First, it implied for one actor to concern themselves with the issues that are interdependent to the issue it was already working on. Within the agricultural RIES, however, issues are so complex and interrelated, that this was understood as an infeasible assignment. Therefore, a new concept of an integrative approach was proposed, where integrative fit refers to a situation where multiple actors, each with their own expertise, work together to move towards an integrative solution. Because this configuration is very similar to that of collaborative governance gaps, the more complete findings regarding the latter are used for the identification of governance gaps in Foodvalley. Collaborative and integrative (in the suggested interpretation) governance gaps were recognised in the Foodvalley RIES. They may be intentional or unintentional, and occur at the individual, organisational and ecosystem level. In the latter case, only a collaborative governance gap was identified. **Intentional individual** governance gaps are the result of poor personal relations. **Unintentional individual** governance gaps can occur because individuals do not know each other, because organisations shift personnel around, or because of contextual conditions in one or the others life. **Intentional organisational** governance gaps occur when collaboration threatens competitive performance, intellectual property, carries an inherent risk, is not profitable, or is simply deemed uninteresting from an organisational point of view. **Unintentional organisational** governance gaps occur when organisations may not know of each other's operations, which may be an indirect result of intellectual property protection efforts. **Unintentional** governance gaps **between ecosystems** can occur because ecosystems do not sufficiently communicate on their co-innovation efforts; the distance between these ecosystems (in the Netherlands and Danmark, in this case) was identified as the reason for lacking communication.

Multiple intermediary organisations were identified, each with their own distinct role in the ecosystem. Most prominently, IM1 as a systemic intermediary, IM2 and IM3 as process intermediaries and IM4 in an occasional second-line regime-based transition intermediary role. Four functions were identified from interview data inductively: F1. Directing the transition, F2. Network building, F3. Shared knowledge development, and F4. Resource allocation.

Collaborative governance gaps require effective network building and resource allocation towards shared knowledge development (F2, F3 and F4). Generally, the intermediary organisation aiming to solve these gaps needs to be aware of the innovation efforts of individuals organisations in the region, to understand where work may overlap. Intermediaries at the system level and at the niche level both play a role in this regard: those at the system level (systemic or regime-based transition intermediaries) have a broad understanding of the operations of many actors, but those in the niche level (niche intermediaries) better understand the specific issue and will likely be more aware of organisations working on similar issues. Process intermediaries can play a role in facilitating collaboration on a day-to-day basis, which is not always necessary, logically dependent upon the number of collaborators and their interconnectedness. For collaborative governance gaps between ecosystems, there is a

representative role for systemic and regime-based intermediaries to represent the region and extend the network (F2) towards shared knowledge development (F3) between ecosystems.

Integrative governance gaps (in the suggested interpretation) are recognised, and require individuals and organisations of diverse expertises collaborating to transition to integrated solutions. All four intermediary functions are relevant in this regard, but with an emphasis on directing the transition (F1). Successfully addressing integrative governance gaps requires a sound understanding of the different issues that the agricultural sector is facing. With this understanding, organisations can formulate and direct towards a vision for the transition (F1), by building a network where actors of different expertises meet (F2), to enable integrative collaborations, in terms of a shared knowledge network and resources (F3 and F4), towards integrative solutions. Systemic intermediaries and regime-based transition intermediaries are likely the most relevant, as their goal is always system change. The first aims for disruption, the latter for incremental solutions; both valid ways to aim for system transition that will require an integrative understanding of the issues faced by the agricultural sector. Niche intermediaries may be useful if a niche innovation is an integrative solution, or else to represent actors knowledgeable on one particular issue. Similar to collaborative governance gaps, process intermediaries may be useful to guide the process of collaboration and to make sure that the operational side runs smoothly. Lastly, user intermediaries might be particularly relevant in agriculture to represent the user-side in getting towards an integrative solution – as farming is a complicated profession that requires a lot of practical experience, but farms are often too small to partake in such projects themselves.

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Lastly, thank you to **all interviewees in Foodvalley**. I quite literally could not have done this research without your input. I hope this final thesis is as relevant to you as your input was to me. Thanks.



