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Young Scientists Summer Program

Qualitative System Mapping for Human Geography

An actor-oriented analysis of agritourism stakeholders and networks in Tirol, Austria

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Supervisor signature:

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Abstract

Stakeholder participation and engagement is often praised to enrich academic enquiry, but often very little guidance and few methods inform research decisions about who is being involved and why. Therefore, this research proceeds to explore qualitative system mapping (QSM) as a means to identify participants for scientific research engagement. QSM is commonly used to describe different system mapping methods in health and sustainability research, but has not yet been applied to study actors and stakeholders in human geography. We explore, to what extent QSM can be a useful social scientific method for analyzing and visualizing stakeholders and networks. The aim is to support integrative approaches in regional research and provide some guidance to capture actors on system maps in a transparent and rigorous manner. In this paper, we begin with a brief review of stakeholder mapping and social network analysis methods and then proceed to introduce the actor-oriented QSM approach, followed by an exploratory application in the context of regional agritourism networks in Tirol, Austria. The contribution of the paper is twofold. Firstly, we provide insight on how actor-oriented QSM can help foster a systematic approach to organize and navigate stakeholder research, particularly for early and intermediary research stages. Secondly, the combined use of qualitative analyses software and visualization applications in agritourism in Tirol shines light on the challenges and opportunities for guiding regional stakeholder enquiry across multiple spatial scales, sectors and governance levels.

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Mapping in Human Geography

Maps play an important role in contemporary society. If we look into the news, we may trace different tones of red to better understand covid-infection rates. In a similar manner, we can follow the frontlines in the ongoing Russia Ukraine war, where shaded regions indicate who controls what territory. Or, we may look at changing precipitation and rising temperatures patterns at a global scale, where future climate change hot spots are demarcated geographically. But how are these maps constructed, by whom and how are they used? Maps have long been deeply embedded into geographical inquiry and the study of space. Especially in human geography, maps present more than just mere objective visualizations of place and change, they embody social practice. In history, maps have been used for political purposes, like for example empire-building (Rose-Redwood et al., 2020), and they are constantly produced and (re)produced (del Casino & Hanna, 2006). Back in the 19th century, maps presented a way to order knowledge spatially and make the world more knowable. At that time, academics regarded maps as mostly impartial, which served reasons of government and management (Crampton & Krygier, 2006). After the Second World War, cartography emerged more broadly during the quantitative revolution within geography. Quantitative spatial models served as a way to integrate mathematical methods from the natural sciences (Anderberg, 2004). The focus laid on functional map design with the purpose of communicating a message from the mapmaker to the map user (Roth, 2013). If we fast forward to 1970s, mapping practices became more contested. Lacoste (2014) explained: "*It is important that we gain (or regain) an awareness of the fact that the map, perhaps the central referent of geography, is, and has been, fundamentally an instrument of power.*" The poststructuralist critique, mostly voiced by critical human geographers, accordingly elaborated on the politics of representation that surface in mapping practices and maps. Perkins (2003) thus spoke of a profound divide in the geography community, with critical studies on the one hand and the hegemonic practices of scientific mapping on the other. Today, the rapidly evolving "avalanche of data," or the "age of big data" unfolds with technologies that produce ever-larger- and easily accessible- data quantities that are being translated onto geographical maps, which further risk to reignite this scientific divide (Feldman et al., 2015). But rather than exploring the humanist critics of the quantifiers, as Wyly and others have done in their analysis of the quantitative revolution in geography (Wyly, 2014), this research builds on the emerging opportunities to solidify the human dimensions in and for mapping exercises. Much in line with the timely challenge of building new methods from across geographic disciplines, we thus reflect on methodological advance for state-of-the-art enquiry into compounding crises, where future-oriented thinking calls for new knowledge systems (Fazey et al., 2020; Wibeck et al., 2022).

Against these evolutionary trajectories of geographic mapping practice and history of thought, there have already been efforts in geography to reconcile- and translate- mapping critiques into integrative research efforts. Geographical Information Systems (GIS) for example, a prominent digital tool for spatial analysis, advanced over time in capturing the human dimensions of maps including power relations, inequities and representations (Schuurman, 2006, Lwin et al., 2012; Taylor et al., 2020). Attention shifts from the mapped outcome alone to the process of mapping itself.

Geographical inquiry is thus not just about spatial analysis and mapping geospatial data. As a prominent research process and practice, maps help to systematically organize knowledge and navigate the unknown. Mapping practice has thus come to intrigue researchers in both the natural and social sciences, qualitative and quantitative research domains and across disciplines. In the zeitgeist of integrative research, this paper thus aims to bring forward a nuanced human perspective into qualitative system mapping, a method that recently emerged in health and policy research (Baugh Littlejohns et al., 2021; Kiekens et al., 2022). A quick glance at the history of cartography and mapping thus sets the background to position qualitative system mapping in the interdisciplinary playfield of human geography as an explorative means to investigate stakeholders. The intention is to enhance an actor-oriented perspective in qualitative system maps and construct methodological avenues to pioneer regional research. Accordingly, Qualitative System Mapping (QSM) is proposed as a tool to capture societal structures by rigorously mapping actor relationships and interactions. The first contribution of this research is thus of methodological nature, targeted at the integration of existing social scientific research methods by reviewing stakeholder analysis and social network analysis for qualitative system mapping. The second contribution is to provide an applied actor-oriented QSM approach and point at first analytical entry point for a regional scoping study performed in the context of agritourism in Tirol, Austria. Finally, the research presents ways and detailed guidance to analyze, organize, synthesize and visualize knowledge in a systematic and transparent fashion, but also to understand if, and if so, how such analyses can serve as an analytical entry point for informed stakeholder selection. We thereby aim to find out, what an actor centered perspective can bring to Qualitative System Mapping in geography and regional research, based on the example of Agritourism development in Tirol, Austria.

The Art of Qualitative System Mapping

The term QSM has recently emerged in the academic literature, e.g. it has already been used in health research (Baugh Littlejohns et al., 2021; Kiekens et al., 2022), in the field of business (Domegan et al., 2020) and sustainability research (Eker & Ilmola-Sheppard, 2020). Applications referring to QSM up to date mostly relied on causal loop diagramming and build maps to visualize the positive and negative effects between different factors. This helps to identify direct and indirect feedbacks in systems, which may help in the discovery of unintended consequences and potential leverage points for policy intervention (Laurenti et al., 2016; Strelkovskii et al., 2022). The exact uses of QSM as a tool, and the sources scrutinized, vary considerably across the literature, however, we see an emerging trend that is propagating QSM to gain deeper insights into the nature of a system. So, rather than proposing a narrow definition, a some key features help distinguish QSM.

Firstly, QSM is not a rigid method, but builds on the idea of integrating different perspectives. Kiekens et al explain*: „the term systems mapping comprises a set of different methods for visualising and analysing complex adaptive systems (2022).* Depsite different methods, different sources can likewise be used as a starting point for the map building process. Some scholars rely on literature reviews (Baugh Littlejohns et al., 2021; Miller & Sahimaa, 2020), others pinpoint at the potential role of stakeholder participation in order to identify qualitative socio-political factors (Kiekens et al., 2022). Integrating stakeholder knowledge

into qualitative system maps is thus very much in alignment with collaborative practices in the social sciences, prominently featured as transdisciplinary, citizen science, participatory, co-creative and transformational research (Fazey et al., 2020; Sedlacko et al., 2014).

Secondly, QSM has been proposed as a complementary method or step, which is for example well illustrated in environmental nexus thinking that is dealing with the phenomenon of highly interlinked energy, food and water issues (Sušnik & Staddon, 2021). Whilst quantitative modelling exercises in this research domain are more prevalent, qualitative mapping is often used at earlier stages in the research to get an understanding of the system structure and main interactions and feedbacks, which help in the design of quantitative models (ibid). Accordingly, QSM is frequently presented as an umbrella term that incorporates various qualitative methods to obtain knowledge on systems structure that can then be converted into numerical terms.

Thirdly, QSM aims for the visualization of knowledge by constructing maps. The system visualization is often interpreted to help gain deeper insight into complex problems and to also strengthen a common understanding amongst different stakeholders through a nuanced understanding (Kiekens et al., 2022). Here, researchers stress the importance of stakeholder engagement and group model building, due to potential disciplinary bias and validity (Baugh Littlejohns et al., 2021). Thus, proposing an iterative and process-based method, the inbuilt research reflexivity enables research to continuously reconsider different forms of knowledge based on newly gained insights, as is illustrated in figure 3 (Kiekens et al., 2022).

