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Food Networks and Agroecology – A comparative study in Territories of the Global North and South

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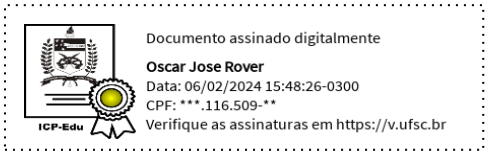

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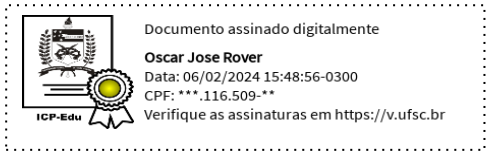

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RESUMO EXPANDIDO

Redes Alimentares e Agroecologia - Um estudo comparativo em Territórios do Norte e do Sul Global

Introdução

Desde a segunda metade do século XX, as consequências ambientais, sociais e econômicas do sistema alimentar hegemônico têm se tornado cada vez mais evidentes. A poluição do ecossistema por agrotóxicos e a redução da biodiversidade são exemplos dessas consequências. Apesar de ter se proposto a alimentar a população mundial, este sistema não atingiu o seu objetivo principal que era resolver o problema da fome. Mais de 820 milhões de pessoas sofrem de insegurança alimentar grave globalmente (FAO et al., 2018), além de existir uma crise significativa de desconfiança alimentar causada por escândalos alimentares. O sistema agroalimentar hegemônico, sem dúvida, é insustentável em termos socioambientais, e a produção agroecológica tem despertado o interesse de uma ampla gama de atores em todo o mundo (HOWARD, 2012; MOORE, 2015). A agroecologia, em seu aspecto técnico produtivo, baseia-se na utilização de princípios ecológicos para a manutenção de sistemas naturais eficientes e resilientes, que garantem equilíbrio por meio de seus processos ecológicos inter-relacionados. Este modelo é fundamentado na diversidade de espécies, na manutenção de ciclos naturais e na reciclagem de nutrientes. Nas últimas décadas, a busca por novas formas de abastecimento de alimentos tem promovido as Redes Agroalimentares Alternativas (RAA). As principais estratégias das RAA têm sido a redução da distância nas cadeias de abastecimento, o estabelecimento de proximidade na relação entre produtores e consumidores (circuitos curtos de comercialização), e o estímulo à produção de alimentos de qualidade com menor impacto ambiental. A agroecologia pode ser entendida concomitantemente como ciência, prática agrícola e movimento social (ALTIERI, 2012; GUZMÁN CASADO et al., 2000; GLIESSMAN, 2000). O movimento social agroecológico tem surgido em vários países, frequentemente ligado a movimentos camponeses e conectado a uma diversidade de atores sociais, instituições e organizações. Ao analisar a massificação agroecológica em diversos estudos de caso em diferentes países, Mier y Terán Giménez Cacho et al. (2018) concluíram que o tecido social constitui o meio cultural no qual a agroecologia cresce, pois fornece a estrutura por meio da qual circulam valores, significados, lições aprendidas e horizontes de ação política. Alguns pesquisadores argumentam que a abordagem teórica das RAA é insuficiente para analisar o movimento social em torno dos alimentos e explicar a natureza ativista dos interessados nas questões alimentares, sociais e ambientais. As RAA representam inovações que promovem práticas com potencial para fomentar sistemas alimentares mais sustentáveis e agroecológicos, embora no debate sobre redes alimentares, alguns estudos apontem aspectos críticos dessas iniciativas. Por exemplo, em relação às abordagens de sustentabilidade econômica e ambiental, uma das principais críticas que frequentemente surge na literatura é de não desmantelar as desigualdades sociais preexistentes, mas sim perpetuá-las, consolidando e legitimando fenômenos de individualismo e desconfiança em iniciativas de mercado. Neste contexto, a abordagem de Redes de Cidadania Agroalimentar (RCA), visa estudar as RAA que além de se oporem ao sistema alimentar hegemônico, enfatizam a cidadania das ações dos atores em torno do sistema alimentar, articuladas nos eixos de produção, distribuição e consumo. Dado as críticas existentes sobre redes de alimentos alternativos, é necessário entender se esses novos arranjos de mercado impulsionados pelo avanço do discurso do movimento alimentar estão contribuindo para sistemas alimentares mais sustentáveis. O conceito de Redes de Cidadania

Agroalimentar que orienta este trabalho baseia-se em Renting, Schermer e Rossi (2012), no qual as RCAs são resultado da articulação cidadã de diversos atores sociais, como instituições, organizações sociais, agricultores e consumidores, atuando em todo o sistema alimentar (produção, distribuição e consumo). O termo RCA destaca os aspectos de cidadania dessas redes alimentares, que se manifestam na maior participação dos atores (agricultores e consumidores) no sistema agroalimentar; circuitos curtos de comercialização; controle local da produção, distribuição e comercialização de alimentos; na auto-organização e autonomia dos atores; e, portanto, em um maior empoderamento dos cidadãos na concepção do sistema alimentar. Neste trabalho, o objetivo é identificar Redes de Cidadania Agroalimentar, identificar as práticas agroecológicas presentes nestas redes e responder se e em que medida as RCAs contribuem para a promoção da agroecologia. Para tal foi desenvolvido estudo comparativo, realizado em dois territórios distintos, onde previamente se identificavam iniciativas de redes alimentares alternativas e possíveis RCAs, sendo eles a Região da Grande Florianópolis no Brasil e a Província de Trento no Norte da Itália.

Objetivos

Objetivo Geral deste trabalho é analisar comparativamente se existem Redes de Cidadania Agroalimentar (RCAs) na Província de Trento e na Região da Grande Florianópolis, buscando compreender a contribuição das RCAs no desenvolvimento da agroecologia em seus territórios. Os objetivos específicos utilizados para atingir este objetivo geral foram: Identificar agricultores e organizações conectados às redes de alimentos alternativos na Província de Trento e na Região da Grande Florianópolis; Descrever e caracterizar as redes, bem como analisar seus elementos de cidadania; Avaliar indicadores de agroecologia nas unidades produtivas das RCAs (quando essas redes estão presentes); Analisar comparativamente a contribuição das RCAs na promoção da agroecologia nos territórios estudados.

Metodologia

Esta pesquisa utilizou o método de estudo de casos múltiplos, uma abordagem apropriada para questões de pesquisa que buscam explicar como, por que, onde e com quem um fenômeno social funciona. No caso desta pesquisa, dois estudos de caso foram realizados, um na Região da Grande Florianópolis e outro na Província de Trento, ambos do tipo descritivo e analítico, baseados em evidências qualitativas e quantitativas. A coleta de dados envolveu fontes diversas, sendo elas documentos, observação direta e participante, entrevistas semiestruturadas com atores-chave e entrevistas estruturadas aplicadas através de questionários a agricultores. A observação direta ocorreu no campo, enquanto a observação participante envolveu o contato direto, frequente e prolongado do pesquisador com os atores sociais em seus contextos culturais. As entrevistas semiestruturadas foram realizadas com 22 atores-chave (11 em cada território), representando diferentes setores, como organizações de produtores, organizações de consumidores, organizações de apoio e pesquisadores. As entrevistas estruturadas, com questionários, foram aplicadas a 38 agricultores, 19 em cada uma das regiões estudadas, com enfoque em práticas agroecológicas e relações em rede. Inclui-se a aplicação de Análise de Rede Social para estudar as interações e relações existentes entre os atores e auxiliar na identificação das Redes de Cidadania Agroalimentar. Foram investigadas relações entre agricultores e a relação dos agricultores com organizações do território. A verificação da promoção da agroecologia envolveu a análise de indicadores, como biodiversidade, eficiência de recursos, produção de alimentos para o autoconsumo e compartilhamento de informações sobre agroecologia. A análise comparativa entre as redes alimentares presentes nas duas localidades foi realizada para avaliar suas contribuições para a

promoção da agroecologia. Em resumo, a metodologia adotada visou entender a existência de Redes de Cidadania Agroalimentar, como elas operam e como contribuem para a promoção da agroecologia em diferentes contextos territoriais.

Resultados e Discussão

Os territórios estudados têm contextos históricos e características diferentes, que influenciam diretamente na formação ou ausência de Redes de Cidadania Agroalimentares e nas características dentro dessas redes. O impacto da Revolução Verde, combinado com contextos históricos específicos, levou a estratégias diferentes e resultou em características distintas para a agricultura nesses territórios. Na Região da Grande Florianópolis (RGF), houve um movimento combinado de resposta de agricultores familiares e suas organizações à exclusão promovida pela Revolução Verde, juntamente com os movimentos ecológicos que visavam contrariar o modelo agrícola também promovido pela modernização conservadora. Atualmente envolvidas nessas iniciativas, estão organizações de apoio, como a universidade pública e ONGs, que atuam na organização e mobilização de consumidores no território. Além disso, instituições públicas de assistência técnica e equipamentos públicos - como programas de acesso a mercados institucionais - assim como órgãos de representação política, estão conectados a esses agricultores. Na Província de Trento, o sistema cooperativo permitiu a manutenção de pequenas unidades de produção familiares no processo de reestruturação pós-guerra. Esse sistema cooperativo está predominantemente ligado à agricultura intensiva e monocultural, com foco na comercialização em longas cadeias para exportação. Os circuitos curtos de comercialização no território têm sido uma estratégia para agricultores agroecológicos em busca de maior autonomia em suas escolhas de produção e procurando uma maneira de sustentar um modelo de produção alinhado com seus modos de vida. No entanto, a maioria dessas iniciativas são esforços individuais de agricultores. No território, há uma fraqueza organizacional entre atores rurais e suas iniciativas, em comparação com a RGF. No entanto, na Província de Trento, as organizações de consumidores são mais organizadas e ativas no território, com os Grupos de Compra Solidária (Gruppi di Acquisto Solidale - GAS) desempenhando um papel de liderança. Essas organizações de consumidores são centrais no território e servem como um canal importante em CCCs - apesar de não estarem conectadas a um movimento agroecológico que inclua atores multi-territoriais, incluindo atores rurais. Na Região da Grande Florianópolis (RGF), identificamos duas RCAs consolidadas e que se inter-relacionam. Elas atuam com amplo alcance e forte participação de organizações que apoiam a agroecologia e instâncias de representação política. Entendemos que essas redes são consolidadas devido à densidade de atores e organizações, assim como ao grau de participação dos mesmos. Elas são consideradas, a partir deste trabalho, como Redes de Cidadania Agroalimentares porque possibilitam a proximidade da produção e consumo, gerando maior autonomia e participação tanto para agricultores quanto para consumidores. Na RGF, a exclusão dos agricultores, aliada à necessidade de coletivização para superar um histórico de falta de assistência técnica e acesso a mercados, fortaleceu uma rede de agricultores e suas organizações, assim como as RCAs, e a proliferação de inovações em circuitos curtos de comercialização. Na Província de Trento, encontramos uma RCA embrionária, com mobilização limitada de agricultores. Essa rede é embrionária porque é pequena e restrita, embora seja uma iniciativa que gerou a organização de atores em torno das relações com os consumidores, e a partir delas, novas relações sociais foram construídas. Na província de Trento, as estruturas sociais privilegiam a individualização dos agricultores e têm dificultado a inclusão coletiva e organizacional deles, assim como sua participação efetiva no sistema alimentar. Apesar disso, algumas iniciativas desenvolveram-se a partir de atos específicos da administração pública municipal e provincial, assim como da universidade

pública, e alcançaram alguns avanços com base no interesse dos atores em CCCs. Visando avaliar o efeito das RCAs para a agroecologia no território, foram utilizados indicadores de agroecologia, construídos para este trabalho, a partir de referencial teórico (H. L. P. E., 2019; GLIESSMAN, 2000; ALTIERI, 2012). Os indicadores agroecológicos analisados foram: biodiversidade, auto-suficiência na utilização de recursos, produção de alimentos para autoconsumo e compartilhamento de informações sobre agroecologia. As unidades produtivas estudadas apresentaram bons indicadores agroecológicos em todas as categorias, sem diferenças significativas entre agricultores mais ou menos envolvidos em RCAs ou entre os dois territórios diferentes. A única exceção é que a RGF teve um maior grau de utilização de espécies/raças e variedades tradicionais. Ao comparar os dois territórios e seus contextos diferentes, concluímos que os bons indicadores agroecológicos são características de produções familiares que participam de CCCs. Os CCCs têm facilitado a manutenção dos modos de vida de agricultores familiares, além de servirem como uma estratégia de inserção no mercado. Eles possibilitam a manutenção de unidades de produção familiares diversificadas e mais autossuficientes, que conectam as demandas do mercado por diversidade de produtos com as necessidades alimentares familiares, garantindo também o equilíbrio ecológico no sistema de produção. A troca de informações sobre produção agroecológica e a amizade são inerentes nas redes de agricultores em ambos os territórios. Na RGF, espécies e variedades tradicionais também circulam nas redes de agricultores, garantindo a manutenção da agrobiodiversidade e do conhecimento tradicional. A troca de sementes está presente na RGF, tanto entre os agricultores identificados como parte das RCAs quanto entre aqueles menos envolvidos. As RCAs se destacam na RGF, uma região onde são robustas e consolidadas, promovendo a agroecologia como um movimento social. Esse movimento é articulado e consegue acessar instâncias de representação e ação política no território, o que não identificou-se na Província de Trento. Na RGF as relações articuladas entre vários atores e organizações em rede, aumentam sua capacidade de influenciar o território. Por outro lado, na Província de Trento, atores dispersos perdem sua capacidade de influenciar e limitam o desenvolvimento de inovações. Analisando as RCAs à luz das críticas dirigidas às Redes Alimentares Alternativas - de perpetuar lógicas de consumo capitalistas e individualistas - entendemos que essas redes se concentram principalmente em torno da organização do acesso aos alimentos e sua comercialização. Os circuitos curtos de comercialização são capazes de promover unidades de produção agroecológicas, independente da existência de RCAs, mas é a construção de relacionamentos mútuos e ação coordenada envolvendo tanto consumidores quanto agricultores que possibilitam mudanças estruturais no território e por meio da participação dos atores promovem verdadeira cidadania e democracia no sistema agroalimentar. Assim, as RCAs são compreendidas como uma estratégia para promover a agroecologia, mas não como seu principal impulsionador. O estudo destaca a importância das CCCs e o papel das RCAs como catalisadoras de um movimento agroecológico, capazes de promover mudanças sociais e estruturais.

Considerações Finais

Esta pesquisa demonstrou o potencial da análise de redes sociais para estudar redes agroalimentares e contribuiu para a compreensão do papel das Redes de Cidadania Agroalimentares na agroecologia. Este trabalho ressalta que as RCAs não são a força exclusiva por trás da agroecologia. Existem unidades familiares agroecológicas em territórios onde RCAs e movimentos agroecológicos são incipientes. No entanto, as RCAs desempenham um papel fundamental em instigar mudanças estruturais e facilitar a expansão da agroecologia. Em ambos os territórios estudados, a formação de Circuitos Curtos de Comercialização (CCCs) cria oportunidades para maior coordenação entre atores individuais

e organizacionais, contribuindo para o desenvolvimento de redes e, esse processo intricado promove a agroecologia.

Palavras-chave: Agricultura Familiar; Circuitos Curtos de Comercialização; Movimento Social; Indicadores agroecológicos e; Democracia Agroalimentar.

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ABSTRACT
Food insecurity and the unequal distribution of power in the hegemonic food system mobilised, in the search for solutions, social actors acting in all axes of this system. The Civic Food Networks (CFNs) are the links of social actors, such as institutions, social organisations, farmers and consumers, who act in a citizen way in the food system. These networks work using short food supply chains (SFSCs). This research studied the existing social relations in the surroundings of short food supply chains (SFSCs) of agroecological foods, comparatively, in the Province of Trento (IT) and the Grande Florianópolis Region-GFR (BR). Our aim was to understand whether civic food networks are formed in the territories, and if so, what contributes to agroecology in the food systems. Direct and participant observation, database consultation, document analysis, semi-structured interviews with key actors and structured interviews using the application of questionnaires with farmers, were carried out. In the GFR, we identified a consolidated CFN with broad reach and strong participation of organisations supporting agroecology and political representation instances. In the Province of Trento, an embryonic CFN was found, with limited mobilisation of farmers and developed through government initiatives and the local public university. Family farmers involved in SFSCs, regardless of their degree of involvement in CFNs, demonstrated high biodiversity, partial autonomy in resource utilisation, and a high degree of self-produced food. We concluded that CFNs are not the prerequisites for promoting agroecology, meanwhile, in the establishment of markets of interest for local producers and consumers, SFSCs are formed in both studied territories, creating conditions for expanding coordination between individual and organisational actors, thus enhancing network formation. This complex movement fosters agroecology.