About half of the clusters were specifically on animal farming, and will be discussed subsequently (see *figure 8.1*). First, the clusters with more direct implications towards issues faced by the agricultural sector will be discussed. These are the dark green, light green, purple, dark purple, light blue, pink and yellow clusters.

- The *light green* cluster is particularly relevant with regards to issue discovery. ‘Systems’ is central, connected to ‘management’, ‘agricultural innovation’, ‘co-innovation’ and ‘knowledge. Climate change and the environment also form a large part of cluster, with terms such as ‘soil fertility (management)’, ‘conservation agriculture’, ‘sustainable intensification’, ‘climate change’, ‘food security’. There is also particular attention for ‘smallholder farmers’ and ‘sub-Saharan Africa’.
- The *dark green* cluster is less structured, but the connection between ‘sustainability’ and ‘governance – policy’, ‘nitrogen’ and ‘environmental impacts’ is relevant nonetheless.
- The *purple* cluster is less clear-cut, but contains some central nodes that also came back as issues in the document analysis, such as ‘land-use’, ‘ecological intensification’, ‘ecosystem services’. The business dimension is also present in this cluster, with terms such as ‘willingness-to-pay’ and ‘perspectives [for farmers]’.
- The *yellow* cluster is central to the full network and deals with emissions (NO, GHG, CH<sub>4</sub>). Emissions are also a prominent appearance in the document analysis network. Other issues mentioned are ‘management practises’, ‘(use) efficiency’, and ‘life-cycle assessment’.
- The *light blue* cluster is also very central to the network, and contains several large issues. ‘Land-use change’, ‘manure [treatment]’, ‘(ammonia) emissions’, ‘livestock buildings’, ‘biodiversity’, ‘farming systems’ and ‘soil organic carbon’. This cluster can be interpreted as focusing on farming systems, and the effects of crop production and livestock farming to the soil and air.
- The *pink* cluster deals with the data-driven side of agricultural innovation, with the ‘agriculture node’ connected to ‘big data’, ‘information’, ‘regression’ and ‘adoption’, and indirectly to ‘precision agriculture’, ‘prediction’.

The following clusters are largely livestock-farming centred (see *figure 8.2*). They are not as issue dense as the prior networks, but contain some issues, particularly those faced by the livestock sector.

- The *dark blue* cluster is largely about dairy-cow farming, with terms such as ‘dairy-cows’, ‘body condition score’, ‘dairy cattle’, ‘milk yield’ and ‘heat stress’; the latter of which is really the only direct term that falls within the issue definition.
- Likewise, the *orange-red* cluster is a mix of animal breeding terminologies primarily, with important terms like ‘selection’, ‘genetic parameters’, ‘eggshell temperature’ and ‘breeding values’. No direct issues are found here apart from maybe ‘conservation’, in between ‘cattle’, ‘selection’ and ‘participation’, which could refer to some sort of animal or environmental conservation, or conservation agriculture (light green cluster).
- The *dark purple* cluster, too, is primarily centred around animal farming, with most central terms like ‘amino-acid digestibility’, ‘growth-performance’, ‘growing pigs’ and ‘growth’. Clearly, animal illness and animal wellbeing are represented in this cluster, albeit indirectly or specifically, through terms like ‘foot-pad dermatitis’ or ‘leg weakness’. Animal food is also represented here, through terms like ‘dietary fibre’, ‘distillers dried grains’, ‘amino-acids’ and ‘digestibility’.
- The *orange* cluster is largely about animal farming, poultry specifically (‘laying hens’, ‘chick quality’). ‘Animal welfare’, ‘housing systems’ and ‘environmental enrichment’ stand out as issues within this cluster.