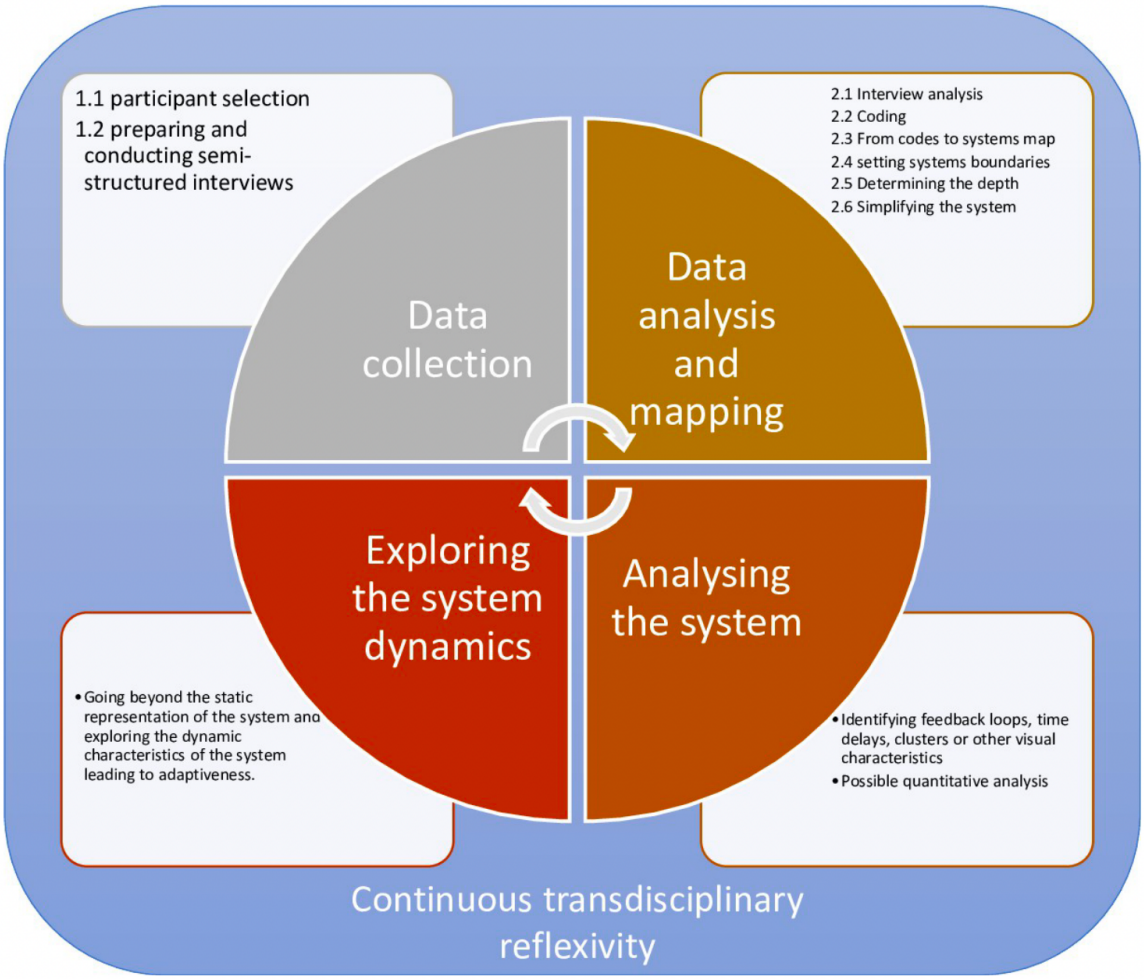


Figure 1 obtained from (Kiekens et al., 2022b) illustrating the iterative research process made of four building blocks guiding researchers in qualitative system mapping developed in the context of public health problems.

Whilst these three features of QSM reflect the current use of the method across the social sciences, explicit linkages to- and application in- geography seem largely absent. Contemporary system mapping approaches have begun integrating different methods in order to figure out how they relate to one another (Barbrook-Johnson & Penn, 2022) but missed out on some of the earlier human geography critique regarding the politics of representation in the map building process. Whilst stakeholder participation and engagement is often praised as a means to integrate different forms of knowledge into academic enquiry, very little guidance and information is provided regarding the selection of whom and what is being mapped. Therefore, this research proceeds to examine, how research participant selection may be enhanced by means of qualitative system mapping. In reviewing some of the existing academic literature dealing with stakeholder analysis and social networks, the purpose is to then construct an actor-oriented QSM approach.

Stakeholder and actor analyses

Generally, a stakeholder is conceptualized as an actor, who holds a stake in a matter. The terms are thus used interchangeably. The questions of who qualifies as a stakeholder and on what premises, however, remain contested (Mitchell et al., 1997). In this debate "persons, groups, neighborhoods, organizations, institutions, societies, and even the natural environment are generally thought to qualify as actual or potential stakeholders" (ibid). Often, we find that actor selection significantly varies across different research domains and for different purposes. Brugha & Sovsky (2000) for example, trace different historical roots of stakeholder analysis in policy and health management, where it is seen as a tool to identify relevant actors and their respective interests. The authors find that the scope of stakeholder analysis may build on a retrospective dimension to understand processes and policy context; but may also be more prospective and immediate, meaning geared to inform policy directions (ibid). The origins of stakeholder analysis can likewise be traced to the corporate domain. Here, it has been seen as a means to assist businesses with strategic management of customers, clients, suppliers, employers and customers etc. (Hester, 2015). Accordingly, in the business management community, the identification of stakeholders is geared to optimize competitive firm strategy. In a somewhat similar manner, Mendelow (1981) operationalizes stakeholder analysis as an environmental scanning process, which includes the collection and analysis of information to be acted upon. Here, the author proposes three steps: firstly, the identification of stakeholders, secondly rating the power of each stakeholder, thirdly to rate stakeholder dynamism and fourthly to allocate responsibilities (Mendelow, 1981). This laid the foundation for the commonly used power dynamism Matrix and power interest matrix used today. Amongst others, the use of stakeholder approaches also found resonance in economic geography and the study of firm environments (Braun & Starmanns, 2009).

But whilst stakeholder analysis is applied in various scientific disciplines there is no longer one stand-alone coherent approach or tool. At least in the context of contemporary

environmental management, we may further contextualize the method in the scientific paradigm of stakeholder participation and engagement (Haddaway et al., 2017; Medema et al., 2008; Reed, 2008). This builds on the realization that actors are knowledge holders and have certain stakes that have to be explored in order to facilitate planning processes and policy building (Collier & Scott, 2009). Stakeholder analysis thus comes to embody an umbrella term to find out, who relates to a given subject matter and how. Key stakeholders may then serve as critical informants and potential entry points to improve our understanding of existing problem frames, discourses and societal tensions. A schematic overview (see fig. 1) was generated in the context of natural resource management and helps to grasp methods and steps that usually inform stakeholder analysis. Here, the authors differentiate between descriptive, normative and instrumental analyses, which refers to the purpose of conducting a stakeholder analyses. Here, we can differentiate for example between an instrumental analysis, which aims to achieve specific outcomes; and normative analysis that is more geared to look at legitimacy and empowerment in decision making processes. The typologies is broken down into three consecutive steps, beginning with the identification of stakeholders, the categorization and finally the analyses. Reed et al (2009) further provide a list of methods that help in these steps with (knowledge) mapping mostly considered for the last step referring to stakeholder analysis part.