ABSTRACT (ITALIAN)
L'insicurezza alimentare e la distribuzione diseguale del potere nel sistema alimentare egemonico hanno mobilitato, nella ricerca di soluzioni, attori sociali che operano in tutti gli assi di questo sistema. Le Civis Food Networks (CFN) sono i collegamenti tra attori sociali, come istituzioni, organizzazioni sociali, agricoltori e consumatori, che agiscono in modo cittadino nel sistema alimentare. Queste reti lavorano utilizzando filiere corte (SFSC). Questa ricerca ha studiato le relazioni sociali esistenti nei dintorni delle catene di approvvigionamento alimentare corte (SFSC) di prodotti agroecologici, in modo comparativo, nella Provincia di Trento (IT) e nella Regione della Grande Florianópolis-GFR (BR). Lo scopo era capire se si formano reti alimentari civiche nei territori e, in tal caso, cosa contribuisce all'agroecologia nei sistemi alimentari? Sono state effettuate osservazioni dirette e partecipative, consultazione di database, analisi di documenti, interviste semi-strutturate con attori chiave e interviste strutturate, compresa la somministrazione di questionari, agli agricoltori. Nella GFR sono state identificate CFNs consolidate con ampia portata e una forte partecipazione di organizzazioni che sostengono l'agroecologia e istanze di rappresentanza politica. Nella Provincia di Trento è stata trovata una CFN embrionale, con una limitata mobilitazione degli agricoltori e sviluppata attraverso iniziative governative e l'università pubblica. Gli agricoltori familiari coinvolti nelle filiere corte, indipendentemente dal loro grado di coinvolgimento nelle CFNs, hanno dimostrato un'alta biodiversità, una parziale autonomia nell'utilizzo delle risorse e un elevato grado di autoproduzione alimentare. Si è concluso non sono un prerequisito per promuovere l'agroecologia, intanto, nell'istituzione di mercati di interesse per produttori e consumatori locali, le SFSC si formano in entrambi i territori studiati, creando condizioni per espandere la coordinazione tra attori individuali e

organizzativi, migliorando la formazione di reti. Questo movimento complesso favorisce l'agroecologia

RESUMO
A insegurança alimentar e a distribuição desigual de poder no sistema alimentar hegemônico mobilizam, na busca por soluções, atores sociais que atuam em todos os eixos desse sistema. As Civic Food Networks (CFNs) são os elos entre atores sociais, como instituições, organizações sociais, agricultores e consumidores, que atuam de forma cidadã no sistema alimentar. Essas redes funcionam usando circuitos curtos de comercialização (SFSCs). Esta pesquisa estudou as relações sociais existentes no entorno de SFSC de produtos agroecológicos, comparativamente, na Província de Trento (IT) e na Região da Grande Florianópolis-GFR (BR). O objetivo era entender se as CFNs existem nos territórios estudados e, em caso afirmativo, se contribuem para a agroecologia nos sistemas alimentares. Foram realizadas observações diretas e participantes, consulta a bancos de dados, análise de documentos, entrevistas semiestruturadas com atores-chave e entrevistas estruturadas, com aplicação de questionários, a agricultores. Na GFR, foram identificadas CFNs consolidadas com amplo alcance e forte participação de organizações que apoiam a agroecologia e instâncias de representação política. Na Província de Trento, foi encontrada uma CFN embrionária, com mobilização limitada de agricultores e desenvolvida por meio de iniciativas governamentais e da universidade pública local. Os agricultores familiares envolvidos em SFSCs, independentemente do nível de participação em CFNs, mantêm unidades produtivas biodiversas, com autonomia parcial para utilização de recursos e uma considerável produção para autoconsumo. Concluiu-se que as CFNs não são pré-requisitos para promoção da agroecologia e que, na construção de mercados de interesse de produtores e consumidores locais, em ambos os territórios estudados, se formam SFSCs, que geram condições para ampliar a articulação entre os atores individuais e organizacionais, qualificando a articulação em redes. Esse movimento complexo beneficia o desenvolvimento da agroecologia.

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LIST OF ABBREVIATIONS AND ACRONYMS

ABDSul *Associação Biodinâmica do Sul* (Southern Biodynamic Association)

AFN Alternative Food Networks

BR Brazil

CFN Civic Food Networks

CCR *Célula de Consumidores Responsáveis* (Responsible Consumer Cells)

CIDASC *Companhia Integrada de Desenvolvimento Agrícola de Santa Catarina* (Integrated Agricultural Development Company of Santa Catarina)

FA Family Agriculture

FAO United Nations Food and Agriculture Organisation

GAS *Gruppi di Acquisti Solidale* (Solidarity Purchasing Groups)

GFR Grande Florianópolis Region

IAASTD International Assessment of Agricultural Knowledge Science and Technology for Development

IT Italy

LACAF *Laboratório de Comercialização da Agricultura Familiar* (Laboratory of Family Agriculture Commercialisation)

NT *Nutrire Trento*

PET *Programa de Educação Tutorial* (Tutoring Education Program)

PNAPO *Política Nacional de Agroecologia e Produção Orgânica* (National Policy on Agroecology and Organic Production)

RES *Rete di Economia Solidale* (Solidarity Economy Network)

SENAR National Service of Rural Learning

SFSC Short Food Supply Chains

SNA Social Network Analysis

TAA Total Agricultural Area

UAA Utilised Agricultural Area

UFPs Unconventional Food Plants

UFSC *Universidade Federal de Santa Catarina* (Federal University of Santa Catarina)

UN United Nations

UniTN *Università degli Studi di Trento* (University of Trento)

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PREFACE

This work constitutes a research project developed as part of a doctoral dissertation to be evaluated jointly by the PhD Program in Agroecosystems at the Federal University of Santa Catarina/Brazil and the PhD Program in Agrifood and Environmental Sciences at the University of Trento/Italy. Although primarily aligned with the applied sciences, the study strategically integrated elements from social sciences to fortify the analysis in a transdisciplinary manner.

The study received ethical approval from the Ethics Committee on Research of the University of Santa Catarina. The participants provided their written informed consent to participate in this study.

A version of Chapter 4 has been published. I conducted all data aggregation and analysis, wrote and edited the manuscript throughout the publication process. Forno F. and Rover O. J., acting as supervisors, provided revisions and suggestions regarding the article's structure, content, and wording.

Chapter 5 and 6 were written in article format for future publication.

Already published article:

Article 1: CARRIERI M. S., ROVER O. J., FORNO F. (2023). Food Networks and Agroecology in the Province of Trento-Italy. Frontiers in Sustainable Food Systems. Volume 7, 1-15.

Work in progress:

Article 2: Civic Food Network in Grande Florianópolis Region- Agroecological Farmers Connected on Short Food Supply Chains.

Possible journal of publication: Journal of Peasant Studies

Article 3: Comparative Analysis of Food Networks Formed by Agroecological Farmers and Short Food Supply Chains in Southern Brazil and Northern Italy.

Possible journal of publication: Agroecology and Sustentainable Food Systems

1 GENERAL INTRODUCTION

Hegemonic production, distribution and consumption systems ensure a substantial agricultural output. Moreover, it promotes affordable and varied food for a portion of the world's population, especially for the middle and working classes of the Global North.

However, this expansive power has proved unsustainable over time (MOORE, 2015), both in ecological and socioeconomic terms. This expansion includes uprooting traditional forms of agriculture and food sovereignty, the over-exploitation of human labour, the massive use of environmentally damaging production techniques and threats to human health (MARSDEN; SONNINO, 2012). Despite large-scale production, this food system has not eliminated hunger and malnutrition at the global level (MCINTYRE *et al.*, 2009). Urbanisation is a crucial part of this process. It has promoted the commoditisation of forms of supply and consumption, energy-intensive and high waste, and disconnection between rural and urban areas (POULAIN, 2013; TRUNINGER, 2013). In addressing these challenges, both governmental and civil society initiatives are actively pursuing transitions towards more sustainable, environmentally friendly, and resilient systems.

In this context, agroecology emerged as an alternative production model to the agroindustrial production standard (BRANDENBURG, 2002). It expanded the discussion beyond the productive scope and understood the need to redesign the food system (GLIESSMAN, 2000). Gliessman (2000) defines agroecology as the application of the principles and concepts of ecology in the management and design of sustainable agroecosystems, establishing alternative models to the agroindustrial (hegemonic) standard of production.

The context of discontentment and insecurity within the food system has led to the emergence over the past decades of new food supply arrangements, particularly in the form of the so-called Alternative Food Networks (AFNs). AFN is a broad term for networks of producers, consumers and other emerging players seeking alternatives to the industrial and standardised food supply model (RENTING; MARSDEN; BANKS, 2003). The AFN concept, similar to agroecology – despite differing levels, approaches, and actions –, focuses on promoting alternative movements, rather than perpetuating the hegemonic food system.

In AFNs, proximity between producers and consumers is a crucial element, often associated with short food supply chains (SFSCs) (AUBRI; CHIFFOLEAU, 2009; BRANDENBURG, 2002). In SFSCs, there is a rapprochement between consumers and

producers. We can understand this proximity in different ways, considering relational aspects (direct relationship between consumers and producers with a small number of intermediaries) and spatial or geographical aspects (the distance that the food travels from the producer to the consumer). Additional, we consider informational elements (in which the consumer has the necessary information about the product and the production system) (MARSDEN; BANKS; BRISTOW, 2000).

Street markets, Solidarity Purchasing Groups (GAS), Communities that Support Agriculture (CSA) and other forms of collective organisation are examples of spaces where consumers and producers connect in SFSCs (DAROLT; LAMINE; BRANDENBURG, 2016; BRANDENBURG, 2002; AUBRI; CHIFFOLEAU, 2009).

Several studies emphasise the protagonism of collective consumer action in the formation and management of Alternative Food Networks (AFNs) (FORNO; GRAZIANO, 2014; FORNO; MAURANO; VITTORI, 2019; ROSSI; FAVILLI; BRUNORI, 2013; BRUNORI *et al.*, 2012). Other studies criticise AFNs, emphasising the perpetuation of the consumerist and utilitarian consumption model, along with the propagation of the logic of the hegemonic food system, reinforced by greenwashing (GOODMAN; DUPUIS; GOODMAN, 2012; MARSDEN; MORLEY, 2014).

Chiffoleau *et al.,* (2019) highlights the significance of multi-stakeholder collaboration in the construction of SFSCs, emphasising the horizontal and non-hierarchical nature of the collaboration. It involves farmers, consumers, intermediaries, and various other actors. Renting, Schermer, and Rossi (2012), considering that the concept of AFN was insufficient, especially in addressing the role of civil society in alternative forms of food supply, propose the idea of a Civic Food Network (CFN).

Analysing food networks through the CFN theoretical perspective enables us to study the interaction of multiple stakeholders within the food system, acting articulately in the axes of production, distribution and consumption, and addresses the topic from the citizenship perspective (RENTING; SCHERMER; ROSSI, 2012). The elements of citizenship are participation, cooperation, local control of food production, distribution and marketing, self-organisation and autonomy of the actors. All elements reflect a greater empowerment of citizens in the design of the food system (*Ibid.*).

Based on the theoretical framework described in this introduction and further elaborated in the literature review section, we understand Civic Food Network (CFN) as the articulation

of several players, such as institutions, social organisations, farmers and consumers, acting civilly and articulately throughout the food system.

Despite indications that Civic Food Networks represent innovations incorporating practices that could foster agroecology (ROVER; DAROLT, 2021; PUGAS; ROVER, 2021), some authors question whether these systems effectively promote fair and sustainable food systems, or perpetuate existing domination systems by providing commercial products to a privileged population (GOODMAN *et al*., 2012; MARSDEN; MORLEY, 2014). Then, it remains relevant to understand whether this contribution is effective and how it occurs.

Studies have highlighted the role of consumers in shaping new commercial arrangements and the utilitarian nature of certain alternative networks, particularly in the European context. These networks sometimes perpetuate inequality models, leaving farmers in conditions of exclusion and low autonomy (GOODMAN *et al*., 2012; MARSDEN; MORLEY, 2014). CFNs assume the active involvement of agri-food actors, with the expectation of including farmer-citizens and consumer-citizens within this framework. Given the limited research addressing the participation of rural actors in CFNs, this study aimed to comprehensively understand their actual participation.

Given the need for studies that investigate these networks and their contributions, this work aims at identifying the presence of Civic Food Networks in the studied territories. Furthermore, we attempt to understand if these CFNs contribute to the promotion of agroecology – and, if so, understand how this contribution occurs.

Additionally, we aim at analysing whether these characteristics contribute to strengthening agroecology. We ssek to understand the networks where farmers are involved, as well as which organisations and other players are mobilised around the CFN – such as support organisations, public initiatives and institutions, universities and consumer groups. Finally, we investigate what farmers' networks that are formed in these food networks.

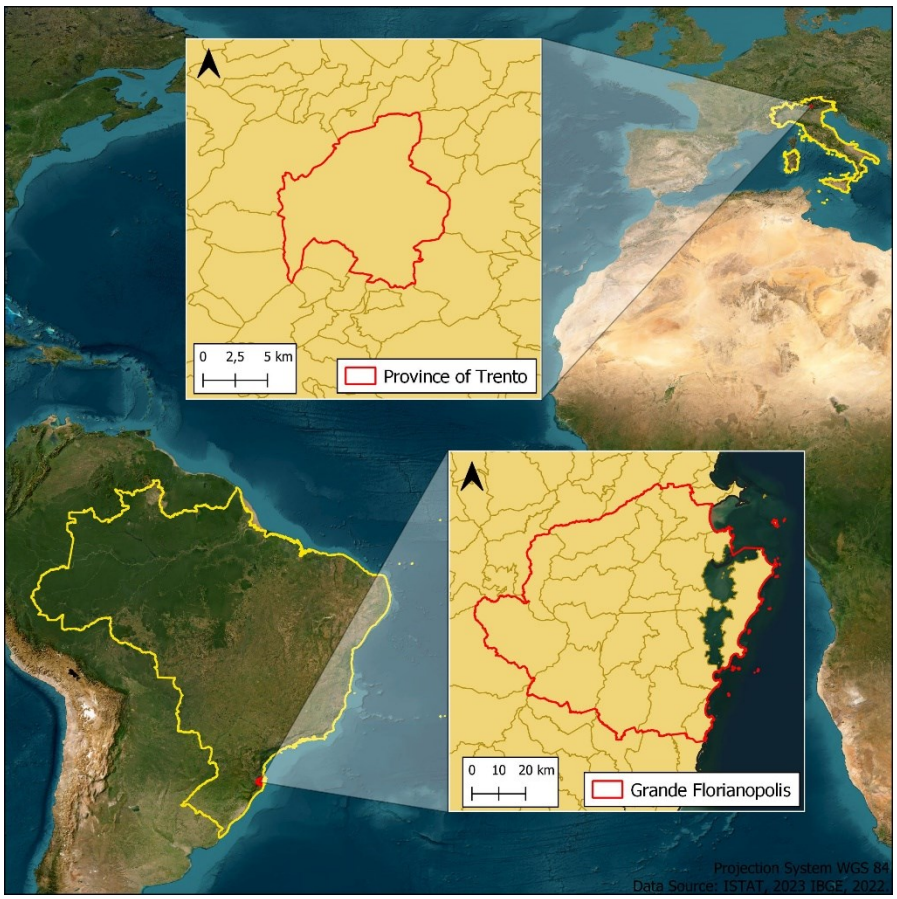
1.1 DESCRIPTION AND DELIMITATION OF THE PROBLEM AND RESEARCH CONTEXTS

This work is connected with community outreach[1] and university research with food networks in the Grande Florianópolis Region (GFR) (Santa Catarina state), Brazil and in the

[1] "University extension Project" for Brazilian academics.

Province of Trento, Italy. In these two territories, food network initiatives and short food supply chains are expanding in different contexts. Some of the features of the territories and initiatives were previously known to the author, which culminated in the choice of these localities. We will detail those further below in Figure 1.