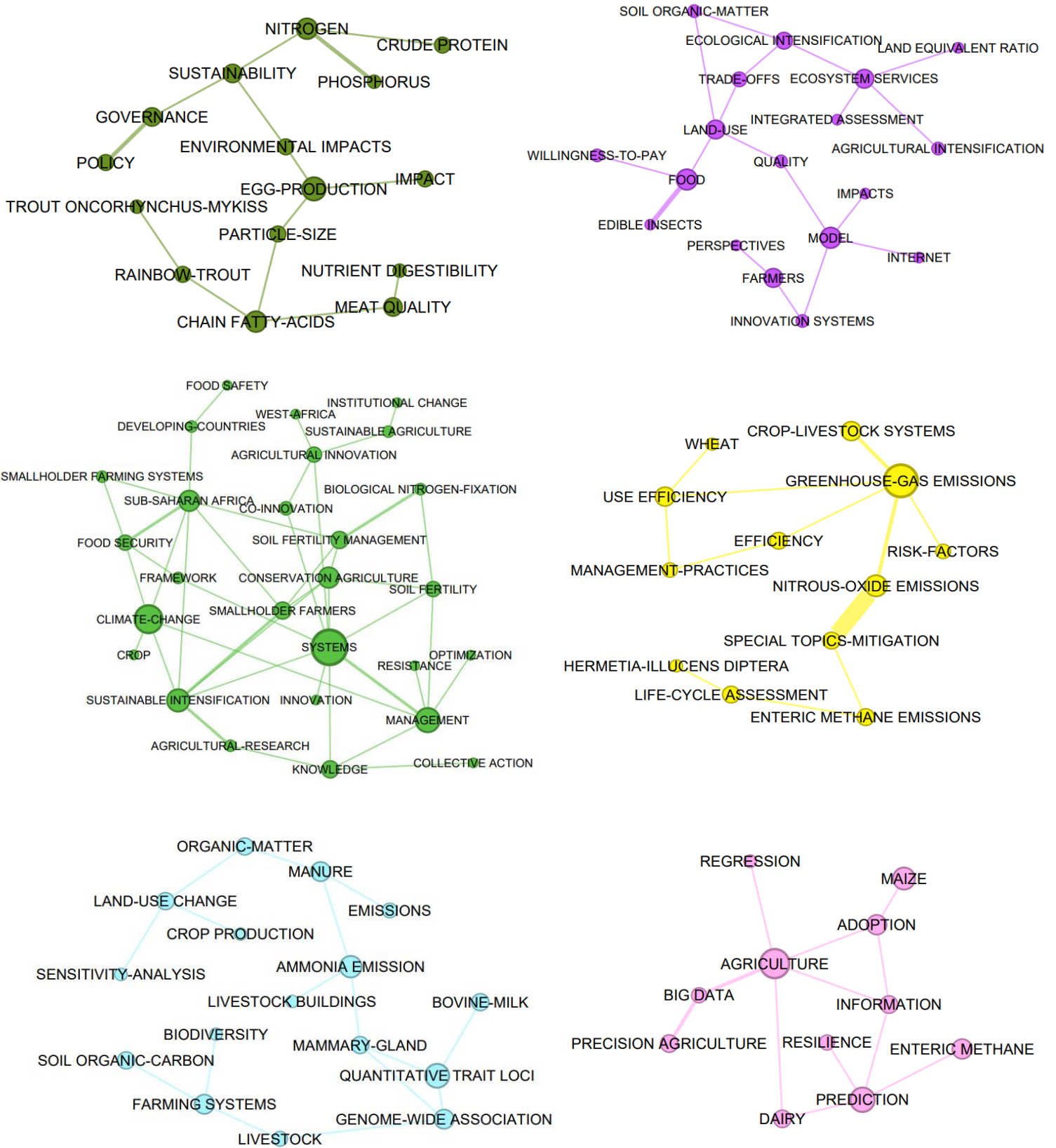


Figure 8.1: Clusters in the keyword co-occurrence network

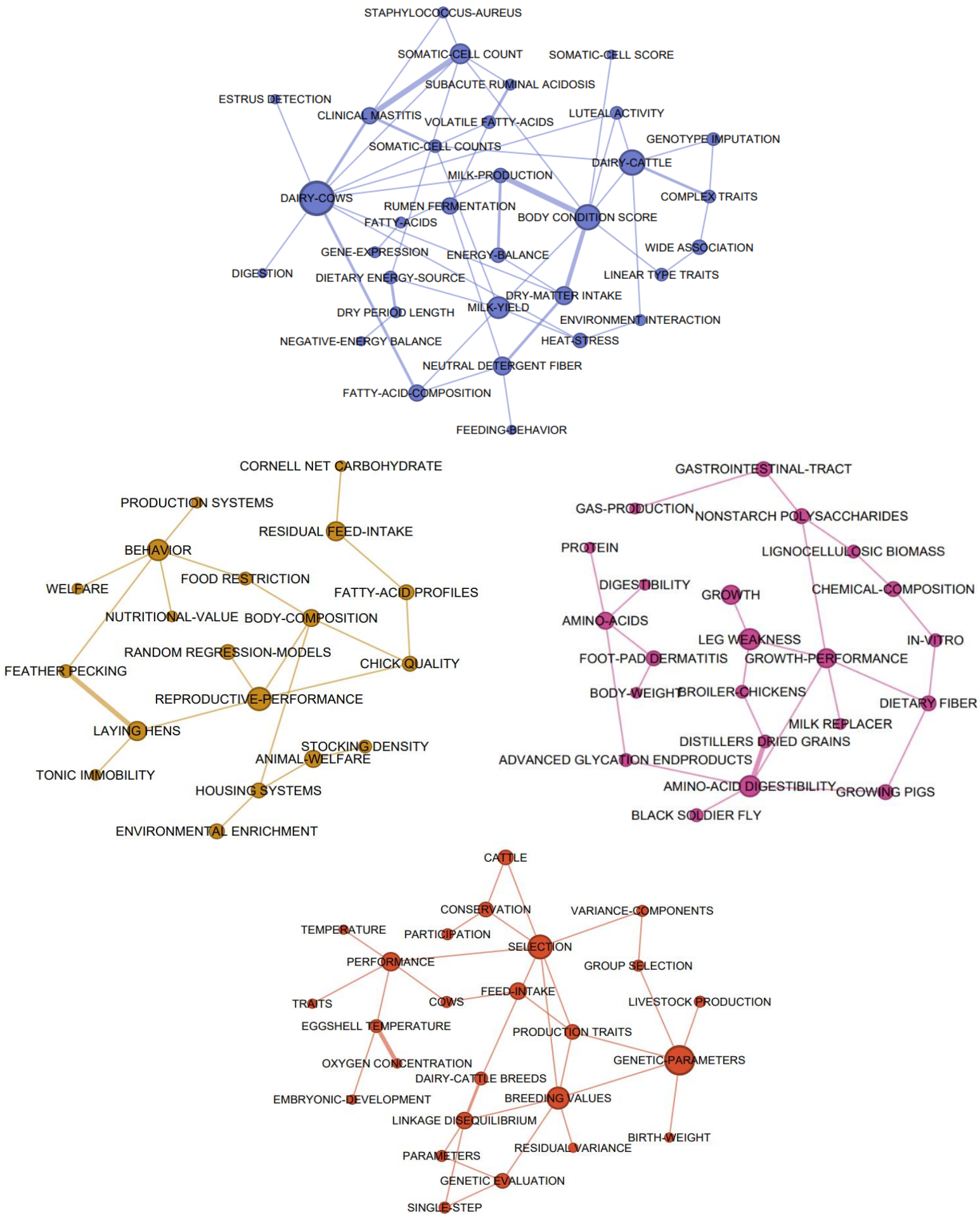


Figure 8.2: Clusters in the keyword co-occurrence network





### **Limitations to document analysis**

The document analysis in particular is vulnerable to anchoring bias, where, once a topic has been identified, it is easier to use that term than to introduce a new one, reinforcing the use of topics that happened to be the starting points. Also, the risk of interpretive bias is high for document analysis, and being able to cross-check with other researchers would have been a major improvement in this regard.