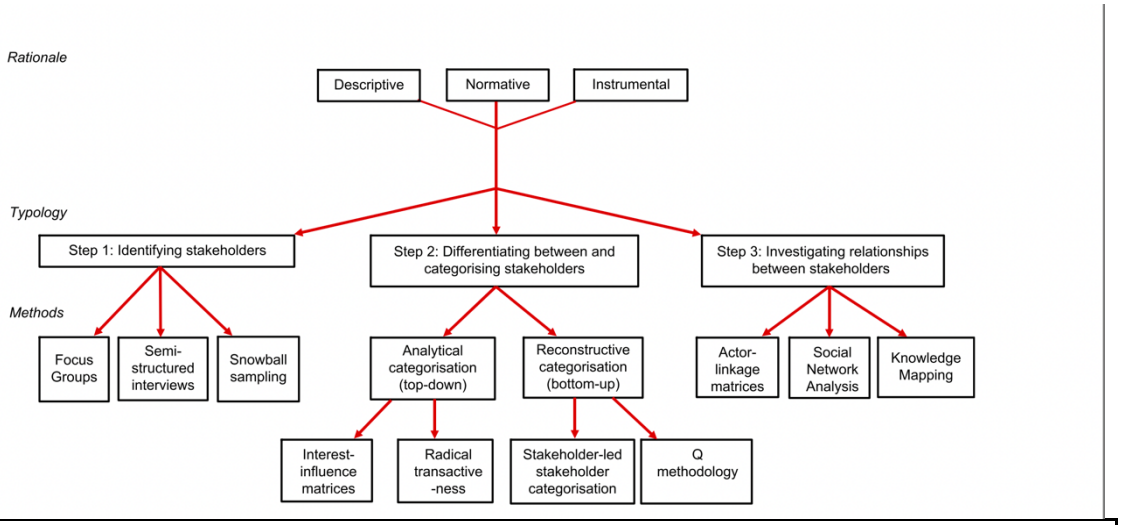


Figure 2 graph obtained from Reed et al 2009, which shows different rationales that can be guiding particular stakeholder analyses methods, followed by a three step typology to guide research. Each of the steps is further delineated into different methods, which the authors have collected under the umbrella of stakeholder analysis.

Social Network Analysis SNA

Reed et al. (2009) list social network analysis as a method for the investigation of stakeholder relationships following up on stakeholder identification and differentiation. Reed et al further clarify that SNA aims to investigate patterns of communication and levels of trust and influence amongst actors in social networks (2009). Social network analysis thus aims at a more systemic proceeding to untangle the complexity, which potentially defines stakeholder relations and interactions. Similar to stakeholder analysis at large, the method was applied across different disciplines and also in real life applications. The immediate use of the method for example is illustrated by Borgatti et al (2009), who point at national security and organized

crime, where network perspectives have long been used to build large maps with linkages between persons of interest. The authors add that the central idea is the flows occurring along network paths between different nodes, which can be the transfer of physical assets and also ideas (ibid).

Similarly, in the social sciences, a social network is generally conceptualized as a system, where the individual is situated in different structures and presented as a node connected through relations, which are also referred to as ties, links, arcs, or edges (Yang et al., 2020)). Different types of networks can be mapped, depending on what relations are under scrutiny and data availability. Especially in the field of human geography, we find social network analysis as a prominent method to focus on flows, boundaries and power that can help in formulating new questions and better understand how social structures function (Marshall & Staeheli, 2015; Rockenbauch & Sakdapolrak, 2017). Much emphasis in the study of geographical systems is placed on the scales and boundaries, next to properly identifying elements and relations (Anderberg, 2004).

In the closely related environmental governance literature, it has further been argued that stakeholder inclusion in these processes and fostering their relations may increase collaboration and collective action to address complex problems (Bodin & Crona, 2009). Here, SNA is not simply meant to understand a given system, but can further be utilized as a means to strengthen or weave network connections to achieve specific outcomes. Vance-Borland & Holley (2011) for example, in the context of nature conservation, employ SNA with the aim of weaving stronger ties between practitioners and stakeholders. Here specific research objectives guide not only the network analysis, but further extend to enhance network connectivity by identifying leverage points. The authors rely on sample snowballing, meaning that interview partners name further potential interviewees (ibid). But SNA is not solely driven by management interests and geared towards specific outcomes, it also holds analytical value. The various ties that determine how stakeholders interact, relate and compared are illustrated in figure 3. In addition to these relations and interactions, researchers may further investigate the overarching network characteristics like network density and positions of nodes and relations amongst others (Bodin & Crona, 2009).

Similarities			Social Relations				Interactions	Flows
Location	**Membership**	**Attribute**	**Kinship**	**Other role**	**Affective**	**Cognitive**	e.g.,	e.g.,
e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	Sex with	Information
Same spatial and temporal space	Same clubs	Same gender	Mother of	Friend of	Likes	Knows	Talked to	Beliefs
	Same events	Same attitude	Sibling of	Boss of	Hates	Knows about	Advice to	Personnel
	etc.	etc.		Student of	etc.	Sees as happy	Helped	Resources
				Competitor of		etc.	Harmed	etc.
							etc.	

Figure 3 obtained from (Borgatti et al., 2009) *displaying the different types of ties that are often studied in social network analysis*

Stakeholder Analysis & Social Networks in Qualitative Systems Mapping

There is no silver bullet explanation for how to apply QSM approaches, and the literature on the matter is dispersed with no existing common jargon (Kiekens et al., 2022a). This implies that QSM is not a well-established research method yet, and a variety of system mapping exercises have not yet been extensively considered as part of QSM. A common denominator in the afore described actor centred methods is the sequential approach that usually begins with the challenge of stakeholder identification. Using Horcea-Milcu et al´s (2022) terminology, mapping exercises likewise go through 'phase zero,' the often-overlooked initiation period when a research project is being launched. Here, knowing who the relevant stakeholders need to move beyond narrowly defined networks to ensure adequate stakeholder involvement (Leventon et al., 2016). Whilst it may be difficult to erode the inherent power imbalances related to researchers exercising non-decision- making power through agenda setting (Denney et al., 2018), one may resort to at least strengthening the selection rationale and make it transparent. Here we see QSM as a potential tool to systematize the stakeholder selection process. Generally speaking, system mapping allows us to take into consideration three main components including elements, interconnections and functions or purposes (Wright & Meadows, 2012) So, as we aim to collect nodes (elements), edges (interconnections) and networks (interconnected elements), key is to make procedural decisions and assumptions visible to produce a foster a rigorous mapping method.

The way a system operates in QSM is quite similar to social network structures, as specific components are connected to one another. The crucial difference is, however, the nature of these nodes and the types of connections considered. A potential contribution of synthesizing methods within QSM, when compared to conventional stakeholder analysis and social network analysis, is the flexibility in defining nodes, one may for example capture non-human entities. This can be particularly helpful when conducting research across disciplinary system boundaries, where human actors alone may reinforce "analytical anthropocentrism" (Wadham, 2021) That is to say, other organisms and natural assets are considered as potential system components, which especially in setting early research parameters may help in exploring and thinking systematically about complex research contexts. Whilst the connections in QSM approaches using causal loop diagrams are usually positive or negative feedbacks, we suggest to interpret relations and interactions between different nodes through social network perspectives in terms of flows of information, material goods, knowledge and so on.

The actor-oriented lens of QSM, is thus different from causal loop diagrams as it stresses the interaction between human actors and other factors, which challenges the researcher to carefully reflect on the selection of the types of nodes selected and on what terms they are being connected and later on visualized. Two potential avenues for method integration emerge from this. Firstly, one may integrate QSM and SNA in a way that incorporates both, social networks and causal loop diagrams. Secondly, one may use QSM as a method to identify stakeholders. Whilst the first integration exceeds the scope of this research, the latter informed our case study on agritourism systems in Tirol, Austria.

Application: Towards a qualitative case study of Agritourism in Austria

The covid-19 pandemic had detrimental impacts on the global tourism industry, as one of the sectors most hit by international mobility restrictions and lockdowns with economic and social costs exceeding those of previous pandemics and financial crises. Despite an astonishing incline in publications on Covid-19 and tourism however, most articles remained 'descriptive, pre-mature and theoretical' in nature (Utkarsh & Sigala, 2021). Others described this trend as a 'publication fever,' characterized by 'poorly conceived methodologies,' 'unsubstituted results,' and 'quality deficiencies' (Zopiatis et al., 2021). Against this background, the need for rigorous context-specific research into the global pandemic with sound methodological underpinning set the starting point for our research.