Figure 1.The location of the studied territories



Source: created by the authors

Family farming (FF) is essential in both territories[2] (IBGE, 2019; ISPAT, 2014). Data from 2010 shows that 97.2% of the productive units in the province of Trento are handled by

[2] In Brazil, for operational purposes, the Federal Government uses the definition of a family farmer or a rural family enterprise expressed in Law 11.326/2006. According to this law, a family farmer or rural family enterprise is defined as follows: I) a farmer who predominantly uses the labor of their own family in the economic activities of their establishment or enterprise; II) a farmer who does not own an area greater than 04 (four) "rural modules" or "rural plots" (the size of which varies by region); III) a farmer who has a minimum percentage of family income originating from economic activities on their establishment or enterprise, as defined by the executive power; IV) a farmer who operates their establishment or enterprise with their family (BRASIL, 2006).

the producers and their families (ISPAT, 2014). In the Grande Florianópolis Region, family farming leads 74% of the 10,088 farming establishments (IBGE, 2019). According to Rover and Darolt (2021), regarding the common point between SFSCs and agroecology, is that they both mainly involve farmers who fit the category of family farming. Family farming is essential in transitioning to more agroecological food systems for its diversified food production capacity and connection with traditional and sustainable management practices (ALTIERI, 2012; MCINTYRE, 2009).

In the Grande Florianópolis Region, there are diverse experiences of direct sale of food, presenting various configurations of collective action, short food supply chains and practice of citizenship around food (SOUZA *et al*., 2021). The Laboratory of Family Agriculture Commercialisation (LACAF/UFSC) is carrying out, among other projects, the Responsible Consumer Cells ("*Célula de Consumidores Responsáveis*" - CCR) project and the "Civic Food Network (CFN) Map of Grande Florianópolis" project. The CCR project connects family farmers' groups to consumer groups to create markets for marketing family farmers' agroecological food. The CFN Map of the Grande Florianópolis project has identified and mapped the players involved in short food supply chains (SFSC) of agroecological food in Grande Florianópolis. The map intends to help in the exchange and access to information about these chains (LACAF, 2022).

The Province of Trento has, as an example of consolidated SFSC experience, the GAS - Solidarity Purchasing Groups (*Gruppi di Acquisti Solidale*). Though the groups are spread throughout Italy, they hold a more strong presence in Northern Italy (FONTE; CUCCO, 2017; ANJOS; CALDAS, 2017; ANDREOLA *et al.*, 2021). Furthermore, amongst emerging initiatives in the Province of Trento, the *Nutrire Trento* project was developed in partnership with the Trento Municipality (*comune*) and the University of Trento - UniTN (*Università degli Studi di Trento*). The project promotes spaces for integrating agri-food players to discuss food policies for the city, allowing for the articulation of already existing experiences and manifestations of new initiatives. Among its actions, the *Nutrire Trento* project maps and

---

In Italy, the generic concept of family farming follows the references of the Food and Agriculture Organization of the United Nations, which considers family farming as: range from smallholder to medium-scale farmers, and include peasants, indigenous peoples, traditional communities, fisher folks, mountain farmers, pastoralists and many other groups representing every region and biome of the world. Avaible on Http://www.fao.org/family-farming/en/

disseminates – on a virtual platform – the short food supply chain initiatives of products from the Province of Trento and their articulation in the territory.

Thus, these territories were chosen for comparative analysis due to the previous existence of food networks and of the research and extension projects carried out by the universities.

1.2 OBJECTIVES

The sections that follow describe the general objective and specific objectives of this dissertation.

1.2.1 General Objective

Comparatively analysing whether there are Civic Food Networks (CFNs) in the Province of Trento and in the Grande Florianópolis Region, seeking to understand the contribution of CFNs in the development of agroecology in their territories.

1.2.2 Specific Objectives

- Identifying farmers and organisations connected to alternative food networks in the Province of Trento and in the Grande Florianópolis Region;
- Describing and characterising the networks, as well as analysing their citizenship elements;
- Evaluating agroecology indicators on the CFN farms (when these networks are present);
- Comparatively analysing the contribution of CFNs in promoting agroecology within the studied territories.

1.3 THESIS STRUCTURE

This first section presents the dissertation structure, composed of seven chapters. The first section is a general introduction that explains the research question and its objectives.

In the second section, there is a literature review explaining the basic terms of this work and the theoretical discussions presented in the academic literature, defining the conceptual aspects used. The literature review is divided into two topics: agroecology and Civic Food Networks.

The third section presents the research methodology, study design, and data collection. The fieldwork was carried out in two territories, the Province of Trento and the GFR, and both followed the general methodology presented in this section. The description of the specific methodological steps in each territory is detailed in the following sections, inserted in the respective scientific articles.

In the fourth section, the first article presents and discusses the research results in the Province of Trento. In the fifth section, the second article presents and discusses the research results in the Grande Florianópolis Region. These articles will incorporate specific discussions about the identified networks, citizenship elements, and their contributions to agroecology, according to the results obtained in each case and their analyses. Finally, in the sixth section, the third article is a comparative analysis of the two territories studied. We draw final considerations on the networks identified in both territories and propose reflections on the contribution of the CFN to agroecology.

The discussion of the third article, which is the comparative article, will also serve as the final discussion of this dissertation. Section 8 will present the conclusion of the work, discussing its contribution to the academic field and its main results. Sections 9 and 10 will present, respectively, the limitations of the research and indications for further development.

2 LITERATURE REVIEW – AGROECOLOGICAL AGRIFOOD SYSTEMS

This section presents the main theoretical concepts underpinning this work, agroecology and Civic Food Networks (CFN). It begins by narrating the historical and contemporary contexts that justify the relevance of agroecology in food systems. It then proceeds to examine the role of citizenship networks in reshaping food systems through the promotion of agroecology.

2.1 HEGEMONIC FOOD SYSTEM AND AGROECOLOGY

Agroecology is a central focus of the analysis proposed in this work. From this theoretical review, to achieve the proposed objectives in this dissertation, we developed indicators to evaluate the promotion aspects of agroecology in the studied networks. These variables are: biodiversity, resource efficiency, self-produced food and sharing of experiences. In the methodological section, we will present them in an analytical framework and detail their respective variables. Next, we present the concepts and theoretical discussions that underpinned the construction of the analytical framework in this thesis.

Before discussing agroecology and agroecological food systems, it is essential to present the so-called hegemonic food system and its implications. This system is characterised by intensive agriculture with ecologically damaging production techniques that operate in long chains governed by large corporations and agroindustrial complexes operating on a global scale (CHIFFOLEAU *et al*., 2019; DAROLT; LAMINE; BRANDENBURG, 2016; ANJOS; CALDAS, 2017).

Even before the end of the Second World War, large private institutions began to invest capital in agriculture by improving food seeds that are the basis of global food. Moreover, at the war's end, the chemical industry that had previously supplied the war industry began to produce agrochemicals and chemical fertilisers and stimulated their use. As a result, the chemical and mechanical industries possess large surpluses, directing them to agriculture (ANDRADES; GANIMI, 2007).

In Brazil, this system consolidated through public policies covering agricultural technical assistance. Brazilian technicians, professors and researchers trained at international centres, and international technicians were taken to Brazil to carry out training. Agricultural credits

were fundamental, as the priority of the credit programs was intended to stimulate sizeable agricultural production, which included machinery and agroindustrial input companies, such as tractors, herbicides and chemical fertilisers producers (ANDRADES; GANIMI, 2007; MOREIRA, 2000).

The dominant food production system's unsustainability, standardised with the Green Revolution[3] and perpetuated to this day, was already denounced in the first half of the 20th century by authors such as Rudolf Stainer (2001) and Albert Howard (2012). Using chemical fertilisers has contributed to soil wear and malnutrition, incurring the need for agrochemicals. The system based on undernourished and unstructured soil results in diseased and susceptible plants (HOWARD, 2012). Crops homogenisation completes this productive system fragility. This is achieved with seeds developed to form a high-response plant in uniform crops based on a single crop and a single cultivar. Due to the dependence on uniform cultivars seeds, the system also requires agrochemicals, because homogeneous systems are less resilient (HOWARD, 2012; STAINER; 2001).

Agriculture modernisation has accentuated animal and plant species extinction because currest systems prioritise more economically profitable products. About 150 years ago, humanity fed on about 3,000 vegetable species; today, 15 species account for 90% of vegetable food. Four crops – corn, wheat, rice and soybeans – account for 70% of production and consumption. Genetic erosion is an environmental consequence of this food system (WILLETT, 2019; MACHADO, 2014).

In short, the technological package that sustains this system is based on the tripod: seeds, soluble mineral fertilisers, and agrochemicals. This way, every system is subject to multinational companies that produce inputs and are interdependent. For example, multinational companies import or produce nearly all agrochemicals used in Brazil – sixty percent of the fertilisers are imported. Additionally, a significant portion of commercial seeds is controlled by multinational patents (MACHADO, 2014).

Duo to its logic of interdependence and domination, this contemporary food system is named the hegemonic food system. The increasing environmental, social and economic consequences of this system include deterioration in the social conditions of farmers, rural exodus, damage to health, concentration of land and income, marginalisation of the rural

[3] It is the term used to describe the period characterized by the massive introduction of a package of agricultural inputs for large-scale food production (CLEAVER, 1972).

population, poisoning of the ecosystem by pesticides and reduction in biodiversity. Numerous studies point to the harmful effects of pesticides on ecosystems, such as biodiversity loss and soil and water contamination, besides negative impacts on human health (HESS, 2018; VEIGA, 2017; CARNEIRO, 2015; STEFFEN *et al.*, 2011).

The hegemonic food system primarily operates through long production, supply, and consumption chains. These chains rely on conglomerates for input procurement and depend on the distribution of the produced food. Alarming issues are associated with the world's food supply. The promise of food for the global population has not materialised. Over 50 years after the Green Revolution, we have more than 820 million people worldwide in severe food insecurity (hunger) (FAO *et al*., 2018). This scenario, however, is linked much more to distribution and access to food than to the planet's food production capacity, since 1.3 billion tons of food is wasted annually – equivalent to four times the amount needed to feed the malnourished portion of the world's population (REDE PENSSAN, 2022). About one-third of the food produced in the world does not reach the final consumer (FAO, 2018), and as for fruits and vegetables, this percentage is more than 50% (*Ibid.*).

Beyond logistical issues and waste, access to food is a central element in the problem of hunger, as low income and lack of financial resources prevent vulnerable people from acquiring food (REDE PENSSAN, 2022).

With the COVID-19 pandemic beginning in 2020, food insecurity in already vulnerable communities is on a very high trend. In Brazil, food insecurity, which has grown since 2013, worsened during the pandemic and reached 59.4% of Brazilian households (GALINDO *et al*., 2021). The COVID-19 exacerbated the issue of hunger, but it is not the fundamental cause of the problem, considering that its impacts hit the families already victimised by poverty, the absence of the State, and basic structures such as water service. The problem of hunger primarily affects economically excluded families from the market dynamics of capitalist society, which concentrates wealth and continuously exacerbates inequalities (REDE PENSSAN, 2022).

Another core problem is the distance between food producers and consumers in long distribution chains. In these chains, there is a distance between the production and consumption axes, caused by the fact that the large food processing agroindustries and the prominent distributors are included between production and consumption. This condition weakens producers as well as consumers. Intermediaries working with large volumes exercise

greater bargaining power and set farmers and consumers powerless to the ends of the food supply chain (PORTILHO; BARBOSA, 2016; GOODMAN; DUPUIS; GOODMAN, 2012; ALTIERI, 2012).

In the social sphere, the conservative modernisation process has become a threat to the identities and roots of family farmers oppressed by the concentration of land and the control of the agricultural system by large corporations (BRANDERBURG, 2002). In Brazil, State actions aimed at strengthening corporate agribusiness have also resulted in the growing subordination of family agriculture to agroindustrial chains, with high dependence on inputs and industrial equipment – acquired, in great measure, through the granting of public credit and via integration with mercantile chains that dominate the processing and distribution of food. This problem drives the replacement of traditional cultivation techniques and the use of landrace seeds, besides causing rural exodus and growth in the mass of marginalised workers in the cities (BRANDERBURG, 2002; ALTIERI, 2012).

In the European context, Van Der Ploeg (2013) argues that the profit-oriented direction of conservative modernisation in the Global North has transformed peasant agriculture into a more entrepreneurial form of agriculture. This shift creates competitive dynamics, where family farms grow by acquiring other family farms. This entrepreneurial orientation poses a significant threat and hinders family farming from realising its potential to contribute to socially just and sustainable agri-food systems (*Ibid.*).

Van Der Ploeg (2013) also highlights a current movement, a counter-tendence of re-peasantisation, where agroecology plays a crucial role. In this process, farmers following agroecological principles engage in new activities or produce new products, often distributed through new market arrangements.

The "Behind the Brands" report by *Oxford Committee for Famine Relief* (*Oxfam International*) reviewed the policies of the top 10 food companies in the world. It identified: excessive secrecy about their raw material supply chains; lack of adequate policies to protect local communities from land and water grabbing; lack of measures to lower high levels of greenhouse gas emissions; lack of proper access to small-scale producers and family farmers to their supply chains; and lack of commitment to ensuring fair prices for producers (HOFFMAN, 2013).

As the hegemonic food system is undoubtedly unsustainable in socio-environmental terms, agroecological production is sparkling interest worldwide among a wide range of

players. Agroecology is understood by some authors as an alternative model to the agroindustrial production pattern, from the models associated with the origin of the alternative movement to the ones re-signified as a function of recent ecological movements and the regulation by the agricultural policies and contexts specific to their respective countries (BRANDENBURG, 2002).

Agroecology can be concomitantly understood as science, agricultural practice and social movement (CAPORAL; COSTABEBER, 2004; ALTIERI, 2012; GUZMÁN CASADO *et al.*, 2000; GLIESSMAN, 2000). For Norder *et al*.(2016), it has been featured not only as a science, practice and social movement, but also as a guideline for government policies and as part of the formal education system. Norder *et al*. (2016) point to a notion of agroecology based mainly on four social fields: scientific, social, governmental and educational. As a science, agroecology is characterised by bringing together various areas of knowledge, incorporating theoretical reflections and scientific advances from different disciplines. Also by allowing the study of agricultural activities from an ecological perspective, laying the foundations for the construction of sustainable agriculture styles and sustainable rural development strategies – which conserve natural resources and are culturally appropriate, socially just, and economically viable (ALTIERI, 2012; GUZMÁN CASADO *et al*., 2000).

In Brazil, agroecology is recognised by the PNAPO (National Policy of Agroecology and Organic Production). It is important to emphasise the significance of this recognition, though it may not necessarily translate into concrete actions beyond theoretical conceptualisations (ARAUJO, 2020). Some of the benefits that are part of the objectives of PNAPO include: food sovereignty and food security; sustainable use of natural resources; conservation of natural ecosystems and recomposition of modified ecosystems; fair and sustainable systems of food production, supply and consumption; valorisation of crop diversification and the products of socio biodiversity; and stimulation of local experiments in the use and conservation of plant and animal genetic resources, especially those involving the management of local, traditional or landrace breeds and cultivars; expansion of the participation of rural youth in organic and agroecological production; contribution to the reduction of gender inequalities, through actions and programs that promote women economic autonomy (BRASIL, 2012).

Organic foods and agroecological foods are different concepts (NIEDERLE; ALMEIDA; VEZZANI, 2013). There are no specific regulations in place, neither in Brazil nor in Italy, to

govern agroecological production. However, in the food supply and for consumer control, the guarantee of some agroecological principles, such as the non-use of agrochemicals and chemical fertilisers, is given by regulating organic products. In Brazil they must comply with Brazilian 10,831 (BRASIL, 2003). In Italy, organic products is regulated by EU Regulation No 834/2007 (EU, 2008).

Several authors have warned about a trend towards the conventionalisation of organic agriculture, which is characterised by certified organic systems that are monocultural and heavily reliant on external inputs. These systems retain the environmental and social problems associated with conventional farming and are integrated into, as well as support hegemonic food systems (VIEGAS *et al.*, 2016; PARRA *et al.*, 2018; ROVER *et al.,* 2020).

Gliessman (2000) presents the agroecology concept used in this dissertation. It is defined as the application of principles of ecology and concepts in the management and design of sustainable agroecosystems, establishing alternative models to the agroindustrial (hegemonic) production model.