Secondly, policy documents often mention one issue in relation to many others, by way of example. It may not do so for equally important issues elsewhere, thus rendering the possibility that non-essential topics get more attention than would be appropriate. It is important, however, to realise that triangulation was implemented in getting towards this topic list, not just by combining two networks – one with a more scientific background (publication keywords), one from a practical point of view (policy documents) – but also by having every interviewee review the list for possible alterations.

Third, the selection of documents as such is prone to subjectivity. To this end, reasons were always registered, as to why a document was or was not selected. Selection happened in two rounds, to try and minimise impulsive choices and to keep the process comprehensible. As stated in the methods section, some preferential features were drafted beforehand, to guide the data sampling.

## Annex I: Internship & REWIRE

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### **Internship at Dialogic**

Writing my thesis, I will be an intern at Dialogic in Utrecht. Practically, this mostly entails getting to know the organisation, updating them on my progress, and sharing my final results in the form of a presentation. Dialogic has no intentions of participating in the research but from an advisory role.

### **REWIRE – overview**

Although not formally connected, this research owes much inspiration to the REWIRE-project, both in terms of topic and methodological fundamentals. The REWIRE-project is a project that aims to ‘tackle collaboration challenges in multilevel ecosystems to synchronize (sic.) the goals of organisations, ecosystems and (inter-)national policy’ (Frenken, 2023, p. 1). This research can best be seen as an independent exploration of REWIRE’s Working Package 1 (WP1), which aims to ‘perform a data-driven mapping of the structure and evolution of the agricultural innovation network’ (ibid., p. 17). The project is ran by a consortium of universities (UU, TU/e, WUR, THUAS, HAS Green Academy) and a multitude of societal stakeholders from the public, private, and NGO-sphere (ibid., p. 12).

I attended the REWIRE kick-off meeting on the 31<sup>st</sup> of May as a participatory observant.

### **REWIRE – potentially relevant partnerships**

REWIRE WP1 is formally connected to two RIES network organisations within the Netherlands, i.e. Regio Foodvalley and Greenport West-Holland. The first is more broadly agriculturally oriented, the second is a leading region with regards to horticulture in particular. Foodvalley is renowned globally and was willing to participate, so was chosen as the central case of research.

### **Transparency statement**

I am an intern at Dialogic whilst I write this proposal and thesis. Dialogic is a member of the REWIRE-consortium. My university supervisor similarly is involved in WP1 of REWIRE. It is important to emphasise that there are no formal connections of this project to REWIRE – it is an independent research. Any exploratory value for REWIRE WP1 would be a welcome bonus; but this is not a set requirement from my supervisor or Dialogic.

## Annex II: Patent network visualisation

Patent co-inventorship was employed to explore the degree to which organisations (public and/or private) co-innovate in the Netherlands. Nodes represent individual inventors. Edges in the network represent a shared patent and are undirected (Liu et al., 2022, p. 1). A collaborative inventor network is a well-established metric of ‘regional economic and inventive or innovative performance’ (de Araújo et al., 2019, p. 236). The Lense database was consulted, as it is user-friendly and free-access. Patent data for 2004 to 2024 within Dutch jurisdiction and in CPC and Y02 categories related to agriculture was included (776 in total). To increase the sample size, a twenty year period was investigated. Going back any further, the patents would certainly predate the Foodvalley region, thus moving too far from the research objective. However, the analysis yielded minimal results. Modularity analysis was employed through Gephi, where multiple clusters were identified in the network of *figure 10.1*, and could be isolated into *figure 10.2*. Upon further inspection in R, linking back the modularity classes of Gephi to the patent database, most clusters simply showed inventor collaborations between one organisation. Three interorganisational collaboration networks were discovered, none in Foodvalley. The lack of inter-firm patenting may be an indication of hesitance of firms in the agricultural sector to formally collaborate in research and development of new technologies, or to employ different IP-protection strategies. Perhaps, more agricultural patents could have been discovered through patent keyword sampling, instead of patent CPC and Y02 categories. For now, due to the minimal yield, the patent co-inventorship analysis is not included in the results section of this research.