Across the rapid surge of scholarly publications on the pandemic, the arising consensus suggested that the crisis has exposed and exaggerated historically rooted structural inequities in the tourism sector (Benjamin et al., 2020; Cheer et al., 2021). These voices have also been accentuated by empirical claims, as first accounts of winter tourism destinations in Austria confirmed how frontline employees were particularly hard hit by Covid-19 related measures (Bichler et al., 2021). Already in pre-pandemic times, scholarly critiques of modern mass tourism have exposed systemic industry shortcomings, as conventional tourism failed to improve local community development (Rauniyar et al., 2021) and was linked to environmental degradation (Shahbaz et al., 2021). Further critical accounts of 'monoculture tourism' in Austria have described, how mass tourism followed rigid path dependency and lock in patterns over time whilst facing power asymmetries and one-sided economic growth orientation reducing social resilience (Stotten, Schermer, et al., 2021a).

Researching the diversity of tourism industries however also revealed that alternative forms of tourism were potentially better equipped when facing crisis. Preliminary evidence from Poland for example suggests that agritourism has been positively impacted by the COVID-19 pandemic (Roman & Grudzień, 2021). Corresponding economic predictions also foresee significant market growth in agritourism, due to the fact that future urban populations are more likely to opt for less populated holiday regions (FORBES, 2020). Agritourism as the name suggests is a niche industry combining agricultural and tourism related activities in which local farms offer leisure, recreation or educational activities in addition to their agricultural sources of revenue (Santeramo & Barbieri, 2017). A we began researching agritourism in Austria, we found that more than 50% of farm tourism takes place in the mountainous areas of South West Austria (Quendler, 2019). Given that tourism is a vital pillar of Tirol´s economy and particularly mountain farms (Rieder et al., 2009), we thus embarked to further investigate agritourism in the region.

Disentangling Agritourism in Tirol: Actor-oriented QSM

We began examining the unfamiliar grounds of agritourism development in Tirol with the intention to conduct interviews, but were faced the challenge of familiarizing with a multiplicity literature sources in both German and English. With the intention to build a rigorous strategy to decide whom to engage and interview, we thus adopted an actor-oriented qualitative system mapping approach. We relied on secondary academic literature, selected via the snowballing method starting from a set of articles found in a preliminary desk-research effort. In total 28 papers academic articles and book chapters dealing with agritourism in Tirol were identified. These publications dated from 1994 until 2021 and provided some regional historical context. As we however further aimed to understand who is involved in agritourism and how, we further analyzed the literature for the actors and their relations amongst each other. This correlates to the identification phase in stakeholder analysis. We chose to use open coding and highlighted relevant text segments as '*Actors*,' '*Actor Description*,' *'Actor Function'* and *Actor Relation'* using the qualitative system software MAXQDA. The coded text segments were then extracted and exported onto Google Sheets, where a total of 73 actor profiles with descriptions and 104 actor connections with descriptions were listed. Google Sheets served as an intermediate medium to ultimately import data into Kumu.io.

The next step according to Reed´s (2009) model of stakeholder analysis was to categorize and differentiate actors. In the list of actor profiles, we added columns to specify organizational types, actor groups, sectors and governance levels. Based on grounded theory, we assigned the actors categories. The actor groups were obtained by a EU working paper on ecotourism by (Bryce, 2017) (see also Annex 1). Different from conventional stakeholder mapping however, we also listed natural assets as stakeholders. Here, we incorporated the flexible and iterative component of QSM that allowed us to extend the unit of analysis, as the literature repeatedly emphasized the crucial role of natural assets in the agritourism network. In addition to the actor groups, we also chose different sector tags and governance levels. These generic categorizations were based on the functions and roles of the individual actors that was provided in the literature. The list of categories used is provided in Box 1 and an illustrative example provided in Table 1.

Box 1: Categories assigned to analyse and differentiate stakeholders and also look into the relations focusing on flows.

Differentiation & Categorization

Organizational-Types: *Association, Company, State Actor, Civil Society, Research and Education, Other*

Stakeholder-Groups: *Government departments, politicians, policy makers/advisors (local national, international), those involved with relevant national/regional strategies,* NGOs*, Business and industry, Landowners and managers , Professional groups, Educators Schools, Community groups , The general public*

Sector-Tags: *Agriculture, Tourism, Natural Asset, Public, Culture, Other*

Governance-levels: L*ocal, Regional, National, International*

Network Flows: *Finance, Information, Labour, Maintenance, Marketing, Norms and values, Policy, Products, Resources*

Table 1 Example of the stakeholder categorization illustrating how the state government of Tirol has been categorized and what information was obtained from the literature.

Example	*Categorisation*		*Description (Reference)*
Tirol State Government	Organisational Type	State Actor	*"Tirol is one of nine federal states in the republic of Austria" (Siegl / Schermer 2008, p. 2).*
	Stakeholder Group	Government departments, politicians, policy makers/advisors (local national, international), those involved with relevant national/regional strategies	*"Rules made by the Tirolean state government, for example, those concerning awarding water concessions and strict rules on the amount of residual water in each tributary" (Stotten et al 2021, p. 6).*
	Sector Tag 1	Public	
	Sector Tag 2	n.a.	
	Governance Level	Regional	*"Tirol has developed regional spatial programs and strategies that affect, inter alia, the development of tourist facilities, and the preservation of agricultural and green areas" (Gruber et al. 2018). (Stotten et al 2021, p. 6)*

Table 2 Example of the Stakeholder Relations and Flows showing the relation between the Federal Association Austrian Farm Hollidays and Farmer-based Accomodation, with information flowing from one actor to the other.

Connection	*Stakeholder 1*	*Stakeholder 2*	*Flow*	*Description (Reference)*
31	Federal Association Austrian Farm Holidays	Farmer-based Accomodation	information	"Updating and maintenance of the information on the WWW is the responsibility of the respective national association (Haas 2005, p. 3). The federation had set itself the goal in 1996 of establishing the Internet among per cent of its members within a period of five years. This goal was already achieved. (Rieder et al, 2009, p. 13) The greatest influence on member satisfaction is the information from the association about the internet project, followed by the number of enquiries and bookings (Haas 2005, p. 1)".

The actor connections were then manually filled in the actor connection sheet, solely based on the relations identified in the literature. These connections were complemented with available descriptions and literature references. Similar to the categorization and differentiation of actors, we classified the actor connections. As it was evident that the types of stakeholder interactions and connections were quite diverse, the differentiation was inspired by the ecosystem service categories to somewhat capture and visualize the bandwidth of interactions (See Table 2). The google sheets were then imported into Kumu.io. The sheets served as a backend for KUMU.IO, whereas the data visualization then took place on Kumu. The advance editor view helped to filter, color code and shape different perspectives into Tirols agritourism network. The online system mapping tool KUMU.IO further supported in the visualizing process. Overall, this process was highly non-linear, meaning that in many occasions, the continuous visualization on KUMU.IO, organization in Google Sheets and code analysis on MAXQDA were running parallel.

Results

Regional Historical Context

Tirol is one of nine states located in the southern part of the Federal Republic of Austria. The region is characterized by steep mountainous areas. It is well known across Europe for its prestigious Alpine landscapes and has become a prominent tourism destination in both summer and winter. The flourishing tourism industry is partially due to the fact Tirol's steep mountainous landscapes were unsuitable for the use of heavy machinery (Embacher, 1994), which meant that farmers were unable to compete with the intensive and large-scale agricultural production across Europe. Especially after the second world war and with Austria joining the European Union, many farms were thus closing, due to increasing market exposure and resulting pressures on subsistence farming practices (Siegl & Schermer, 2000). Agricultural subsidies funneled by the European Union and the Austrian federal government thus came to support farm maintenance. Agricultural commodities are of limited importance for mountain farmers, as income is reliant on public transfer payments adding up to 86% on average in Tirol (Schermer et al 2015, p. 7). Especially in recent decades, the regional tourism economy has flourished as an economic diversification strategy to complement and replace agricultural revenues in the wake of rural decline (Rieder et al., 2009). Agritourism in Tirol thus materializes as a tool for economic diversification and part of a structural shift from agricultural productivism to multi-functionalism (Stotten et al., 2019). Farmers renting out rooms were able to use their farm resources to accommodate guests, who likewise benefited local economies through additional revenues in local food production, transport and entertainment amongst others. In this context, especially women were empowered (ibid), as they played a key role in setting up provincial agritourism association in Tirol and took care of the work associated with the renting out of rooms.