Since this dissertation aims at evaluating the promotion of agroecology in different territories, it is relevant to set out clear indicators of how this can be implemented and analysed.

The advance of sustainable agriculture in various environmental, socioeconomic, and cultural settings focuses on conserving and enhancing biodiversity to encourage self-regulation and the sustainability of agroecosystems (ALTIERI, 2012; BRANDENBURG, 2002). The transition process to an agroecological production system can be divided into levels: improvement of the efficiency of conventional practices and input reduction; input replacement and change of conventional approaches by alternative methods; redesign of agroecosystems based on new sets of ecological processes (GLIESSMAN, 2000).

Agroecological practices that contribute to the redesign of the agroecosystem in the productive unit involve processes such: as nutrient cycling; improvement of soil structure and health; water conservation; biodiversity conservation and habitat management techniques for biodiversity associated with crops; maintenance of ecological corridors and riparian forests for the protection of springs and waterways; biological pest control and natural disease regulation; diversification, mixed cultivation, inter cultivation, crop mixtures; and waste management, reuse and recycling as inputs to the production process, e.g. dung and compost

use (REIJNTJES *et al.*, 1992; ALTIERI, 1999; NICHOLLS; HENAO; ALTIERI, 2015; WEZEL *et al*., 2014; MIGLIORINI; WEZEL, 2017).

For agroecology, biodiversity is a crucial point for the resilience and sustainability of agroecosystems. The diversity evaluation measures the heterogeneity of a complex system and the quantity and proportion of its elements. Monocultures generate losses in biodiversity and cause a general change in agroecosystems. When a biological string is interrupted with monoculture, the whole biome is attacked because interrelated individuals and species are destroyed (MACHADO, 2014; NICHOLLS; HENAO; ALTIERI, 2015).

Biodiversity can be understood at different levels concerning: genetic diversity in agriculture (cultivars and breeds); crop diversification; and natural biodiversity characterised by the variety of agroecosystems (DE BOEF *et al.,* 2007). Species diversity and cultivars/breeds in agriculture are **agrobiodiversity**. That is, diversification elements produced by human intervention in the ecosystem, with the purpose of interacting with the natural environment for agricultural purposes (MACHADO, 2014).

The reduction or elimination of dependence on inputs is a highlighted element of agroecology because, in contrast, the hegemonic food system is dependent on external inputs, mainly agrochemicals, fertilisers and seeds – which, on their turn, contribute to the dependence of farmers, while increasing production cost (VAN DER PLOEG, 2008; ANDRIOLI; FUCHS, 2008; MACHADO, 2014). This latter dynamic results in an inequality of power and in concentration of capital by large agroindustrial complexes. They hold the monopoly of technologies, inputs, credit and processing and marketing structures, making the end product more expensive for the consumer, reducing the income of the producer, deepening social inequalities, and bringing economic risk to the farmer who wants to produce outside this system (VAN DER PLOEG, 2008; ANDRIOLI; FUCHS, 2008; MACHADO, 2014).

Besides the social issues involved, the dependence on inputs has ecological implications as well. Agroecosystems become more reliant on external inputs and cannot sustain their ecological cycles, leading to increased dependence on external processes and resources. This also results in the generation of externalities that can become environmental contaminants. Therefore, a system less dependent on inputs or with greater use of local resources tends to be more efficient and sustainable (HOWARD, 2012; ALTIERI; NICHOLLS, 2020; PIMENTEL *et al*., 1980).

According to the principles highlighted by FAO (H.L.P.E., 2019) and the discussions among various authors (ALTIERI; NICHOLLS, 2020; FRANCIS et al., 2003), agroecology encompasses not only ecological elements, but also socioeconomic aspects that emphasise human interactions and their significance.

Thus, it is essential to highlight that family farming is recognised as a category that constitutes a social basis for agroecology. It is responsible for most of the world's food production, providing diversified food grown in production systems compatible with preserving natural resources, with less dependence on systematic inputs of energy, materials and external technologies (ALTIERI, 2012; MCINTYRE, 2009; FAO, 2018). Thus, maintaining livelihoods and promoting family farmers' political and financial autonomy can contribute to advancing agroecology.

According Altieri (2012), the restructuring of local food systems should be linked to the construction of agroecological alternatives that adapt to the needs of family farming, as opposed to the control of large corporations over food production and consumption. In addition to the different operational concepts used by various countries' regulations, this research will be guided by the definition of family farming in the terms of Wanderley (2001) as a generic category in which the family takes over the work in the productive establishment while managing the means of production. The family nature is not only a descriptive detail of this concept, as it has real consequences for how the family acts economically and socially.

One strategy that has been shown to contribute to the autonomy of family farmers is the facilitated access to quality food, diversified and in sufficient quantities for the family's consumption (self-produced food). That is an element of agroecology because it supports livelihoods for peasant families (POZZEBON; RAMBO; GAZOLLA, 2018). Duval *et al.* (2008) discuss the relationship between agroecology and self-produced food, noting the association of this practice by family farmers with a production system that preserves genetic diversity, values traditional methods, and fosters diversified production, besides guaranteeing a more diversified and nutritious diet. For Van Der Ploeg (2013), the quality of self-produced food is becoming increasingly important for family farmers around the world, for whom the farm is not only a place of production, but also a place of belonging and social reproduction.

Strategies to maintain the livelihoods and to meet the challenges imposed on family farmers by the hegemonic model involve the collective construction of new organisational, commercial and productive dynamics (ALÉSSIO; ROVER, 2014; FANTINI *et al.*, 2018;

DAROLT; LAMINE; BRANDEMBURG, 2013). The interaction in social networks and the horizontal sharing of information in these networks are essential elements in this collective construction because they provide alternatives to the monopolisation of knowledge and technologies, besides favouring innovations (AGNE; VAQUIL, 2010; SABOURIN, 2001). Corroborating this analysis, FAO highlights the generation of mutual knowledge from the horizontal sharing of experiences and the generation of knowledge, local and scientific innovation – primarily through exchanging information between productive units – as elements of agroecology (H.L.P.E., 2019).

To conclude, agroecology addresses the challenges posed by dominant food systems by reconstructing local food systems, considering ecological principles, and fostering new social relationships.

2.2 ALTERNATIVE FOOD NETWORKS (AFNs), SHORT FOOD SUPPLY CHAINS (SFSCs) AND CIVIC FOOD NETWORKS (CFNs)

In the previous decade, there has been an increasing number of studies on new ways of food supply, with particular attention to the relation between producers and consumers, in parallel with and in opposition to the dominant regime, using different concepts and theoretical perspectives (ANJOS; CALDAS, 2017). The new supply forms have been discussed in different approaches that emphasise their various aspects.

Consumers' search for higher quality food emerged in response to food scandals that have triggered consumer mistrust. As a result, they have sought to increase their control over the agri-food chains they are part of and have also included social and environmental criteria in their food choices. This phenomenon was termed the quality ‘turn’ by Goodman (2003).

In the same context, Alternative Food Networks (AFNs) movements emerge with the aim of counterbalancing the model characterised by promoting monoculture, operated within long commercialisation chains, and dependent on large corporations. In the second half of the 20th century, the idea of alternative agriculture arose in opposition to the widespread agriculture of the Green Revolution, and the term "alternative" was intended to highlight the antagonism between these models. The notion of AFNs expands alternativity beyond production (alternative agriculture), incorporating the idea of a confrontation that covers the entire

agrifood system and challanges the dominant model of distribution and consumption (ANJOS; CALDAS, 2017).

Some authors argue that the AFN's theoretical approach is insufficient to analyse the social movement phenomenon around food and explain the activist character of social players in food, social and environmental issues (SBICCA *et al.*, 2019; RENTING; SCHERMER; ROSSI, 2012). Additionally, other authors emphasise that this focus is indeed not intended to understand the motivations and circumstances that promote the emergence of these networks (ANJOS, CALDAS; 2017).

Preiss and Deponti (2020) point out that AFNs do not constitute a theoretical-conceptual approach, but rather a terminology that has been used to emphasise that these experiences seek to address the shortcomings of conventional systems. Furthermore, the term AFN favours the dichotomisation between alternative and conventional systems, ignoring that these systems live within the same space and often overlap (RENTING; SCHERMER; ROSSI, 2012; ANJOS; CALDAS, 2017; FONTE; PAPADOPOULOS, 2010).

For Van Der Ploeg *et al.* (2012), new markets come with a mix of the following elements: democratising existing markets, creating new markets arrangements, and developing new governance structures. For the same author, social networks differentiate nested[4] from traditional markets. The concept of AFN does not allow us to study the formation of these new markets or new arrangements of production and consumption based on the social mobilisation, which creates these new governance structures.

A key point for the emergence and expansion of AFNs is that the spatial and relational distance between consumption and production in long production chains makes consumers unaware of the product's origin, aggravating the context of food insecurity (informational distance). Thus, the key Short Food Supply Chain (SFSC) feature is bringing consumers and producers together (MARSDEN; BANKS; BRISTOW, 2000; AUBRI; CHIFFOLEAU, 2009; BRANDENBURG, 2002).

AFNs typically operate in short food supply chains. However, despite the usefulness in differentiating short food supply chains from long ones, the concept of AFN is limited in analysing the participation and autonomy of consumers and farmers in the chains, as well as the social relationships involved in production-consumption relations.

[4]Nested markets are hybrid markets that, in the local sphere, are taken as alternative and entrenched, while at the same time intermingling with dominant conventional markets (GRADE; MERGEN; ROVER, 2021).

SFSCs are frequently linked to organic food consumption (KNEAFSEY *et al.*, 2013). That is because the context of low confidence and doubts regarding highly processed contemporary food has stimulated the creation of groups of organic food consumers in urban areas who seek to ensure knowledge of the origin of the food. The combination of ecological agriculture and short food supply chains has a positive impact on various dimensions, including social, environmental, and economic aspects. It also generates employment and income, while at the same time enhancing the value of natural resources and the landscape (DAROLT; LAMINE; BRANDENBURG*,* 2016).

Different approaches define short food supply chains: informational, relational, and spatial. The informational approach highlights SFSCs where consumers are aware of the origin and identity of the product consumed (MARSDEN; BANKS; BRISTOW, 2000). In other words, consumers have the necessary tools to know with certainty how, where, and by whom a product was produced, including details about the production system, location, and producer (ROVER; DAROLT, 2021).

This approach is fundamental because, as pointed out by Preiss (2017), the distance in long food supply chains has cognitive aspects, as the identities and contexts of producers and consumers become veiled. This, in turn, contributes to a process of alienation and loss of knowledge regarding food production, processing, and consumption processes.

The relational approach focuses on the closer relationship between the actors in the chain by reducing the number of intermediaries (MARSDEN; BANKS; BRISTOW, 2000). According to some authors, SFSCs are distribution circuits that involve at most one intermediary. These chains operate in a way that fosters close engagement between producers and consumers, and they often have interactions with other actors within the food system (ROVER; DAROLT, 2021). In this approach, SFSCs are those capable of incorporating social and relational aspects present in the link between consumer and producer in the processes of local development and food territorialisation (AUBRI; CHIFFOLEAU, 2009; BRANDENBURG, 2002).

In the spatial approach, SFSCs are considered to be those where there is geographical proximity between consumers and producers. The notion of spatial proximity varies depending on the territory under analysis. Rover and Darolt (2021) identified that in Southern Brazil, farmers could travel up to 200 kilometers for direct sales while still maintaining the characteristics of SFSCs.

In light of the necessity to gain a deeper understanding of food networks and their impacts, Civic Food Networks (CFNs), which will be the focus of this research, emerge as a complementary category to the concept of Alternative Food Networks (AFNs). CFNs emphasise the significant role of consumers in acting as engaged citizens (RENTING; SCHERMER; ROSSI, 2012). Within CFNs, the ideal consumer is not perceived merely as the endpoint of the supply chain. They are not seen as passive recipients of final products resulting from the production process. Instead, they are viewed as agents of political consumption. These consumers take ownership of social and environmental issues, recognising how the hegemonic food system negatively affects their personal quality of life and the planet as a whole. Consequently, they actively seek out food options that challenge this system (PORTILHO, BARBOSA; 2016).

Civic Food Network is a theoretical pespective used to describe a collective of individuals and organisations engaged in civic and coordinated actions across all phases of the food system (RENTING; SCHERMER; ROSSI, 2012). Furthermore, these Civic Food Networks, in their different varieties and contexts, contribute to new food strategies and policies (PORTILHO; BARBOSA, 2016; RENTING; SCHERMER; ROSSI, 2012).

CFNs operate in short food supply chains. The central element of the Civic Food Networks approach is food democracy. The term highlights the role of the citizen in food control and management (RENTING; SCHERMER; ROSSI, 2012). Participation, self-organisation, actors' autonomy, and local control in the food system are citizenship elements in CFNs (RENTING; SCHERMER; ROSSI, 2012).

Additionally, by considering Civic Food Networks as social networks, we can integrate research findings from this field of study to enhance our comprehension. For Diani (2011), it is necessary to consider the spatial dimension of social networks, understanding that they are deeply embedded in the territory. Diani (*Ibid.*) examined the contributions of network analysis to the study of collective actions and emphasises the importance of comprehending the context in which individuals become part of these movements within networks. Furthermore, it is crucial to elucidate how networks function, and the implications this has on the involvement of participants.

Food movements emphasise food activism and reflect the grouping of initiatives and organisations in networks where political and social commitments guide their practices (SBICCA *et al.*, 2019). Some authors suggest the study of social food movements or "*food*

movement networks" to understand collective actions and social-based formations intended to challenge the dominant system and the distribution of power (SBICCA *et al.*, 2019; RENTING; SCHERMER; ROSSI, 2012).

Darolt, Lamine and Brandenburg (2016) identified that, despite different historical and geographical contexts, there are alternative food network initiatives in France and Brazil with characteristics resembling those of CFNs (though not explicitly named as such by the authors). These include social cooperation and partnerships between producers and consumers, short food supply chains, and the reconnection between production and consumption. They also entail the revitalisation of local markets with territorial identity, along with the enhancement of the circulation of distinct quality products. These chains originated in social movements favouring ecologically based agriculture and share ideas with a solid political significance – which allows, to some extent, to readjust production to more sustainable systems, as well as to rethink diets and eating habits, strengthening ties between rural and urban areas.

Food networks can originate from the active involvement of various actors within specific regions, including farmers organisations, consumer organisations, government initiatives, and support entities (RENTING; SCHERMER; ROSSI, 2012; BRUNORI; ROSSI; GUIDI, 2012; SOUZA *et al.,* 2021).

The role of consumers and how they are placed in this context is a crucial point for understanding CFNs. In the traditional view, consumption is understood as an individual act belonging to the private sphere and guided by individual interests. In this vision, the act of consuming will continuously strengthen the capitalist system (BRUNORI; ROSSI; GUIDI, 2012). However, in the discourse surrounding food networks, certain studies bring to light critical aspects of these alternative food networks, particularly concerning the perpetuation of consumption patterns inherent to the capitalist system.

One of the main emerging criticisms is that the emergents food network do not contribute to a redesign of the food system and do not act in the deconstruction of social inequalities (GOODMAN *et al*., 2012; MARSDEN; MORLEY, 2014). Furthermore, critical arguments point out that these networks perpetuate individualistic consumption behaviors that are typical of the capitalist system (*Ibid*.). When looking at the data collected, our research will empirically address such criticisms, confronting them with the civic food networks found in each territory studied.

Finally, we would like to highlight and define two concepts discussed in this literature review that are fundamental to understanding this research: Short Food Supply Chain and Civic Food Networks.

The SFSC concept used here was based on Rover and Darolt (2021). It is the one that comprises the food supply chains that have (I) at most one intermediary; (II) acting in an engaged manner between production and consumption, interacting with one and the other, as well as the other actors in the system; (III) and in which the assumptions of informational proximity are respected, as described in the literature review.

For the CFN definition, based particularly, on Renting, Schermer, and Rossi (2012), we consider it as the outcome of the interaction of various actors, performing in a civic and articulate manner throughout the food system, encompassing the production, distribution, and consumption axes. Citizenship elements encompass participation, self-organisation, actors' autonomy, and local control within the food system (*Ibid.*).