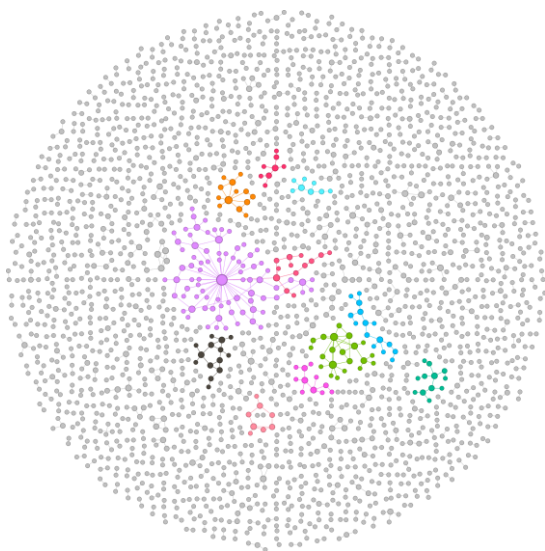


Figure 10.1: Patent co-inventorship (deg. >1) for Dutch agricultural patents

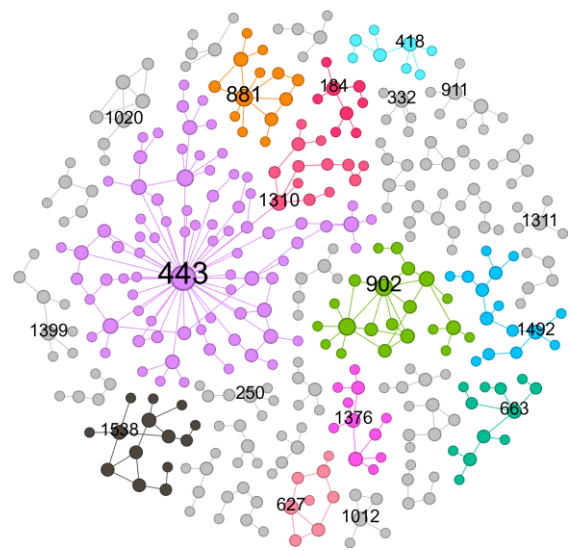


Figure 10.2: Largest patent co-inventorship structures for Dutch agricultural patents

## Annex III: Document analysis protocol

Document number		Document type	
Title		Author	
Date		URL	
Have issues been identified	YES NO	Have connections between issues been identified	YES NO
<i>If so, what issues have been identified</i>		<i>If so, what is the connection to other issues</i>	
Name	Description	Name	Description
<i>Further comments:</i>			

## Annex IV: Interview protocol

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FIRM PROTOCOL – REVISED 9/4/2024  
SEMI-STRUCTURED, 45-60 MINUTES  
RECORDED – CONSENT FORM

ONDERZOEKSINLEIDING - max. 3'

- a. Persoonlijke kennismaking
- b. Interesses en aanpak van het onderzoek
- c. Privacyverklaring - geïnformeerde toestemming

ACTEURSINTRODUCTIE - max. 3'

- a. Kunt u uw organisatie kort introduceren?
- b. Wat is het doel van uw organisatie?

PERCEPTIE VAN SAMENWERKING IN FOODVALLEY EN INTERMEDIARE ORGANISATIES - max. 10'

- a. Wat is uw beeld van de regio Foodvalley?
- b. Hoe zou u de regio Foodvalley typeren?
- c. De regio Foodvalley wordt vaak gezien als een samenwerkingsregio voor innovatie binnen de food- en agri-sector, ervaart u dat zo? Waarom?
- d. Werkt u veel samen met andere partijen in de regio? Wat zou u als uw top vijf samenwerkingspartijen rekenen?
  - i. Waarom; wat is het doel van samenwerking?
  - ii. Hoe ziet de samenwerking eruit?
  - iii. Wie neemt het initiatief in die samenwerking?
  - iv. Is uw organisatie essentieel om samenwerking tot stand te doen komen?
  - v. Met welke partijen werkt u bewust niet samen in de regio? Waarom?
- e. Waarom denkt u dat uw organisatie gekozen heeft voor de regio Foodvalley?
  - i. wat is de rol die uw organisatie daartoe aanneemt in de regio?
  - ii. wat is de waarde van regionaliteit / nabijheid in de doelen die u nastreeft?
  - iii. Zijn er organisaties in dit Foodvalley-ecosysteem die partijen bijeenbrengen en samenwerking organiseren?
    - {Hoe zou u hun rol en functioneren beschrijven?}
    - {Hoe verschilt die van uw organisatie?}
    - {Wat is de reden van deze verschillen?}
  - iv. Is er behoefte aan een andere intermediaire organisatie / sturing?
    - {Welke samenwerkingen zou deze intermediair moeten faciliteren?}