Tourism is now making up for 17.5 % gross regional product of Tirol's economy and this became further institutionalized through public sector support (Stotten et al., 2019). Whilst certain regions in Tirol evolved into highly commercialized tourism places, facilitated by infrastructure investments that made rural regions more accessible, most of the farms offering accommodation are located in less populated, rural regions (Quendler, 2019). Many of these farms thus remained small scale family businesses and offer only a limited number of beds. Here, emphasis is placed on the authentic farm experience and natural surroundings, where farmers are able to directly market food locally. This also led many to conclude that agritourism serves as a more sustainable form of tourism with benefits for the local population (Pechlaner & Tschurtschenthaler, 2010; Stotten, Schermer, et al., 2021b).

Figure 4: Agritourism Actor Groups in Tirol displaying the different actor groupings assigned to the actors

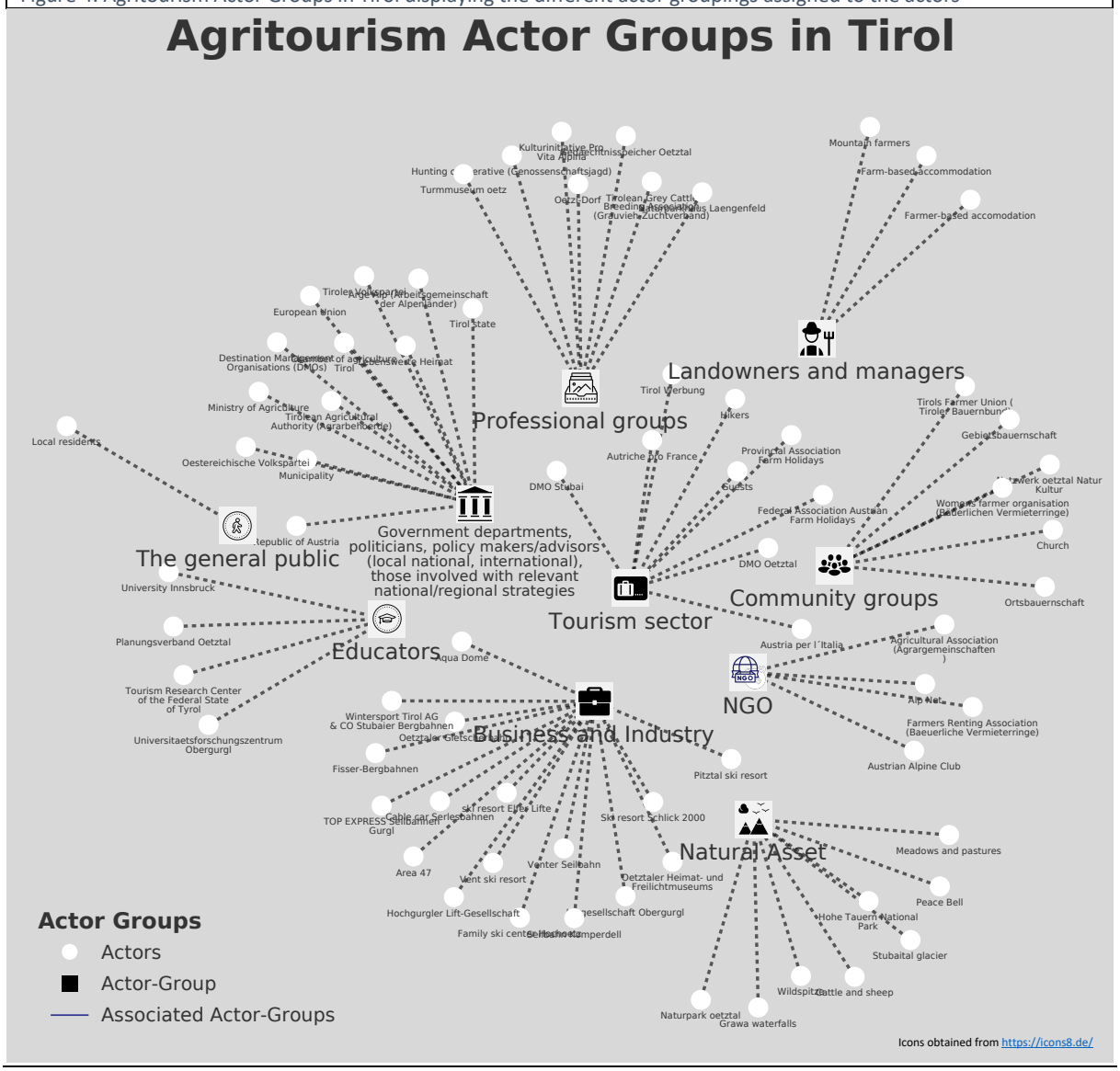
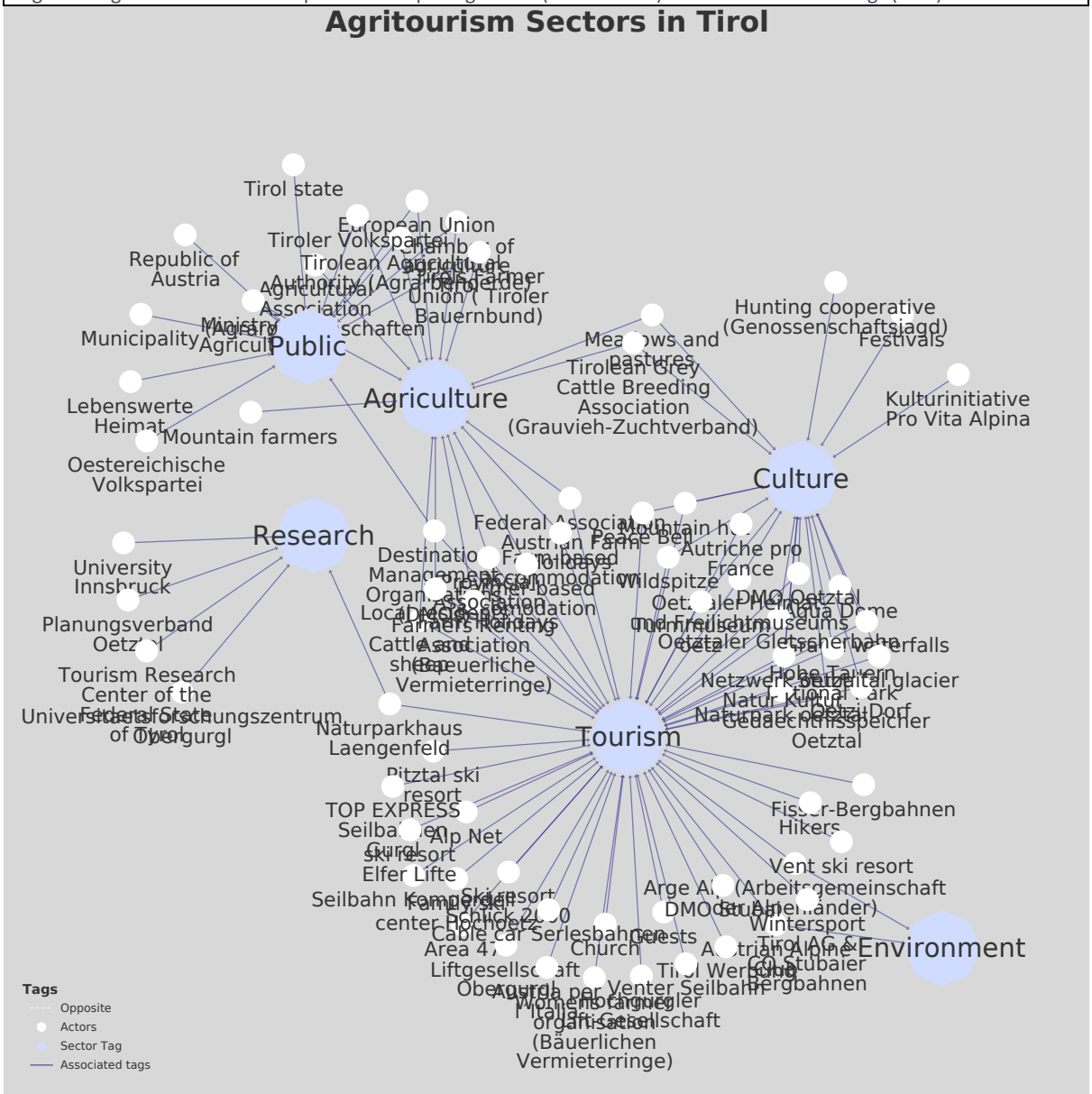