3 METHODOLOGY

3.1 METHODOLOGY - THEORETICAL BASIS

The research method used is the study of multiple cases. This method was chosen because it is a suitable approach when research questions seek to explain of how, why, where and with whom a social phenomenon works. It becomes even more relevant when describing this phenomenon broadly and profoundly. The case study is appropriate when there is a need to know individual, group, organisational, social and political complex phenomena (YIN, 2015).

The method of multiple case studies allows the description of Civic Food Networks (CFNs) as complex social phenomena and the understanding of how these networks can contribute to the promotion of agroecology (*Ibid.*).

Case studies are empirical research instruments that investigate a contemporary phenomenon in depth and in its actual context, especially when the boundaries between the phenomenon and the context are not clearly outlined, i.e., it is used for understanding phenomena that encompass necessary contextual conditions (*Ibid.*). In our work, the technique consisted of multiple case studies, with two being carried out, one in the Grande Florianópolis Region and the other in the Province of Trento. The case studies are descriptive

and analytical in type, based on qualitative and quantitative evidence. In a multiple case study, each case study consists of a complete study (*Ibid.*).

The cases were analysed comparatively. The comparison allows us to break with the singularity of events, formulating laws capable of explaining the social components aspects. Comparison as a cognitive process is inherent in studying social phenomena (SCHNEIDER; SCHIMITT, 1998) and consists of systematic and ordered procedures to examine relationships, similarities, and differences between two or more objects or phenomena with the intention of drawing specific conclusions. Thus, the term comparison is synonymous with 'comparative method', often used as a 'research scientific method' (YIN, 2015).

The analysis of the phenomena can investigate their causes or effects and properties (COLINO, 2009). This work describes the phenomena of Civic Food Networks and their impact on the specific theme of agroecology.

This study will compare the food networks present in the two study locations, evaluate them from the perspective of CFNs, and analyse them using agroecological indicators.

The case studies used multiple sources of evidence: the collection of information and documents, direct and participant, semi-structured interviews with key actors and structured interviews including the application of questionnaires, with farmers. Direct observation consists of observation of the phenomenon in the field (YIN, 2015). Participant observation is carried out in direct, frequent and prolonged contact of the investigator with the social actors in their cultural contexts, and the observer himself is integrated into the object of analysis (MORSE, 2007).

Interviews are guided conversations that must follow a consistent line of research (YIN, 2015). Consequently, the interviews were semi-structured, guided by question prompts rather than multiple-choice queries, facilitating a free expression of ideas by the interviewees regarding the investigated subject (QUIVY; CAMPENHOUDT, 2005). Both, semi-structured interviews and structured interviews (with questionnaire applications) were conducted in person and online through the Google Meet[5] platform.

These sources of evidence will be elaborated upon in further detail in Section 3.2, where the methodological tools and procedures are presented.

[5] Available on: https://workspace.google.com/products/meet/

3.1.1 Social network analysis (SNA) - analysis of relations and interactions

This section aims to introduce the social network analysis tool, which is one of the tools used in this work to identify Civic Food Networks in the studied territories based on the networks of farmers and organisations connected to SFSCs in the Province of Trento and the Grande Florianópolis Region (GFR).

Part of the power of the network concept is that it provides a mechanism for an indirect connection between different parts of a system that can affect one another. Networks are ways of thinking out social systems, focusing on the relationship between the entities that form the system, called actors or nodes. Nodes can be individuals or groups, organisations and institutions. Connections between nodes also have features that, in network analysis, are considered ties or links (BORGATTI; EVERETT; JOHNSON, 2013).

These relationships may be definitive or occasional. Established relationships are similarities, relational roles, or cognitive relationships. Relationships by similarity occur when there are common attributes between nodes belonging to the same locality or participating in something in common. Events can be interactions such as "buy from", "sell to ", and "talk to". Interactions can be associated with other events, like flows. For example, there can be flows of information, knowledge, money, etc. Interactions can generate established relationships, and from interactions can arise, for example, friendships or trust (*Ibid.*).

Social networks can be analysed as an adjacency matrix, where rows and columns represent nodes, and an entry in the row and column represents a link between these two nodes. Interactions can be quantified through the cohesion measure, which expresses network connectivity. Density, one of the simplest measures of cohesion, is essentially the number of links in the network expressed as a proportion of the total possible connections. Density is typically used for comparative purposes and can be applied to compare networks of different sizes, since this coefficient considers the number of nodes in the network (*Ibid.*).

The matrices can be employed to assess various categories, as in this research, where we investigated farmers' interactions with organisations. We used the betweenness centrality measurement to comprehend and compare the performance of actors in these networks. This measure examines an actor's position within the network and evaluates to what extent other actors depend on them to access the rest (*Ibid.*).

High betweenness centrality values indicate how much an actor plays the intermediation role and is typically interpreted as potential control across the network. Thus, the players with

the highest indexes can filter information and influence the network through restrictions or incentives (BORGATTI; EVERETT; JOHNSON, 2013; DA SILVA *et al*., 2013).

Another way of analysing networks, other than matrices, is represented in the form of graphs. Both matrices and graphs are mathematical conceptualisations. The graph consists of a set of nodes (vertices) and a set of lines (edges) that link pairs of nodes. The graphic illustration visually represents and allows for the analysis of the studied networks (BORGATTI; EVERETT; JOHNSON, 2013; DA SILVA *et al.*, 2013). All the matrices were illustrated as graphs. Graph illustrations and measurements were processed in the UCINET software (BORGATTI; EVERETT; FREEMA, 2002).

3.1.2 Verification of agroecology promotion

Table 1 presents the categories of analysis to evaluate agroecology promotion – defined based on the theoretical framework described in this study (H. L. P. E., 2019; GLIESSMAN, 2000; ALTIERI, 2012) – and their indicators. The ecological indicators were based on the case study of Rover *et al*. (2020) and adapted for the present research work. This framework was elaborated in a way that would allow one to analyse which CFN elements in the networks promote agroecology and which would stimulate more or less each variable in their territories.

Table 1. Analytical framework

Variables	**Indicators**
Biodiversity	• Number of species, varieties/breeds and traditional varieties/breeds cultivated (agrobiodiversity) • Native vegetation (%)
Resources efficiency	• Use of their autonomous inputs • Use of agroecological management (practices)
Self-produced food	• Perception of importance • Relevance in family feeding (%)
Sharing experiences	• Density of exchange of information on agroecological practices between farms

Source: created by the author

3.2 METODOLOGY - PROCEDURES AND INSTRUMENTS

The research consists of two case studies to be analysed comparatively. It comprises the territories of the Province of Trento in Italy and the Grande Florianópolis Region in the Brazilian state of Santa Catarina.

The methodology of this research will be divided into two stages. Summarily, one stage describes the empirical context, and the other analyses it. We first verify the answers found to the question established as the general objective of this research: understand if there are CFNs in the studied territories and how would these networks contribute to the promotion of agroecology in the study territories. The procedures carried out for each of these steps are summarised in Table 2. Data collection was conducted from April to July, 2018 and November, 2020 to April, 2021, in Italy, and from August, 2018 to October, 2019 and June, 2021 to December, 2022, in Brazil.

Table 2. Methodological research procedures

Description of the empirical context	collection of information and documents
	direct and participant observation
	identification of social actors and experiences of the territory (agroecological farmers, experiences of short agroecological food supply chains, support entities and public institutions and initiatives)
	identification of key actors for semi-structured interviews
Analysis for answers verification	semi-structured interviews with key actors
	application of a structured interviews using questionnaires, with agroecological farmers involved in SFSCs
	case study analyses and comparative analysis

Source: created by the author

The description of the empirical context consisted of the description and characterisation of the actors involved in local food networks, short food supply chains, and agroecological production. The SFSCs served as a starting point for the identification of possible Civic Food Networks, since a central element for citizenship of the players is the greater participation in the food system that occurs through the SFSCs, in which consumers and farmers have greater participation and autonomy compared to the long food supply chains.

To this end, the procedures carried out included collecting information and documents, doing direct observation, mapping the actors in the territory, and identifying key actors. In

addition, the semi-structured interviews contributed to the stage of empirical context description and to the answers analysis and verification stage.

The information and documents collection involved official institutions' websites, local libraries, news pieces, and institutional publications. Likewise, it entailed academic work in the research group database in which this study is locally inserted: Laboratory of Family Agriculture Commercialisation (LACAF), in Brazil, and *Nutrire Trento* project, in Italy.

The direct observation occurred in the context of developing the community outreach and research projects in which this work is inserted. From the information obtained – in the observations (for both study territories) and the collection of information and documents –, key actors were identified, with which semi-structured interviews were carried out. Thus, 22 in-depth semi-structured interviews were conducted with key actors (11 in each territory). These interviews were critical to the design of the territorial context and description of the food networks, as well as how these actors interrelate. The answers were also relevant to investigate whether those actors perceive that the networks they are part of contribute to the advancement of agroecology.

The key actors interviewed are related to agriculture, agroecology and short food supply chains in the territories. There include representatives of producer organisations, consumer organisations, support organisations, and researchers, among others.

Subsequently to the semi-structured interviews with key actors, we apply structured interviews, including the application of questionnaires, with farmers. These structured interviews aimed to assess the farmers' perception of how their network relations contribute to the advancement of agroecology within their farms. Additionally, we sought to identify the elements of agroecology present in these establishments and their practices.

Farmers' selection started from a combination of two instruments: the previous mapping of the territories (map of the Civic Food Networks of the GFR and *Nutrire Trento* Map), besides farmers nominated by the key players. The focus was on agroecological farmers in short food supply chains, who represented a comprehensive coverage of the territory and who were somehow related to the various players, institutions, and initiatives of food networks.

Though we acknowledge that there are differences between organic and agroecological farming (NIEDERLE; ALMEIDA 2013), we chose to use organic production as an initial reference, and in the cases indicated by the main stakeholders, non-certified agroecological farmers were also consulted. This methodological choice is only relative to the choice of the

sample, but the verification of the promotion of agroecology took place on the basis of agroecology indicators, in addition to institutionalised organic certification.

In the province of Trento, all the organic farmers from the Nutrire Trento Map who were willing to participate took part in the survey. The structured interviews, including the application of questionnaires, were administered to 19 farmers in the Province of Trento. Similarly, in the GFR, all the farmers who were mapped and recommended by key actors were invited to participate in the structured interview phase, and interviews were conducted based on their availability. Additional referrals were sought from the respondent farmers until a total of 19 structured interviews were completed.

The structured interviews, when authorised by each farmer, was recorded in audio format, so comments and perceptions from farmers could be used in the qualitative analyses. The questionnaire comprised three sections: a) general information on the family farmers; b) practices (related to production and marketing); and c) food networks.

In the section covering practices, we investigated elements such as self-produced food, agrobiodiversity, conservation of natural resources, the origin of resources (seeds and seedlings, fertilisers, etc.), agroecological management and practices, and supply channels. Additionally, we aimed to identify the influence of different supply channels on agrobiodiversity. For quantitative data analysis, we employed measures like mean dispersion, standard deviation, and quartiles.

In the final section of the questionnaire, which was designed to support the analysis of social networks (food networks), the following aspects were explored:

- Understanding the relationships among farmers within the territories;
- Investigating how farmers interact with each other and with organisations;
- Understanding whether the networks formed can be considered Civic Food Networks (CFNs);
- Exploring how participation in these networks influences the promotion of agroecology.

To analyse these network interactions, the method involved asking farmers to identify the five individuals with whom they had the most frequent contact. Furthermore, we sought to identify the types of interactions that existed within these networks. These interactions were categorised into the sharing of information about agroecological practices, friendship, collaborations for commercialisation, social participation and organisation (through co-

management of resources, development of projects for the territory, and construction of public policies), and exchange of seeds and seedlings.

The methodological choice of asking each farmer to identify the five farmers with whom they had the most contact allows farmers to freely mention these contacts without specifying the relationships in advance was. This choice was intended to identify the most relevant connections. By focusing on five contacts, the primary goal was to identify the most significant relationships. It is important to note that these 19 farmers and their relationships represent a sample of the relationships present within the network.

To understand farmers' interactions further, they were asked whether they had any connections – which could include integration or participation in joint projects – with the listed institutions and organisations within the territory. The initial list of institutions was compiled based on data obtained during the empirical context description. Furthermore, farmers were encouraged to add any other organisations and institutions with which they have had or currently have relationships.

This approach allows for a comprehensive analysis of farmers' interactions and connections within the food networks and with various institutions and organisations in the studied territories. It provides valuable insights into the dynamics of these networks and their impact on the promotion of agroecology.

To determine whether the networks formed can be classified as Civic Food Networks, the definitions and criteria mentioned in the section 2.2 were utilised. CFNs are typically characterised by the active and participatory engagement of various actors in the food system, including farmers and consumers who act as citizens in shaping the food system. The citizenship elements within CFNs encompass participation, self-organisation, actors' autonomy, and local control within the food system (RENTING; SCHERMER; ROSSI, 2012). For the analysis of CFNs and their interactions, the parameters from Table 3 were used.

Table 3. Parameters for the analysis of relations in networks

Categories/variables		Descriptors/indicators
Relations between actors	• Sharing information on agroecology • Marketing collaboration • Participation in an association or group social arrangements • Swap seedlings • Friendship	• Density
Centrality	• Farmers • Organisations/institutions	• Betweenness centrality
Network structure	• Centrality distribution	• Actors' distribution and graphs structure

Source: Created by the author

The aforementioned methodology is used for the two case studies, in the Province of Trento and in the GFR, and it enables the comparative study. Furthermore, in Florianópolis' case study, two complementary questions were added to analyse the interactions with organisations. Those wew aimed at deepening the research on the confidence of farmers in these players and their perception about the contribution of organisations to agroecology. The specific details of data collection for each territory will follow within the articles presented in the next chapters.

4 ARTICLE 1: FOOD NETWORKS AND AGROECOLOGY IN THE PROVINCE OF TRENTO – ITALY*

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ABSTRACT

As the hegemonic food system is unsustainable in socio-environmental terms, over the last few decades the search for new forms of food supply has fostered alternative food networks (AFN). Civic Food Networks (CFNs) are a particular subset of AFNs that strongly emphasise the citizenship of the actors involved, including farmers, and their active engagement in the food system. Our objective was to identify CFNs within the studied territory, evaluating farmers' participation, and answer if the CFNs are contributing to the promotion of agroecology. The research comprises a case study in the province of Trento (Italy). Direct and participant observation, database consulting, document analysis, and interviews with key players and organic farmers linked to short food supply chains (SFSCs) were employed. The contributions to the promotion of agroecology were evaluated through ecological and socioeconomic elements, including biodiversity, efficient use of resources, and self-produced food. We identified the presence of initiatives that promote discussion spaces and stimulate the construction of SFSC experiences. Those initiatives have provided space for the formation of new networks, as well as created opportunities for new relationships, production and consumption networks. However, organisational structures that favour monocultural systems and commercialisation in long food supply chains prevail in the territory and hinder these innovations. Though the collective organisations of farmers, outside the formal cooperatives, are still developing, farmers are often individualised and with little active participation in decision-making processes within the territory. This study identified an embryonic CFN that showed positive indicators of agroecology for all the analysed aspects. However, the differences were not as significant when compared to other farmers who also participate in SFSCs. This research reinforces that there is promotion of agroecoloy, from the maintenance and encouragement of short food supply chains that are proponents of agrobiodiversity, to the maintenance of family farmers' livelihoods. CFNs have the potential to empower rural actors by providing them with greater participation and autonomy. Nevertheless, strengthening these networks remains a challenge, as it requires stimulating social organisation and fostering the integration of various actors within the territory, including rural stakeholders.

Keywords: Short food supply chains, Food Democracy, Family farmers, Social network analysis, Biodiversity.

4.1 INTRODUCTION

Since the second half of the 20th century, the hegemonic food system's environmental, social, and economic consequences have been increasingly apparent, examples of which include deterioration in the social conditions of farmers, poisoning of the ecosystem by pesticides, and reduction in biodiversity. This system, despite having set out to feed the world's population, did not achieve its purpose, and over 50 years after the Green Revolution there are more than 820 million people in severe food insecurity (hunger) globally (FAO *et al*., 2018), on top of a major crisis of mistrust in food caused by food scandals (DÍAZ-MÉNDEZ; ESPEJO, 2014; TRUNINGER, 2013; BRANDENBURG, 2002).