TOPICS (former issues) / NETWERK - max. 10'

Korte introductie: definitie 'topics': problemen en uitdagingen waar de agri-sector voor staat.

- a. Welke van deze topics spelen voor uw organisatie? Wat is de top drie?
- b. Zijn uw topics gelijk aan / lopen zij parallel aan de topics die in de Foodvalley regio spelen?
- c. Ziet u verbanden tussen deze topics op basis van uw ervaring in het veld?
- d. Bent u het oneens met enige topics binnen dit voorlopige netwerk? Waarom?
- e. Heeft u toevoegingen aan deze lijst? [uitleg: lijst is niet uitputtend, belangrijkste topics]
- f. Welke zijn minder van toepassing op uw organisatie? {Waarom?}

- g. Neemt uw organisatie een positie in als het gaat om het aanpakken van deze uitdagingen? Of ziet zij zichzelf als een neutrale toeschouwer?

#### GOVERNANCE GAPS – max. 10'

[Collaborative]

- a. Zijn er topics waarover goed wordt samengewerkt tussen organisaties in de regio?
- hoe ziet die samenwerking eruit?  
[Aanvullend: over topics? En hoe sterk is die samenwerking? Wat is de uitkomst?]
  - wat is de toegevoegde waarde van samenwerking in die gevallen? Waarom?
  - wat zijn de specifieke obstakels die samenwerking belemmeren? Waarom?
- b. Zijn er topics waarover juist niet goed wordt samengewerkt die benoemd moeten worden?
- Wat zijn de specifieke obstakels die samenwerking belemmeren? Waarom ervaart u die zo?
  - Heeft u het idee dat verschillende organisaties ieder het wiel uitvinden?
  - Wat is hiertegen te doen?
  - Ligt hier een rol voor uw organisatie?
  - Ligt hier een rol voor een andere intermediaire organisatie om partijen samen te brengen?  
{zou dat uw organisatie aan kunnen sporen meer samen te gaan werken? Waarom?}
  - Hoe zou die organisatie te werk gaan om het gebrek aan samenwerking te dichten?

[Integrative gap: korte uitleg]

- a. Worden problemen in de landbouwsector integraal benaderd? Hoe?
- b. Wat kan integraliteit verder bevorderen? Ligt daar een rol voor intermediaire organisaties in Foodvalley? Waarom?
- c. Zijn er onderwerpen waar naar uw oordeel niet genoeg aandacht naartoe gaat?
- Waarom?
  - Wat is daartegen te doen?
  - Bestaan er inzichten over andere topics die daaraan kunnen bijdragen?
- d. Ligt er een rol voor uw organisatie in het bevorderen van kennisdeling over de verschillende topics?
- e. Is hiervoor een andere intermediaire organisatie nodig? Waarom?
- f. Welk doel zou die intermediaire organisatie dienen?  
{zou dat uw organisatie aan kunnen sporen meer kennis over verschillende topics te delen?}  
{en oplossingen in andere topics te zoeken? Waarom?}

#### VALIDATIE & AFRONDING

- a. Bent u het eens met hetgeen er gezegd is?
- b. Heeft u nog opmerkingen of aanvullingen?
- c. Inherent aan dit onderzoek kunnen er nog toevoegingen zijn in de fase van gegevensverzameling. Zou ik u kunnen bellen als de netwerken bijna rond zijn, gewoon om te controleren of uw organisatie verbindingen heeft met nieuw ontdekte organisaties / kwesties die we vandaag niet hebben besproken? Het zou heel kort zijn.
- d. [Snowballing] met wie zou u mij aanraden nog meer te spreken?
- e. Bedankt voor uw tijd. Zou u geïnteresseerd zijn in het ontvangen van de uiteindelijke resultaten?