Figure 4 shows the visualization of the different actor groups identified. Each actor was assigned to a single group and these connections were then mapped out. From the ten actor groups identified, most stakeholders were linked to the *Business and Industry* and the Policy domain, as indicated by number of dotted lines connected to each Actor Group. The *Business and Industry* group included lift operators, adventure parks, Spa resorts and Ski centers, which were frequently indicated as important regional economic actors. The chair lifts, ropeways and are owned by private companies and cited as quite influential political and economic actors and some of them are also land owners and managers (Stotten, Schermer, et al., 2021b; van Gils et al., 2014). Next to ski infrastructure companies, policy related actors were also accounted for quite frequently. These included political parties, municipal administration bodies and state organs, who provide legal frameworks and incentivize tourism development. EU regulations for example, require farmers taking part in agri-environmental measures to conform to the measure for five years (Schermer et al., 2016)

Community groups and non-governmental organizations were also referred to in the literature and indicated the variety of actor groups directly and indirectly related to Tirol´s agritourism. Few actors, like destination management organizations were more difficult to pin down, as Pechlaner (in Strobl & Peters, 2015) accounts for 36 organizations in Tirol alone and they likewise support private companies. Accordingly, the *Tourism Sector* group helped to include tourism specific organizations in the region. The only actor directly associated with the general public were local residents, who likewise present a broad stakeholder group, which overlaps with community groups, NGOS and professional groups. Some authors provided the information that seasonal workers make up more than half of these residents during the tourism season and livelihoods for the local population are predominantly based on tourism (Stotten, Ambrosi, et al., 2021; Stotten et al., 2019). The listet natural assets are the manifold sources, mapped because is interdependent on regional natural resources in order to ensure its successful functioning (Siegl & Schermer, 2000). A prominent example for the value provided to the tourist experience here is Aqua Dome, a spa resort that was built around thermal spring baths originating from spring baths glacier melt attracting tourists. Alpine pastures and meadows and sheep, waterfalls and forests likewise emphasize how natural assets fall into the cultural and economic domains of agritourism, as tourists seek to experience rural landscape and nature experiences.

Figure 5: Agritourism Actor Groups in Tirol depicting Actors (white nodes) connected to Sector tags (blue)

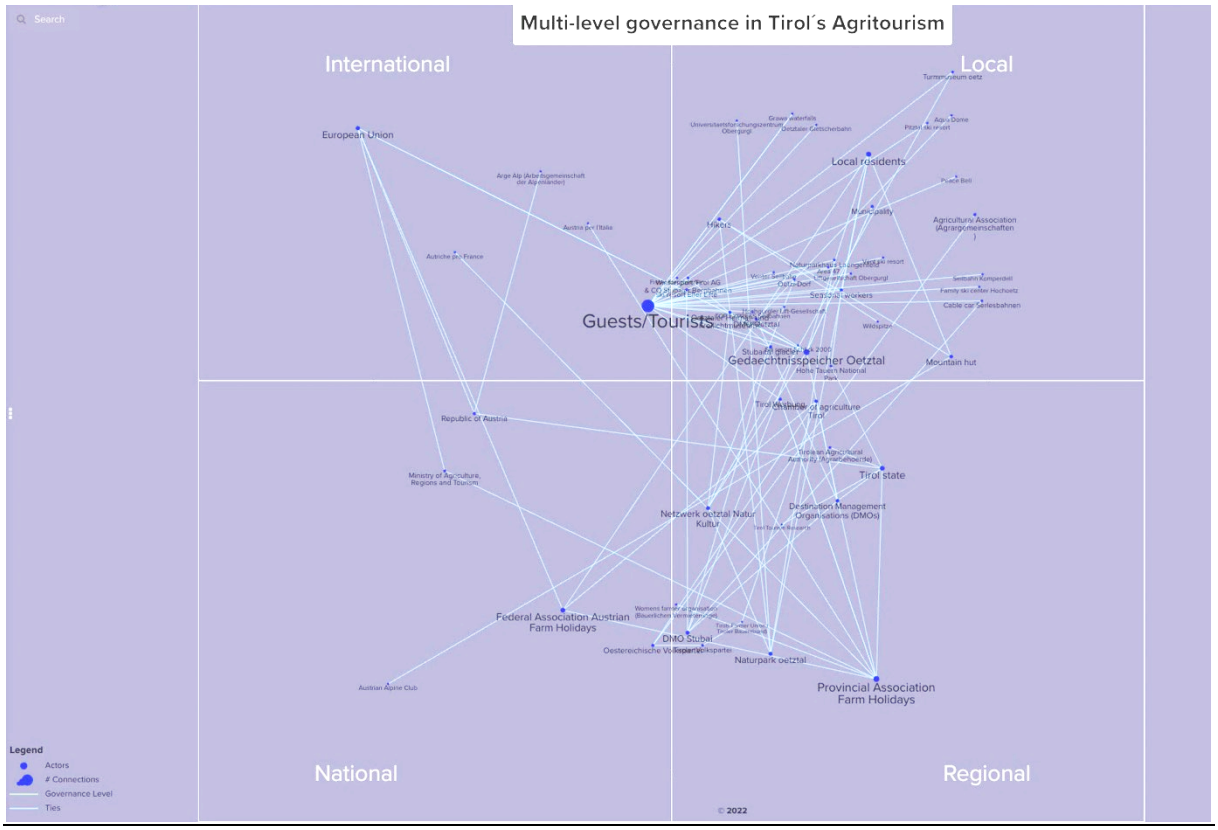


Another visualization of the different actor characteristics was based on the actor tags assigned in order to better understand the connections between these actors. Figure 5 captures the actors as white nodes, which are connected to at least one, or maximum two different sectors. These sector tags, illustrated by blue nodes, are based on the findings from the literature indicating the roles and functions each actors plays. Unsurprisingly, given the literature scope, most actors were directly related to the Tourism sector. The tourism sector further shows to be well connected to the agriculture and culture sector. The environment and research related actors were less frequently mentioned in the literature and hence very

few linkages exist. The actor tags on this map capture, how some stakeholders are linked to several sectors, such as firms, who actively farm and provide accommodation. Agritourism farms are hence linked to both sectors, agriculture and tourism. In the same manner, the chamber of agriculture was linked to the public sector and agriculture. We find that indeed many of the public sector actors are closely linked to the agricultural sector, including for example the agricultural chamber of commerce or various agricultural associations and the ministry. Other linkages for example of the research community remained relatively scarce.