As the hegemonic food system is undoubtedly unsustainable in socio-environmental terms, agroecological production is arising the interest of a wide range of players worldwide (BRANDENBURG, 2002; HOWARD, 2012; GLIESSMAN, 2020). Agroecology is based on the ecology of natural systems that are efficient and resilient because in them occur ecological processes that interrelate and guarantee their balance. This model is based on species diversity and the maintenance of natural cycles and nutrient recycling (MACHADO, 2014; NICHOLLS; HENAO; ALTIERI, 2015).

Over the last few decades, the search for new forms of food supply has fostered alternative food networks (AFNs). The AFNs main strategies have been the reduction of the distance in supply chains (SFSCs), the establishment of proximity in the relationship between producers and consumers, and the encouragement of the production of quality food with less environmental impact (SBICCA *et al.,* 2019; RENTING; SCHERMER; ROSSI, 2012).

Analysing agroecological massification in diverse case studies across different countries, Mier y Terán Giménez Cacho *et al*. (2018) concluded that the social fabric constitutes the cultural medium on which agroecology grows, since it provides the structure through which values, meanings, lessons learned, and horizons of political action circulate.

Agroecology can be concomitantly understood as science, agricultural practice, and social movement (CAPORAL; COSTABEBER, 2004; ALTIERI, 2012; GUZMÁN CASADO *et al*., 2000; GLIESSMAN, 2000). The agroecological social movement has emerged in several countries, often linked to peasant movements and connected with a diversity of social actors, institutions, and organisations. This social movement has been fundamental to achieving public policies that allow the expansion of agroecology (CAPORAL, 2011).

Mier y Terán Giménez Cacho *et al*. (2018) have found that markets contribute more to agroecological movements when embedded in networks whose unifying elements are environmental and social values. According to the same authors, though the development of AFNs is not a necessary condition for the adoption of agroecological practices by farmers, markets are a strategic sociopolitical arena for scaling agroecology. Likewise, the adopted market arrangement is a key aspect to enlarge its contributions to food-system transformation.

Some researchers argue that the AFNs theoretical approach is insufficient to analyse the social movement around food and explain the activist nature of stakeholders in food, social and environmental issues (SBICCA *et al.*, 2019; RENTING; SCHERMER; ROSSI, 2012). In this context, the so-called Civic Food Networks (CFNs), in addition to opposing the hegemonic food system, emphasise the citizenship characteristic of players' actions around the food system, articulated in the axes of production, distribution, and consumption (RENTING; SCHERMER; ROSSI, 2012).

Civic Food Networks represent innovations that promote practices with the potential to foster more sustainable and agroecological food systems, although in the debate on food networks, some studies have pointed out critical aspects of these initiatives. For example, regarding the economic and environmental sustainability approaches, one of the main criticisms that frequently emerges from the literature is that of not dismantling the pre-existing social inequalities, but rather perpetuating them, consolidating and legitimising phenomena of individualism and mistrust in market initiatives (GOODMAN *et al*., 2012; MARSDEN; MORLEY, 2014). These food movements could favour wealthy segments of society while causing food networks initiatives' outcomes to be restricted to commercial products, rather than channel socioeconomic development (TREGEAR, 2011).

Starting from this dilemma, Civic Food Networks – the main object of this research analysis – emerge from the concept of AFNs as a complementary category and highlight the role of civil society in the control and management of food (RENTING; SCHERMER; ROSSI, 2012). By approaching the civic perspective, the CFN concept highlights how the relationship between consumption and citizenship can be an agent of political and socio-environmental transformations (PORTILHO BARBOSA, 2016).

The ethical values and qualities of the alternative food networks have been captured by mainstream companies that use slogans as a commercial strategy, but who in reality are weakening social movements and reinforcing the hegemonic food system (GOODMAN *et al*.,

2012). There is an ongoing discourse competition in which agribusiness responds to agroecological movements with labels such as "organic", and "transgenic free" – which, in turn, forces social movements to make increasingly fine and political distinctions between true agroecology and corporate greenwashing (MARTÍNEZ-TORRES, 2006; ROSSET; MARTÍNEZ-TORRES, 2012).

Given the existing criticisms about alternative food networks, it is necessary to understand if these new market arrangements that are being driven by the advancement of the food movement discourse are contributing to more sustainable food systems. In this paper, the aim is to identify the agroecological practices present in alternative food networks; to understand whether these can be considered Civic Food Networks; and to answer whether and to what extent do Civic Food Networks contribute to the promotion of agroecology.

Studies have described the emergence of a citizen movement centred around food, led by consumers who are building new arrangements for production and consumption. These consumers seek to have greater knowledge, participation, and control over the processes that involve their food (ROSSI, FAVILLI, BRUNORI, 2013; RENTING; SCHERMER; ROSSI, 2012). Similarly, studies conducted in other territorial contexts indicate the role and organisation of farmers in the development of collaborative networks for marketing in short food supply chains (SOUZA *et al*., 2021).

The concept of CFNs that guides this work is based on Renting, Schermer, and Rossi (2012), in which Civic Food Networks are the result of the citizenly articulation of diverse social actors, such as institutions, social organisations, farmers and consumers, acting throughout the food system (production, distribution, and consumption). The term Civic Food Network highlights the citizenship aspects of these food networks, which are manifested in: the greater participation of actors (farmers and consumers) in the food system, short food supply chains and the local control of food production, distribution, and commercialisation; the self-organisation and autonomy of the actors; and, therefore, the greater empowerment of citizens in the design of the food system (RENTING; SCHERMER; ROSSI, 2012).

Research conducted in southern Brazil (MIRANDA *et al*., 2021; PUGAS *et al*., 2023; SOUZA *et al*., 2021) contrasts with studies carried out in the European context (BRUNORI *et al.*, 2012; FORNO; MAURANO; VITTORI, 2019; ROSSI, FAVILLI, BRUNORI, 2013). European studies emphasise consumer organisations within Civic Food Networks, in contrast

to Brazilian studies, which highlight a trajectory of rural actors as the basis for establishing short food supply chains and promoting agroecology.

In the northern part of Italy, the region studied in this research, the consumer movement around food is consolidated through GAS (*Gruppi di Acquisto Solidale*, or Solidarity Purchase Groups), which are grassroots initiatives where consumers come together to purchase food directly from local farmers and producers (FORNO; GRAZIANO, 2014; FORNO; MAURANO; VITTORI, 2019). It is important to highlight that Civic Food Networks are networks that encompass various actors within the food system. Thus, in this study, taking into consideration CFNs as networks that also include organised farmers, we aim to analyse the existence of such networks in the study area. Our focus is on identifying and understanding these Civic Food Networks where farmers play an active and organised role alongside other actors within the food system.

4.2 METHODOLOGY

This research consists of a case study, and its fieldwork followed a two-stage research design that aims to evaluate the elements of citizenship in food networks in the territory. It also set out to analyse whether there are elements of Civic Food Networks in the food networks initiatives in the Province of Trento, and to what extent CFNs contribute to the promotion of agroecology. Data collection was conducted from April to July, 2018, and from November, 2020 to April, 2021.

The research was first conducted with local stakeholders linked to a short food supply chain and to agroecology, which contributed to understanding the specific characteristics of the Province of Trento.

The instruments used in this first stage were: information and documents consultation, direct and participant observation, and semi-structured interviews with 11 key players of different roles related to agroecological agriculture in the Province of Trento. The observations were carried out within the meetings of the *Nutrire Trento* project, organised by the municipality of Trento and the University of Trento, which started in 2018 and established a discussion space for a food policy by stakeholders of the local food system. Besides providing space for observation, this project also contributed with a database for the collection of information and documents.

In the second stage of the investigation, we collected data through a structured interviews, using questionnaires, applied to 19 agroecological family farmers in the Province of Trento and adhered to the map of *Nutrire Trento*[6]. This map pinpointed small farmers who marketed short food supply chains and voluntarily joined the project platform. All 26 farmers on the map linked to agroecological production were contacted and 19 of them participated in the research. This selection criterion was used due to the understanding that the participation in a short food supply chain of agroecological food, coupled with the adhesion of these farmers to the platform of the *Nutrire Trento* project, would be a starting point to identify Civic Food Networks involving farmers. It is important to emphasise that the study does not aim to study only the networks related to *Nutrire Trento*.

To identify agroecological farmers, a combination of two elements was used as a starting point: organic certification and pointed out by key actors. It is known that there are differences between organic and agroecological production (NIEDERLE; ALMEIDA, 2013). However, we used organic production as a reference, understanding that organic agriculture brings basic elements for agroecology, such as the non-use of pesticides. This methodological choice is related only to the sample selection, but the assessment of the promotion of agroecology was based on agroecology indicators, beyond institutionalised organic certification.

The questionnaires had three main areas: characterisation of farmers and farms; investigation of production and supply chain practices; and investigation of the relations of these farmers with organisations and institutions, as well as with other farmers.

This study was reviewed and approved by the Ethics Committee on Research of the University of Santa Catarina. The participants provided their written informed consent to participate in this study.

For the analysis of the data we used indicators of agroecology and social network analysis. For the analysis of quantitative data we used measures of mean dispersion, standard deviation and quartiles

4.2.1 Agroecology indicators

In this section, we present variables and their respective indicators used in the present

[6] Map of Nutrire Tento, available at https://nutriretrento.it

research to evaluate the promotion of agroecology. We chose to use indicators because agroecology is a broad concept and the construction of indicators allows us to delimit the research and to compare the results with those of other case studies. The study was based on the case study of Rover *et al*. (2020), but the indicators were adapted for the present research. Next, we point out the elements of agroecology that allowed us to arrive at these indicators.

The concept guiding this work is the one presented by Gliessman (2000), in which agroecology is defined as the application of principles and concepts of ecology in the management and design of sustainable agroecosystems, establishing alternative models to the agroindustrial (hegemonic) pattern of production.

We designed the analytical framework for the evaluation of the promotion of agroecology descriptors (Table 1). The variables cover ecological aspects, namely: biodiversity, resources efficiency, and agroecological practices; and socioeconomic aspects, namely: production for self-consumption. The results of descriptors and indicators will come from different data collection tools (semi-structured interviews, structured interviews through the application of a questionnaires, as well as direct and participant observations). The construction of these indicators was based on the theoretical review presented in Section 2.1.

4.2.2 Network interactions

To support the analysis in this research, we referenced and described knowledge from Social Network Analysis (SNA) in Section 3.1.1. We also investigated farmers' interactions with one another and their connection with institutions and organisations in the territory. To analyse interactions among farmers, the methodology was to ask them which five farmers they had the most frequent contact with and what types of relationships existed between them. From the answers, a directional matrix was built between the 19 respondent farmers and the farmers mentioned, which was then plotted in the form of a graph.

We chose to use an open-end method, as described by Borgatti, Everett, and Johnson (2013), because we wanted to identify whether these social interactions existed in the networks studied, rather than starting from a previously known network. We applied the fixed-choice of five nominations per farmer because this way we could focus on the most relevant existing interactions. This choice brings us a sample of the existing relationships from the 19 respondent farmers.

The relationships investigated were: exchange of information about agroecological production practices, friendship, collaboration for commercialisation, joint participation in groups or associations, participation and social organisation (through co-management of resources, development of projects for the territory, and construction of public policies), and exchange of seeds. The density of each type of relationship was measured by calculating the total number of possible ties, considering that each farmer could nominate up to five farmers.

To investigate the activities of organisations and institutions, farmers answered which ones they were a part of at the time. The networks between farmers and organisations formed a matrix of farmers by institutions and organisations, which was also illustrated in the form of a graph.

A measure of intermediation (betweenness centrality) was applied, allowing us to understand which institutions/organisations have a greater capacity for intermediation, as well as how they interconnect through the farmers. All graphical illustrations and measures were processed in UCINET software (BORGATTI; EVERETT; FREEMA, 2002).

Based on the information obtained from the analysis of network interactions and the complementary information from the local stakeholders and farmers, we tried to understand the components of citizenship, identifying the elements of participation, self-organisation, and autonomy of the actors (farmers and consumers) in the food system and the local control of production, distribution, and commercialisation of food.

4.3 FINDINGS

The province of Trento is characterised by its agricultural farms, which cover most of the territory and therefore have significant importance in the landscape and the conservation of

natural resources and biodiversity[7]. In its majority (97.2%), the farm units are conducted mostly by family labour. The main crops of the territory are grapes and apples, which together account for more than 81% of the province's agricultural area. This monoculture trend extends to organic agriculture, where, also, about 80% of the organic cultivated area is composed of the aforementioned crops (SPAT, 2014).

The Province of Trento used to have diversified subsistence agriculture, involving vegetables, grain, and animal production. Agriculture was done using traditional methods and with typical features of mountain farming. With the worsening of the economic crisis after the two World Wars, agriculture was rebuilt through monoculture and commercialisation by cooperatives in long chains aimed at external supply beyond the Province.

Agricultural cooperatives and the local state played an important role in this reconstruction and made it possible for many families to continue on and return to agriculture, in a context where the farms were fragmented by hereditary laws and resulting in small areas. Despite the recognition of the importance of this support that the province and the cooperative system have given to agriculture, interviews with actors in the territory show that this system supports intensive, monocultural agriculture and long food supply chains. It is also clear that the strength of this highly consolidated system creates difficulties for those who wish to maintain a different type of production and commercialisation.

In contrast to long food supply chains in the territory, alternative food networks, such as the GAS (*Gruppi di Acquisto Solidale*, or Solidarity Purchasing Groups), have been developing. The Solidarity Purchasing Groups are consumer groups organised for collective purchasing and mobilised for recurrent food purchasing in large quantities. Thirty-three GAS have been identified in the Province of Trento, which are distributed fairly widely in the territory, especially in the areas with the largest urban concentrations, the municipalities (*comuni*) Trento, Rovereto, and their surroundings.

The widespread distribution and presence of GAS in the territory indicates a strong movement of consumers and a significant channel for short food supply chains. However, it does not necessarily guarantee the effective participation of other actors in the food system. In the Trentino territory, other initiatives have been identified that strengthen Civic Food

[7] Total agricultural area of 408,864 hectares, corresponding to 66% of the province area (620,686 hectares) (ISPAT, 2014).

Networks, involving a diversity of actors, including rural stakeholders. Below, we will describe the elements of the Civic Food Network in Trento and its development over time.

4.3.1 The components of the Civic Food Network of Trento and its history

4.3.1.1 Nutrire Trento project and CSA Naturalmente

In 2017, Trento's Municipality (C*omune*) started a process that aimed to develop policies and support actions to increase sustainable food production through a specific public notice. In this context, the *Nutrire Trento* project was created as a collaboration between the Municipality of Trento and the Department of Sociology and Social Research of the University of Trento (DSRS/UniTN). The latter set up a multi-stakeholder workshop in the territory, with the aim of coordinating existing local food initiatives and expanding them to include civil society. Participating players include farmers, trade unions, consumers, institutions, associations, schools, universities and research institutes.

The first product of this project was the development of the map of *Nutrire Trento*, an interactive map of short food supply chain initiatives that interlinked supply and demand of food in the territory. With the involvement of the university in this project, its work is not restricted to the promotion of short food supply chains, but also aims to investigate which relational and institutional stakeholders favour or prevent sustainability and the activation of innovative practices. Despite the centrality of *Nutrire Trento* among the respondent farmers, recurring participation in the project's regular meetings is more predominantly of students and researchers than of farmers.

Nutrire Trento consolidated a multi-stakeholder discussion space on local food system that has pushed other initiatives, in the course of the four years of project up to when this research was conducted. As an example, the CSA[8] *Naturalmente* developed from the relationships established in a pilot project that emerged in the pandemic, the *Nutrire Trento*

[8] *Community Supported Agriculture* - Term set out in the *European CSA Declaration* adopted during the third European CSA Meeting in 2016 in Ostrava, Czech Republic. Available at: https://urgenci.net/wp-content/uploads/2016/09/European-CSA-Declaration_final-1.pdf

phase 2[9]. After the end of the *phase 2* project, the farmers involved, together with the municipality of Trento and the University of Trento, decided to think of alternatives for the demands and challenges identified and to give continuity to the networking capital acquired between farmers and consumers. CSA's formation counted on the technical assistance of a researcher from Libera Università di Bolzano, located in the neighbouring province of Bolzano, which was working on a project for the implementation of a CSA in another region of the Trento[10] territory. CSA *Naturalmente* was established as the second CSA initiative in the Province of Trento.