## Annex V: Informed Consent Document – Interview

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### **Informed consent form (interview)**

In this study we want to learn about the horticultural regional innovation ecosystem West-Holland, of which you may be a participant. Participation in this interview is voluntary and you can quit the interview at any time without giving a reason and without penalty. Your answers to the questions will be shared with the research team. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act). Please respond to the questions honestly and feel free to say or write anything you like.

This research will never refer to your name directly, and will wherever possible aim to avoid talking of organisations directly – apart from those that seek publicity in their role within the network, of course. The main focus of this research is not the individual organisation, but the network and the issues it faces.

I confirm that:

- I am satisfied with the received information about the research;
- I have no further questions about the research at this moment;
- I had the opportunity to think carefully about participating in the study;
- I will give an honest answer to the questions asked.

I agree that:

- the data to be collected will be obtained and stored for scientific purposes;
- the collected, completely anonymous, research data can be shared and re-used by scientists to answer other research questions;

I understand that:

- I have the right to see the research report afterwards.

**Do you agree to participate?**  Yes  No

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## Annex VI: Statement of Originality

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Utrecht University

Master's Programme Innovation Studies

Student's name:	Pim Mattijssen
Student's number:	6434541
Title report/thesis:	Mind the gaps: navigating actors and issues in the regional innovation ecosystem

I, truthfully, declare that:

- This is an original report/thesis and is entirely my own work;
- Where I used the ideas of other writers, I acknowledge the source in every instance;
- Where I used any diagrams or visuals, I acknowledged the source in every instance;
- This thesis (or part of it) was not and will not be submitted as assessed work in any other academic course.
- This report/thesis can be placed on the internet.

Date of signature: 4/7/2024

Student's signature:

A handwritten signature in black ink, appearing to be 'Pim Mattijssen'.

## Annex VII: Statement of Attendance



Utrecht University

Master's Programme Innovation Studies  
Master's Programme Sustainable Business & Innovation  
Master's Programme Sustainable Development  
Master's Programme Energy Sciences  
Master's Programme Water Science and Management

Student's name:	Pim Mattijssen
Student's number:	6434541

	Date	Name	Title of the graduation presentation
1.	15/11/23	Melina Dorstewitz	Master Thesis: paradoxes of the sharing economy – the case of peer-to-peer clothes sharing.
2.	17/11/23	Martijn Kobes	The effects of public transport cuts: a case study of rural Netherlands.
3.	21/11/23	Laurien van Houten	The Conditions a Circular Business Model should meet to contribute to lowering environmental impacts.
4.	21/11/23	Richard Romeijn	Labour implications of Dutch edible seaweed farming.
5.	30/11/23	Joachim van Leeuwen	The influence of different stakeholder types on the circular activities of Dutch manufacturing companies
6.	5/1 2/23	Alessia D. Carriquiry Lucco	Traditional Ecological Knowledge (TEK) for Climate Change Adaptation
7.	5/12/23	Puck Roodenrijs	Gender inclusivity and remittances in the Bangladeshi garment industries
8.	7/12/23	Rebecca Hanke	Love and Rage – How Extinction Rebellion's approach to navigating tensions can advance the co-creation of sustainability transitions
9.	13/12/23	Aisse Feldheim	Who wins for what reasons from Ecosystem-based adaptation? Understanding the distribution of societal benefits from a mangrove restoration project in Demak, Indonesia.
10.	14/12/23	Nicolaas Geijer	Agricultural food forestry

I, truthfully, declare that:  
I have attended the 10 graduation presentations listed above.

Date of signature: 14/12/2023

Student's signature:

A handwritten signature in black ink, appearing to be 'Pim Mattijssen'.

Pim Mattijssen - 6434541  
Innovation Sciences – Utrecht University  
Internship @ Dialogic