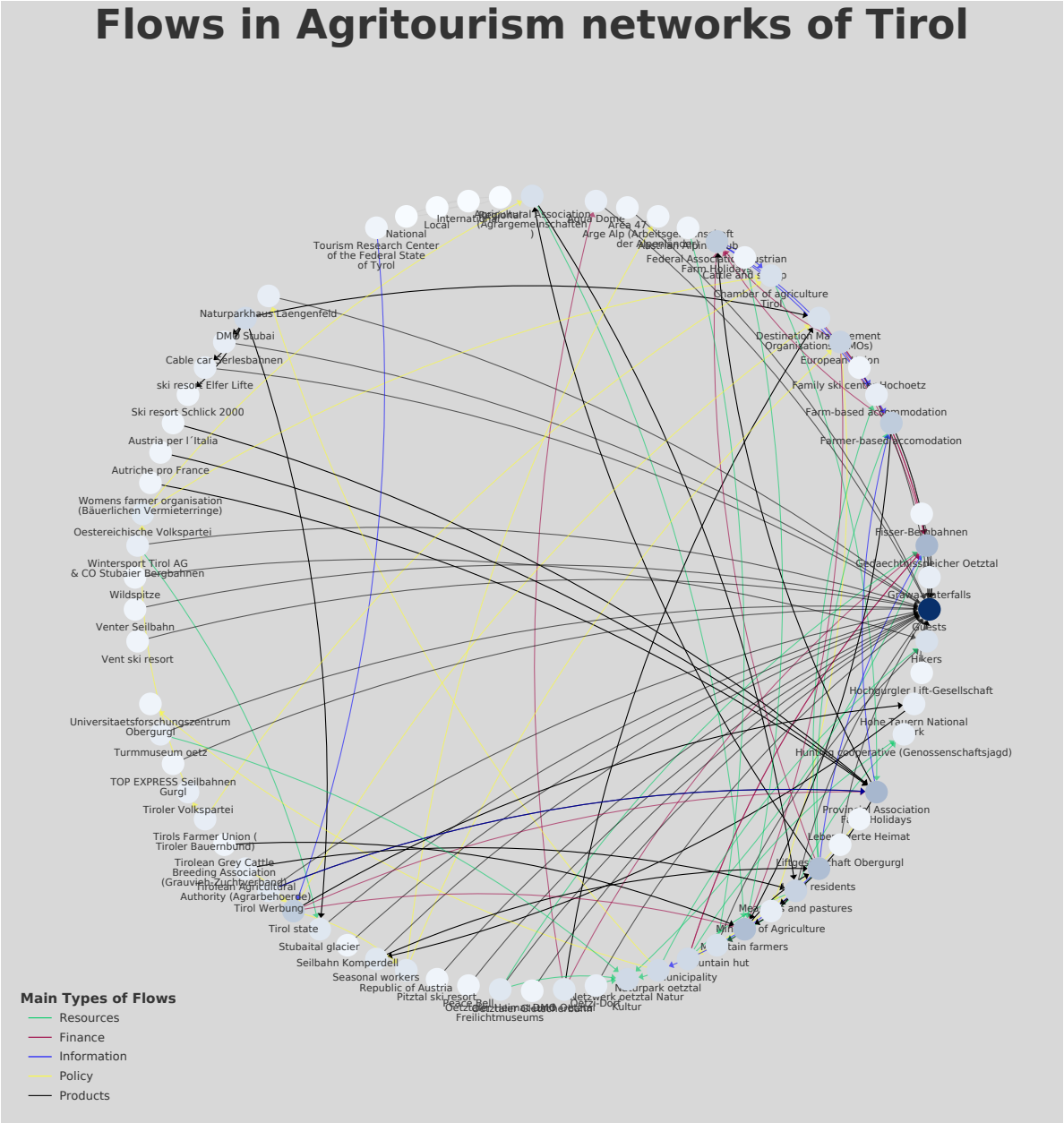
From this map some first insight emerges for agritourism as a visitor economy phenomenon. The term “visitor economy”, as distinct from tourism, implies that of relevance are the wider intersectoral linkages that occur between tourism and other allied sectors such as agriculture and services – this is especially relevant in regional settings (Cheer & Lew, 2017)”. Correspondingly, several studies have emphasized the evident close linkages between tourism and agriculture in Tirol (Fischer, 2019; Forbord et al., 2012). Rieder et al (2009) even speak of a symbiotic relationship between agriculture and tourism being essential for rural stability.

Figure 6: Multi level governance in Tirol´s Agritourism shows how the actors distribute at local, regional, national and international levels. The size of the node indicates the number of relations each actor has.



The next system map view (Figure 6) focusses on the governance levels that were assigned to each actor. Here, each actor has been categorized at either local, regional, national or international level. The international actors, like the European Union and Intergovernmental Tourism Associations like the ARGE ALP (Alpine countries community) are thus located on the top left of the graph. National actors, like the federal association Austrian Farm Holidays and the agricultural ministry are displayed on the bottom left. On the top right we see many more local actors, which included for example museums, local residents and agricultural associations. The regional actors were the state of Tirol and destination management organisations, which operate at a higher level than the local actors. Some actors, like guests/tourists were more difficult to assign. Given that most accounts frequently list German tourists as the main country of origin and the most important source market (Pechlaner & Tschurtschenthaler, 2010), they were assigned at the international level. Yet, many Austrian tourists likewise count into that group, which is why one could also place them at national level. The same difficulty goes for the organizational reach of alpine clubs and other associations. Whilst the location of each actor within the governance level domain is random, meaning random numbers inform the position within the governance level realm, the size of each node illustrates the number of connections identified. Here, Guests/Tourist were most connected, as many firms and natural assets somehow cater to the tourist experience. The large amount of small blue dots indicates that numerous actors were mentioned in the literature, but they were not sufficiently analyzed to capture the various connections they may have across governance domains. Whilst actors without relations, like the church and womans farmer organisations, also coined orphans, were not visualized, these illustrate potential knowledge gaps and unknowns to be further pursued in upcoming research steps. It becomes however evident that most of the actors were traced to the regional and local level, which is reasonable given that the literature was selected specifically for the region of Tirol. Yet, still many of the actors identified were not falling into the administrative geographical boundaries of Tirol. The visualization demonstrates, how Tirol's agritourism network spans from local to higher level institutions, which perhaps relates to the historical context in which agritourism developed as a rural diversification strategy across Austria and Europe. Farm Holliday Association Austria for example is an organization that is active at both the national and provincial level and supports farmers in optimizing their accommodation offers.

Figure 7 Flows in Agritourism demonstrates what flows were detected between the different actors.



The final visualization produced in the qualitative system mapping process was focused on the different flows in the network of actors. The circle of nodes in the figure illustrates different actors, with the shades of blue indicating the number of connections identified. Once more the dot with Guests/Tourists is most connected (See table 3). The different connections indicate the type of flow identified between the actors. The table illustrates that the Gedaechtnisspeicher Oetztal, a local museum ranked second and the provincial

farm holidays association third. The main types of flows identified were resources, finance, information, policy and products.

Rank	Label	Value
#1	Guests	30
#2	Gedaechtnisspeicher Oetztal	10
#3	Provincial Association Farm Holidays	10
#4	Local residents	9
#5	Mountain farmers	9
#6	Federal Association Austrian Farm Holidays	7
#7	Farmer-based accomodation	7
#8	Tirol state	7
#9	European Union	6
#10	Meadows and pastures	6
#11	Municipality	5
#12	Naturpark oetztal	5
#13	Netzwerk oetztal Natur Kultur	5
#14	DMO Stubai	5
#15	Agricultural Association (Agrargemeinschaften)	4
#16	Chamber of agriculture Tirol	4
#17	Destination Management Organisations (DMOs)	4
#18	Hikers	4
#19	Mountain hut	4
#20	DMO Oetztal	3

Table 3 Metric Analysis of Actor flows detected with 30 connections traced to Guests and 3 to the Destination Management Organisation Oetztal

The numerous black connections linking to guests/tourists illustrate the many products including mountaineering experiences, accommodation and sightseeing that are being offered to tourists in Tirol. The finance streams, represented by the red lines, illustrate that agritourism is funded by different actors. Accordingly, a study by the European Union came to conclude: *„Austrian Farm Holidays is, without doubt, the most effective, the most innovative, and the best funded, farm holiday/agritourism marketing and development group in Europe* (Lane et al., 2013)." The analysis also showed information flows between actors, which included for example information from the holiday farm association about online internet presence, number of enquiries and bookings (Haas, 2005). The flow of policy largely refers to the various regulatory and decision-making processes identified. This included for example, the influence of the agrarian associations on agricultural policy (Rieder et al., 2009) and the role of the dominant conservative people's party (OeVP), who protect the agricultural associations in return (Siegl / Schermer 2008, p. 3). Finally, the green lines imply the flow of resources, such as land. We found that actors like alpine clubs, hunting associations and municipalities provide access to -and manage- alpine landscapes. Other flows of resources identified were based on the common use of resources in network organisations like the network *Oetztal nature culture*, and again others like local agricultural associations have collectively owned machinery (Siegl / Schermer 2008, p. 7). Additional flows such as marketing and maintenance work was not visualized in the figure in order to avoid overloading the map. Yet, the visualization of flows amongst the different actors implies that the agritourism networks in Tirol are characterized by diverse interactions.

Discussion

The systematic identification of stakeholders in research can be challenging and many researchers remain elusive when reflecting on their informant selection strategy. The process of carving out a systematic and transparent rationale for such selection is no doubt a laborious process, which partially explains, why there is the temptation to rely on a network of ‘‘usual suspects” (Lang et al., 2012). Researches frequently identify stakeholders through snowballing methods, which means that interviewees and other participants are asked to name further actors and so on. This however heavily relies on a strong personal research network, networking skills and sufficient time, which is not always a given.