As a recent initiative, on the occasion of the interviews with farmers (March/April, 2021), it was to start its first food deliveries. It involved 12 farmers from the Province of Trento and 40 consuming families who would buy regularly, with the commitment to maintain an active relationship for a period of one year. The initiative encountered organisational difficulties linked to the collectivisation of the farmers, because in the territory there are no pre-existing social networks among the farmers.

4.3.1.2 Solidarity Economy Law and Solidarity Economy Market

The province of Trento has been a pioneer in Italy in the creation and implementation of a law promoting the solidarity economy. Provincial Law 13/2010[11] establishes the creation of a permanent coordination allocated in the province's council, as well as a specific fund for the promotion of the solidarity economy. In practice, the main action to promote the solidarity economy resulting from this initiative is the Solidarity Economy Street Market, an experience that promotes direct sale from artisans and farmers of Trento Solidarity Economy, weekly, in the city centre area. The farmers' street market takes place in a very central location, but it does not usually receive an intense flow of people. Currently, the market has approximately

[9] *Nutrire Trento Project phase 2* emerged from the discussion tables at the *Nutrire Trento* project as an experimental project bringing together 65 consumer families and 13 producers, from March 9 through May 18, 2020 (9 weeks), for direct sale and home delivery.

[10] In the region of Vassulgana (TN).

[11] Provincial Law 13/2010, available at: https://www.consiglio.provincia.tn.it/leggi-e-archivi/codice-provinciale/Pages/legge.aspx?uid=21678

five farmers' stands. Though it is an institutionalised initiative, it does not have a high impact on the number of farmers nor the flow of consumers.

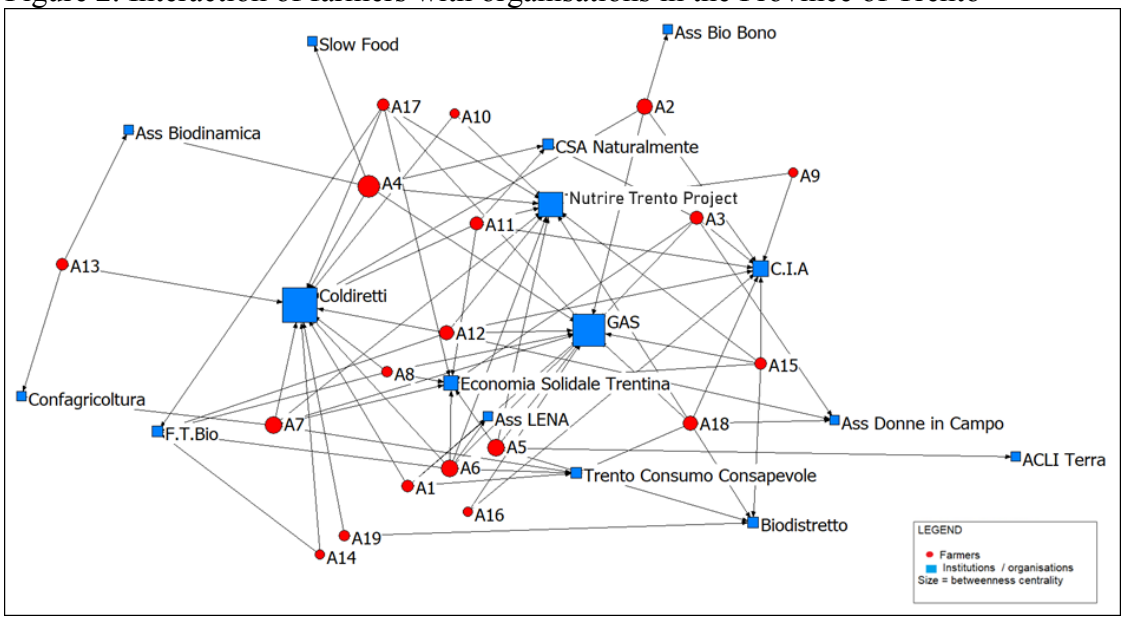
Despite its small scale, the Solidarity Economy Street Market is a consolidated initiative and current participant farmers perceive the initiative as a place for strengthening relations with consumers and other farmers. During March and April of 2020, the city's markets, including the Solidarity Economy Street Market, were closed due to the COVID-19 emergency. In this context, four farmers had come together to deliver their products. Through this organisation, farmers were able to create more convenient delivery logistics, and eventually formed the informal group L.E.N.A., named with the initials of the participants' names. Even with the return of the in-person market in June of the same year, L.E.N.A remained active until the date of the interviews (one year later, in March/April, 2021).

The farmers report that the collaborative experience for commercialisation has strengthened bonds of friendship and a sense of belonging, promoting other types of collaboration, generating mutual knowledge, and building collective solutions.

4.3.2 The organisations linked to the respondent farmers

To understand the territorial context in which farmers are situated and their relationships, we studied their interactions with organisations within the territory. In Figure 2, we see the organisations and institutions linked to farmers that are involved in short food supply chains of agroecological food and who we consulted in this research project.

Figure 2. Interaction of farmers with organisations in the Province of Trento



Source: created by the authors

The largest organisations and farmers represented are those with the highest degree of betweenness centrality, i.e. those with the greatest intermediation power with the others, through the connection between the farmers who are part of the various organisations. Intermediation concerns the greater capacity of these actors to be connected directly or indirectly (through other players) with the other actors in the network.

The organisations with greater intermediation power are linked to organised consumer groups (GAS and *Trento Consumo Consapevole*); farmers trade unions (*Coldiretti Trentino Alto Adige - Coldiretti*, *Federazione Trentina Biologico e Biodinamico*-F.T.Bio, and *Confederazione Italiana Coltivatori Trentino* - C.I.A); and public administration and its initiatives (*Nutrire Trento, Economia Solidale Trentina*), as well as to Trento University (*Nutrire Trento* and *CSA Naturalmente*).

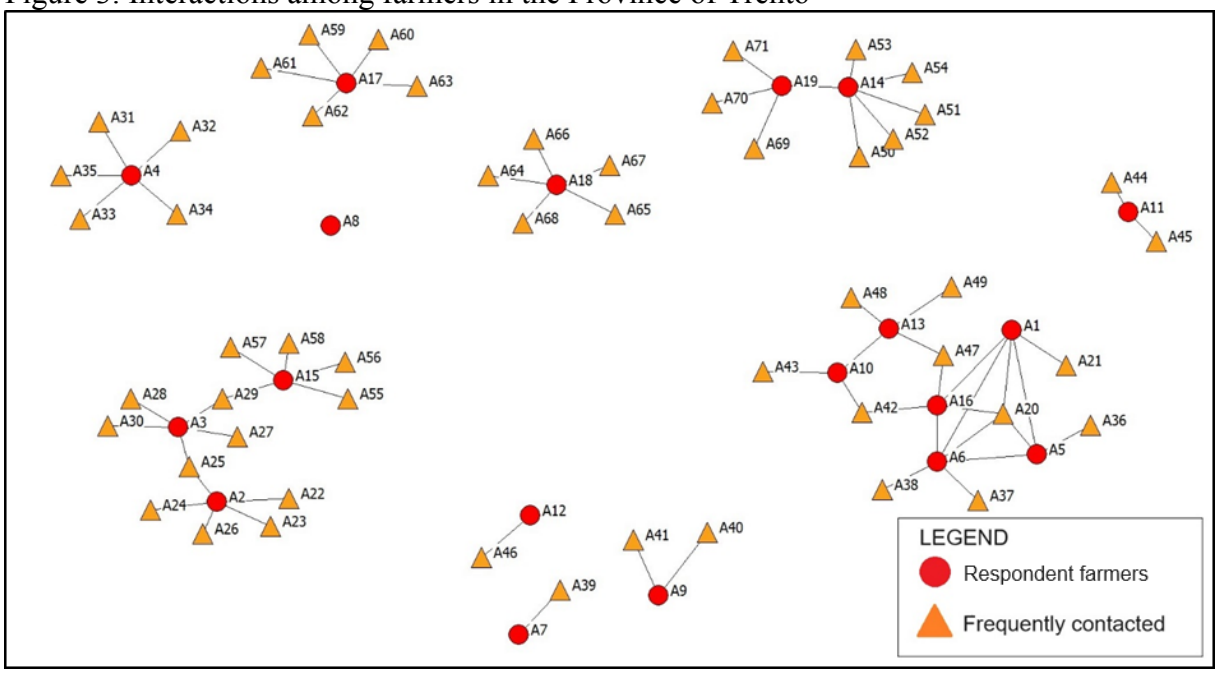
Participation in trade unions, though highly present among farmers, is not related to the formation of networks found among farmers, as trade unions do not constitute important spaces for the collective and participative mobilisation of respondent farmers. The most referenced trade union among farmers is *Coldiretti Trentino Alto Adige*, and it holds this central position because it is responsible for organising farmers markets in public spaces. These farmers markets involve a larger number of farmers and reach a wide range of consumers. Moreover, these markets have highly centralised management, and farmer

participation is closely regulated. For instance, to participate in the market, farmers are required to sell specific products that have already been registered.

4.3.3 The farmers involved in Civic Food Networks

The relationship amongst farmers was assessed by asking the respondents farmers which other farmers they had the most frequent contact with. Each farmer could indicate up to five other farmers. The results are shown in Figure 3.

Figure 3. Interactions among farmers in the Province of Trento



Source: created by the authors

Among the 19 farmers studied, we found only one cluster of farmers exhibiting multiple connections, forming a network that includes six of the respondent farmers (A1, A5, A6, A10, A13 e A16), along with additional 15 farmers mentioned by them. Within this network, farmers establish connections with each other through the initiatives previously described: the Solidarity Economy Law and Solidarity Economy Market, and the *Nutrire Trento* project and CSA *Naturalmente*. Farmers A7, A9, and A12 did not have five farmers with whom they have a more frequent contact – the methodology allowed for up to five nominees, but these farmers indicated fewer names –; and farmer A8 did not indicate any farmer.

Interactions among farmers were evaluated, specifically comparing two groups: the networked farmers (A1, A5, A6, A10, A13 e A16) and the remaining farmers (A2, A3, A4,

A7, A8, A9, A11, A12, A14, A15, A17, A18, and A19). By measuring the densities of the different interactions, expressed in Table 4 and Table 5, respectively, we were able to compare the intensity of these interactions. The type of these relationships was then further explored with objective questions about the presence or not of a certain type of interaction, which were: sharing of information about agroecological practices, friendship, collaborations for commercialisation, social participation/organisation (through co-management of resources, development of projects for the territory, and construction of public policies), and exchange of seeds and seedlings. The density of each type of interaction was measured by calculating the total number of possible ties, considering that each farmer could nominate up to five farmers.

Table 4. Degree of interaction between CFN farmers by purpose (density measures) in the Province of Trento

	all	sharing information on agroecology	friendship	marketing collaboration	joint participation in an association or group	participation and social arrangements	seed exchanges
Density*	**0,857**	**0,743**	**0,857**	**0,514**	**0,543**	**0,371**	**0,171**
Total (N of ties)	30	26	30	18	19	13	6
Std Dev	0,403	0,375	0,396	0,328	0,335	0,284	0,194
Avg Degree	1,364	3,714	4,286	0,818	0,864	0,591	0,857

* Largest possible number of ties: 35
Source: created by the authors

Table 5. Degree of interaction between farmers (outside CFN) by purpose (density measures) in the Province of Trento

	all	sharing information on agroecology	friendship	marketing collaboration	joint participation in an association or group	participation and social arrangements	seed exchanges
Density*	0,666	0,5	0,5	0,217	0,317	0,333	0,083
Total (N of ties)	40	30	30	13	19	20	5
Std Dev	0,52	0,220	0,220	0,149	0,179	0,185	0,093
Avg Degree	3,333	2,5	2,5	0,265	0,388	0,417	0,102

* Largest possible number of ties: 60
Source: created by the authors

This analysis allows us to investigate elements of citizenship, identifying their character of collective organisation for collaboration and of social and political organisation in the territory, as well as grasping how information circulates within these networks.

Among the networked group of farmers (A1, A5, A6, A10, A13 e A16), a high degree of friendship (85%) was found, along with a significant level of joint participation in collectives and organisations (50%) and a substantial flow of information sharing about agroecology (74%). The elements of citizenship found in these networks include the participation of these organised farmers in collaborative networks of production and consumption, where they directly connect with consumers. This facilitates the participation of both farmers and consumers in the agrifood system and enables local control over food production and distribution.

Despite the experiences associated with *Nutrire Trento* and the Solidarity Economy Market, a large network of farmers was not found, and neither of the former initiatives were identified as an agroecological movement due to the low density (37%) of participation and political action among those involved in these two endeavors. Therefore, we will consider this network of farmers (A1, A5, A6, A10, A13 e A16), who participate in the *Nutrire Trento* and the Solidarity Economy Market, as part of a Civic Food Network (CFN), though one that is still in its early stages and can be described as embryonic.

Outside of this CFN, the level of political participation among farmers (33%) was quite similar to that of CFN farmers (37%). However, it can be observed that there is a collaboration for marketing (51%) and more sharing of information about agroecology (74%) among CFN farmers. On the other hand, the collaboration for the exchange of seeds and seedlings remains low in both groups (17% within CFN and 8% outside of it).

Next, we will present the results of the agroecology indicators from the analysed farms, also considering whether there are differences in these indicators between farmers within the embryonic CFN and those outside of it.

4.3.4 Agroecological indicator of farmers within the CFN

In this section, the goal was to evaluate farmers who are connected to what we referred to as an embryonic Civic Food Network (A1, A5, A6, A10, A13 e A16) and compare them with the other farmers (A2, A3, A4, A7, A8, A9, A11, A12, A14, A15, A17, A18, and A19).

For agrobiodiversity on the farms, the data obtained indicate that there is no difference in the number of species produced for commercial purposes (Table 6) between the two groups of farmers. However, there is a small difference in the diversity of breeds and cultivars among the farmers within the CFN (56 cultivars/breeds) and those outside of it (61 cultivars/breeds).

Table 6. Biodiversity in the farms in the Province of Trento

	CFN FARMERS				FARMERS OUTSIDE OF THE CFN			
	AGROBIODIVERSITY			natural ecosystems (%)	AGROBIODIVERSITY			natural ecosystems (%)
	species	cultivars/ breeds	traditional cultivars/ breeds		species	cultivars/ breeds	traditional cultivars/ breeds	
Average	30	56	10	41	29	61	14	28
Minimum	4	9	1	0	3	3	0	0
1st quartile	27	34	1	12	22	40	1	2
Median	33	43	8	40	30,5	66	5	13
3rd quartile	41	73	11	69	40,2	88	18	59
Maximum	44	151	36	81	50	110	80	90
Std. Dev	12,1	42,4	11,3	24,2	13,7	32,3	21,4	31,5

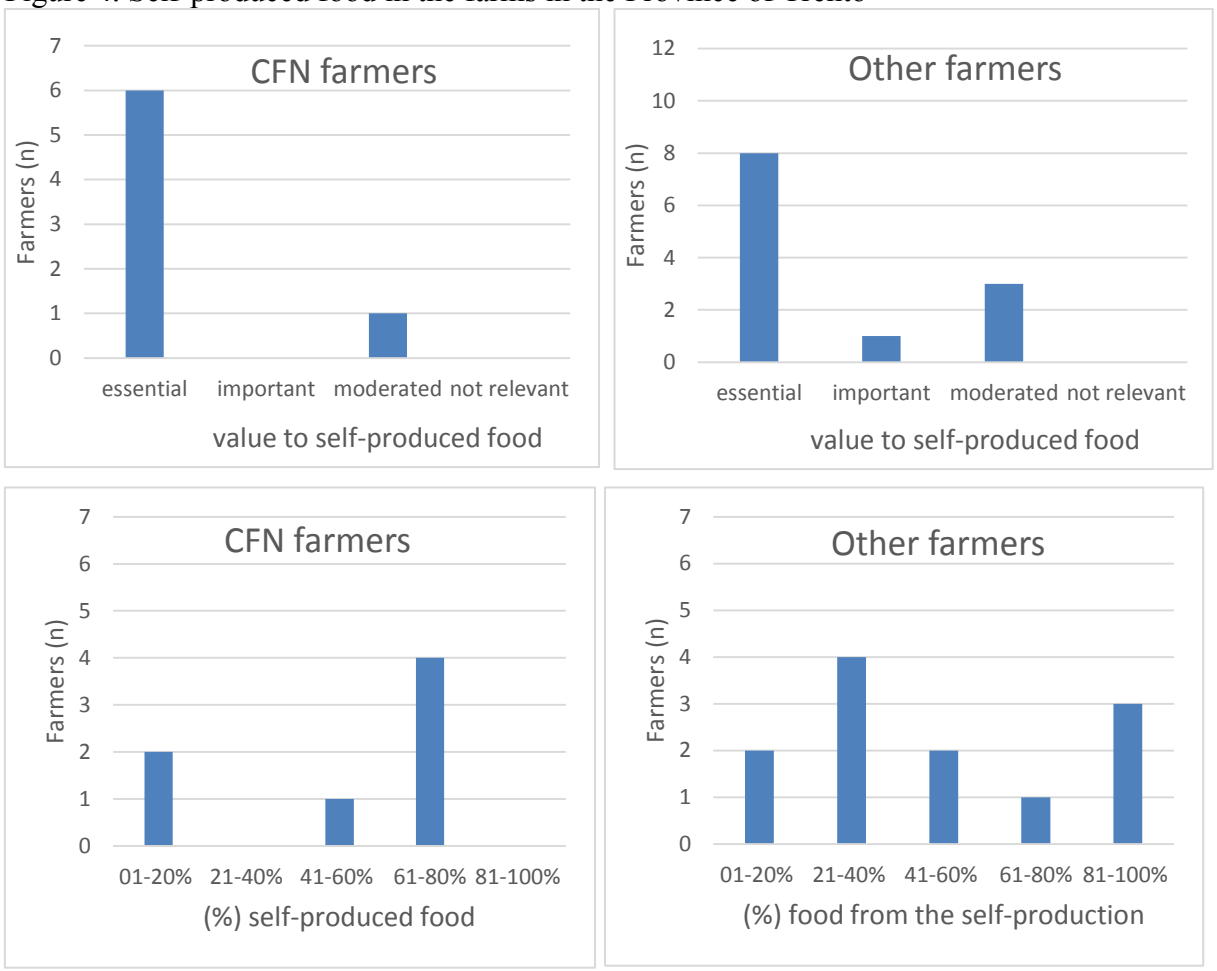
Source: created by the authors

Regarding biodiversity linked to the percentage of native vegetation, which includes native forests, native forests in recovery, and native pastures, a higher number was observed for farmers within the CFN (41%) compared to the other farmers (28%).