In this context, QSM was explored as a method to enable a more rigorous stakeholder identification process, which in this instance built on existing academic knowledge about regional tourism systems in Tirol. The system maps provided some promising first analytical entry points and the integration of secondary sources in order to map first system visualizations enabled a holistic view on the region. Yet, the results are confined by the available literature sources selected. Whilst a desk-based QSM strategy was chosen due to data accessibility, the integration of other and additional knowledge sources seems promising. Despite their value, the maps are bound to the representations of previous insight generated by academic researchers, which likewise is confined by institutional practice. The lack of co-production in the map building process hence emphasizes the potential grey spaces and knowledge gaps, where certain actors and assets have not been captured or adequately visualized.

Accordingly, qualitative system mapping here served not so much a deep analytical purpose, nor was it participatory in design, but it helped in grasping the range of stakeholders connected to agritourism. Rather than identifying leverage or intervention points as is common in social network analysis and causal loop diagraming, QSM presented a scoping step. In the words of Marshall & Staeheli (2015) we may characterize the map in this instance as an abstraction with the purpose of opening up future avenues of investigation and navigate follow up research steps. It served particularly well as a way to store research sources and also elucidate insight into the history of agritourism in Tirol and the multiplicity of actors involved. Whilst the conventional spatial dimension has been disregarded, qualitative enquiry brought to light, how a diverse range of actors span across various government levels and sectors. These socio-political characteristics demonstrated a multiplicity of interactions and connections shaping agritourism, once more confirming that tourism is a “*complex phenomenon”* (Quendler, 2019).

Whilst the information gathered on individual actors and connections were quite extensive, we resorted to visualize and reflect mostly on the entirety of agritourism. This is because the behavior of a system is primarily determined by the characteristics of the whole and not by the characteristics of its individual parts (Laurenti et al., 2016). The QSM approach then helped in approaching regional context beyond pre-defined boundaries and across administrative boundaries. Also due to the open coding process, the integration process was quite extensive, whilst the visualization then helped to think of categorizations and elucidate patterns. This suggests that “*a systems analysis may be performed verbally, but it is definitely easier to understand a system if it is described in a visual form* (Anderberg, 2004).”

Finally, reflecting on the method integration process of stakeholder analysis and network analysis, we found that the literature sources were much more reliable to identify actors, rather than investigating their relationships and interactions. The list of actor profiles was significantly richer in data than the actor connection sheet, which may relate to the fact that different analytical foci informed the literature sources. Whilst some authors were much more focused on agritourism specifically (Embacher, 1994) others were more generic in their approach to tourism in Tirol (Teissl & Seltenheim, 2017). Another challenge occurred in the stakeholder categorization and differentiation phase, as the actor groups were quite diverse. The unit of analyses varied from individual firms to state agencies and groups of individuals. We were thus struggling to find suitable pre-existing actor groupings, as the actors were quite specific to the region. The grounded theory approach helped to further analyze the stakeholders, but underlined the need for further empirical validation to pursue further in-depth analysis.

Whilst the categorization sufficed for an exploratory analysis to better understand the historical context and range of stakeholders, the consequent stakeholder analysis demonstrated the difficulty in setting boundaries between networks in tourism (Zemła, 2016). The existing linkages of agritourism to the environment and resource governance for example were left out within the scope of the study. Here, promising research leads to advance the QSM may be to further dive into the sustainability claims of agritourism (Stotten, Schermer, et al., 2021b). Additional challenges identified in the QSM were especially with regard to the temporal dimension. The two-dimensional graphics were mostly static and unable to capture change over time. A number of associations and institutions, like the church, played an important role in the founding of agritourism. As stakeholder dynamics change, take for example changing ministerial structures and responsibilities, these visualizations maintain mostly illustrative value. This critique of being too static hampers stakeholder analysis may perhaps best be addressed through knowledge co-production (Reed et al., 2009) and advanced visualization.

Conclusion

Mapping practices in geography are a highly contested field of enquiry, which opens new methodological space to explore what we map and how. In this research, we proposed QSM as state-of-the-art method to study regional agritourism systems. We propose to position QSM as part of the "soft system" mapping efforts in human geography, designed to capture stakeholders and build a strong rationale for research participant selection. We tested QSM as an iterative method and coupled qualitative literature analysis on MAXQDA with visualizations on KUMU.IO. Here, the identification of nodes and connection were based on literature, in which we coded for actors and actor connections. This helped to understand the social fabric of agritourism. Such an actor-oriented QSM approach firstly to helped to build some regional context, which helped to familiarize with the place-based specificities of agritourism across Tirol. Accordingly, QSM as part of phase zero or scoping research helped to identify entry points, rather than leverage points or policy relevance. That is to say, future research may benefit from a holistic understanding about the multi-sectoral and multi-level nature agritourism in Tirol. This understanding may further serve the selection of stakeholders for follow up interviews and data collection, in which we can rely on the map

visualizations to ensure a broad representation of actors from across different governance levels, sectors and services provided. Based on the number of actor connections, the governance levels and the types of relations we may thus proceed to build a coherent rationale for whom to further include in our agritourism enquiries in Tirol. Making sure to have diverse actor groups represented and accounting for different sectors will hopefully help getting diverse perspectives to better understand the impacts of covid-19 on Tirol's agritourism. Whilst acknowledging the inherent power imbalances related to selecting informants, the actor oriented QSM approach thus operates as a tool to strengthen the selection process and make it transparent, as we rely on the various literature references identified throughout the map building exercise. In the meanwhile, systematically storing and organizing all data helped to ensure a rigorous research process, where data can easily be traced back to the literature sources not only within the map, but also to the MAXQDA backend. The detailed information about individual actors including the descriptions and functions each actor plays were also embedded into the maps, but were considered beyond the scope of this paper. Certainly, this repository of knowledge and information further underscores the value of QSM as a go to point throughout the research process, which can be enhanced and revised in an iterative manner. Whilst the application within the scope of this study was limited to secondary literature analysis, we see great potential to further test the integrative potential of QSM with different sources. The absence of non-academic participants in sources and research process, and the temporal complexity, were the greatest barrier to pursue in depth analysis, but perhaps illustrate the value of the method for less time and resource intense scoping studies.

Further validation now lies in elaborating on these qualitative system maps to verify and compare the network information gathered from the academic literature with other sources including policy, social media and civil society actors. Recognizing stakeholders as part of systems may also be of use to identify leverage points alongside causal loop diagramming and other qualitative system mapping efforts, but this research mostly confined itself to apply QSM as a tool for stakeholder analysis. Building on the stakeholder- and social network analysis provided some guidance for integrating the social dimensions into system mapping and showcased great potential to bridge physical and human research method in geographical research (Chignell, 2022). Alongside many novel mapping methods in social-ecological systems thinking and participatory modelling (Barraclough et al., 2022; Tourais & Videira, 2021), further value may come from mixed quali/quanti approaches and visual sophistication. Finally, an actor-oriented perspective brings more nuance for integrating social dimensions into modern mapping approaches and, based on Agritourism development in Tirol, helps in better grasping who matters how.

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Annex 1

Table 1.1. Stakeholder groups

Stakeholder group	Examples	Stakeholders in SHA
Government departments, politicians, policy makers/advisors (local national, international), those involved with relevant national/regional strategies	Departments and public bodies for environment, culture, tourism, community development and climate change Local authorities/municipalities National tourism bodies	
Non-governmental organisations	Natural conservation, cultural heritage, land management, climate change action, recreational interest organisations	
Business and industry	SMEs, farmers, tourism enterprise, large commercial interests	
Landowners and managers	Individual land owners; reserve managers, farmers	
Professional groups	Tourism and hospitality, Nature conservation, Cultural heritage	
Tourism sector/tourists	Visitors/tourists to SHAs National tourism bodies Regional/local tourism groups	
Educators	Schools, Colleges, Universities	
Youth groups	Youth groups providing social, educational and leisure activities; young famers/crofter groups	
Community groups	Community trusts; Community councils; relevant community action groups	
Minority groups	Indigenous groups, young people,	
The media	Local and national media: newspapers, websites of organisations (above)	
The general public	People who may have a general interest in the area and its cultural/natural assets, potential visitors/tourists	

4

Stakeholder Groups used from (Bryce, 2017) *COMMON METHODS TO IDENTIFY STAKEHOLDER GROUPS AND INTERACTIONS Sustainable Heritage Areas: Partnerships for Ecotourism Deliverable DT1.1.1*. *July*, 1–12.