We observed that both groups of farmers have a reduced number of traditional cultivars and breeds, compared to the total number of cultivars and breeds.

Proportionally, farmers within the CFN place a higher value on self-produced food. Among them, 85% (6 out of 7 farmers) consider this production essential, while among the other farmers, 67% (8 out of 12) view it as essential. Similarly and proportionally, a higher percentage of CFN farmers produce over 60% (4 out of 7 farmers) of the food in their diet within their own farming units, compared to the other farmers, where the percentage is 33% (4 out of 12) (Figure 4).

Figure 4. Self-produced food in the farms in the Province of Trento



Source: created by the authors

Regarding resource efficiency, farmers outside the network exhibited a slightly higher average of self-produced fertilisers (45%) compared to CFN farmers (36%). Conversely, for seeds, the disparity was minimal; CFN farmers recorded 30% from self-production or exchange, while non-CFN farmers registered 33% (Table 7).

Table 7. Input source in the farms in the Province of Trento

Fertilisings' sources produced on the farm (%)				Breeds and seedlings produced on the farm or obtained through exchanges (%)		
	CFN FARMERS	OUTSIDE CFN			CFN FARMERS	OUTSIDE CFN
Average	35,9	45,6		Average	30	33
Minimum	0	0		Minimum	10	0
1st quartile	1	0		1st quartile	15	1
Median	15	35		Median	25	19
3rd quartile	95	95		3rd quartile	50	65
Maximum	100	100		Maximum	60	100
Std. Dev	40,1	44,3		Std. Dev	17,1	33,6

Source: created by the authors

Although we observed a slight improvement in some agroecological indicators, such as the percentage of natural ecosystems and resource efficiency within the farms and self-produced food, there is not a significant difference in terms of agrobiodiversity, specifically in the number of species produced, between the different groups of farmers studied.

4.3.5 The influence of short food supply chains on agroecology

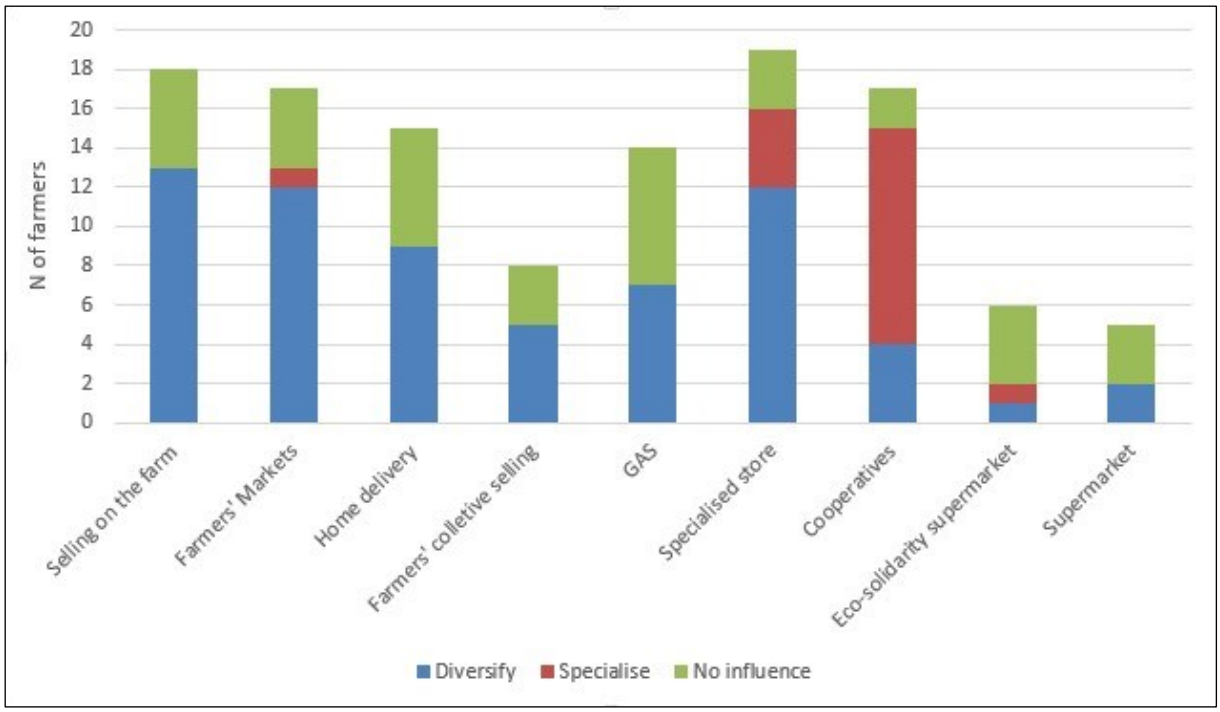
Based on the data obtained, it was evident that all the respondent farmers, both within and outside the CFN, exhibited positive indicators of agroecology. A common characteristic among these farmers is their involvement in short food supply chains. Notably, these farmers engagement in short food supply chains demonstrate a higher level of production diversification compared to the general agricultural landscape of the Trentino territory.

The official data from the Province of Trento (SPAT, 2014) shows that approximately 81% of the agricultural area in the territory is dedicated to apple and grape crops, including organic production. In contrast, farmers involved in short food supply chains reported an average of 29 different species in their production. This observation is particularly significant,

considering that these farmers operate within a region predominantly characterised by monoculture and long food supply chains.

According to farmers in our research, supply chain channels interfere with their productive choices as to cultivated products, as well as the choice to further diversify or specialise their production. When asked which channels influence their choices, and how, respondents farmers highlighted that cooperatives are channels that stimulate specialisation (Figure 5). From the words of the key stakeholders and farmers, it is understood that cooperatives are safe markets for specific products and that they guarantee financial, albeit limited, stability for families, though they also restrict productive choices.

Figure 5. Farmers' perception of the influence of supply chain channels on agrobiodiversity in the Province of Trento



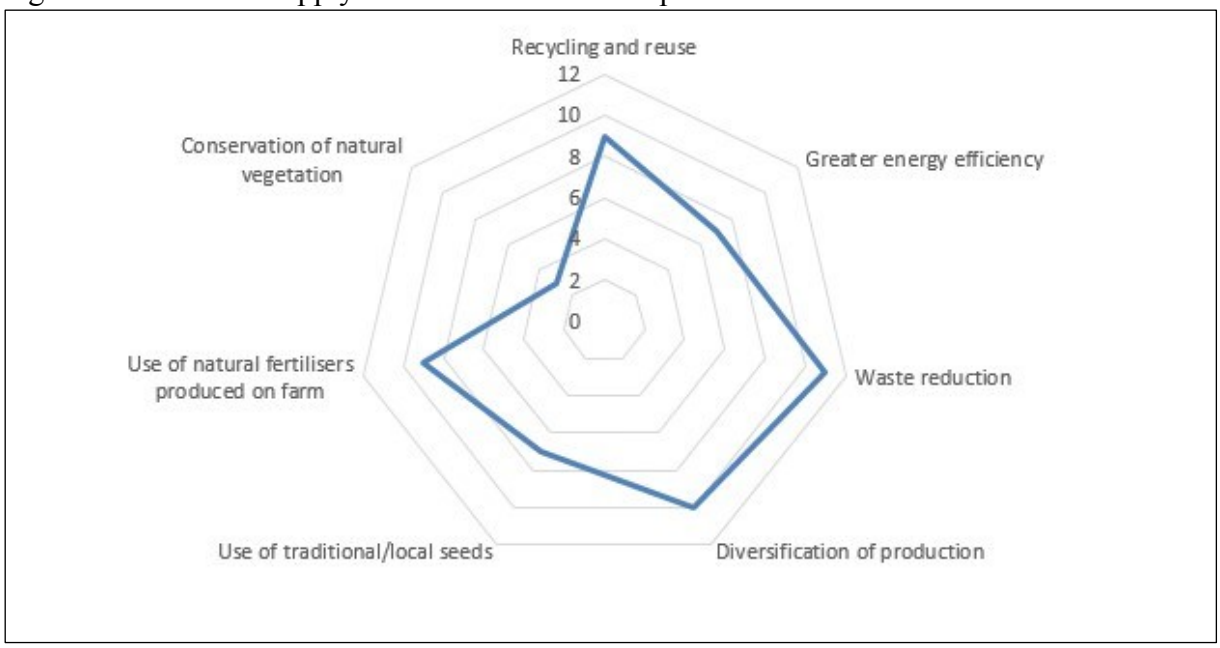
Source: created by the authors

Cooperatives are important and consolidated channels that have guaranteed markets for family farmers, but they tend to favour the monoculture mode of production and decrease the autonomy of farmers when it comes to products marketed to the cooperative. This loss of autonomy can be minimised as they diversify the supply chain channels, products, and economic activities in the farms.

Short food supply chains stand out as important channels to maintain or stimulate productive diversification. In this sense, the channels that most stimulate agrobiodiversity are farmers' markets and sales in the farm, along with, more recently, collective farmers' organisations not mediated by cooperatives.

Overall, Farmers responded that their participation in short food supply chains positively influences their practices, mainly by making them seek greater resource efficiency through the greater use of natural fertilisers produced in the farm. Additionally, they seek waste reduction, reuse, recycling, and diversification of production (Figure 6).

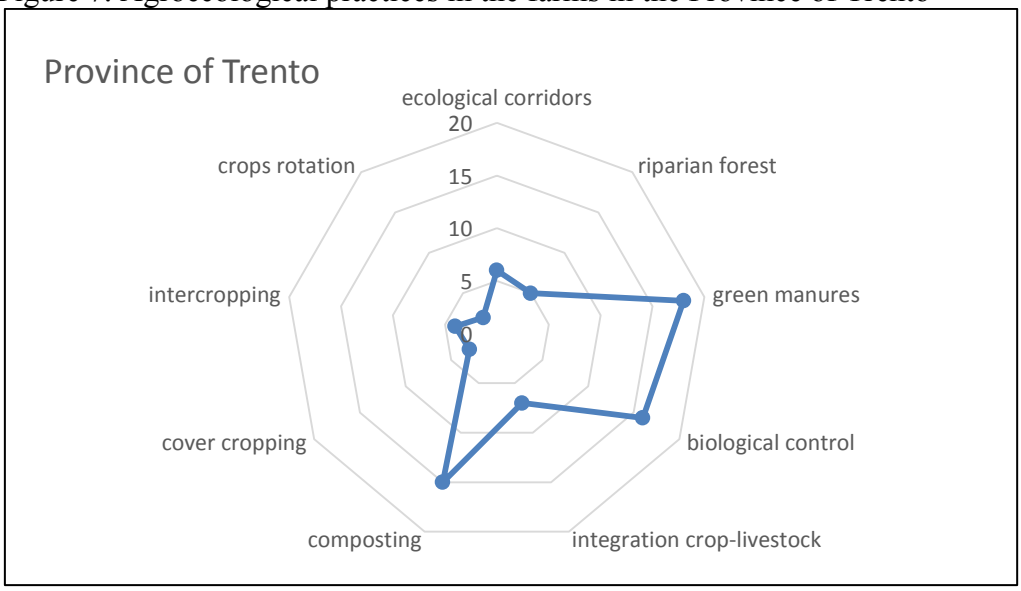
Figure 6. Short food supply chains influence in the practices in the Province of Trento



Source: created by the authors

To promote the efficiency of the production systems and maintain biodiversity, all the farmers studied have used agroecological practices – many of them traditional, such as conservation of soil and crops management, green manures, field biological pest control, and composting (Figure 7).

Figure 7. Agroecological practices in the farms in the Province of Trento



Source: created by the authors

4.4 DISCUSSION - CITIZENSHIP AND PROMOTION OF AGROECOLOGY IN FOOD NETWORKS

Networks can act to both encourage and foster certain practices and innovations, as well as to restrict them. Shove, Pantzar, and Watson (2012) highlight that practices are influenced by the social structures in which they transit, change and reproduce, called social orders and systems. Seemingly neutral networks are actually biassed by patterns of inequality, perpetuated through mastering and marginalising specific practices (*Ibid.*).

In the province of Trento, there are networks linked to the hegemonic food system that hinder the development of farmer networks for short food supply chains and agroecology. However, some farmers in the Province of Trento are also embedded in connections beyond those structures of domination that monopolise technology and food supply.

Various authors (SOUZA *et al.*, 2021; CARRIERI; PUGAS; ROVER, 2023; PUGAS *et al.*, 2023) identified, in Brazil, initiatives to approximate consumption in which farmers and their organisations play a major role in structuring these experiences. These emerging networks have been contributing to the redesign of production-consumption relations through the connected action between consumers-citizens and producers-citizens (RENTING; SCHERMER; ROSSI, 2012).

The context of low confidence and doubts regarding contemporary, highly processed food has stimulated the creation of groups of consumers of organic foods in urban areas. They

seek, through short food supply chains, to ensure knowledge of food trajectory (KNEAFSEY, 2013; BRANDENBURG, 2002). Renting, Schermer, and Rossi (2012) highlight the large number of food network initiatives and experiences that are emerging with the drive and conduct of citizen-consumers. For Brunori (2012), a crucial point for understanding the CFN is the role of consumers and how they have been placed in this context. This stems from the fact that in the traditional view, consumption is understood as an individual act, belonging to the private sphere and guided by individual interests, thus following that the act of consuming will always be strengthening the capitalist system (*Ibid.*).

We observed, in the Trentino territory, a great centrality of the consumers' organisations. However, there are no large collective mobilisations of farmers: the existing entities of farmers are configured as trade unions. Despite the clear centrality of the GAS, those interactions between consumers and farmers do not necessarily reflect in consumers' support of the family farm movement. Additionally, farmers described that they often observe a lack of knowledge by consumers about the dynamics of production and of the family farming.

The dynamics of the Italian GAS show that the organisation of consumers for purchase, working actively and unpaid in the organisation of collective purchases, guarantees an important and consolidated short food supply chain for agroecological agriculture, expressed in the large number of GAS distributed throughout the territory. The centrality of the GAS in the territory indicates changes, even if at the regional level, in the mechanisms of food governance with the protagonism of collective consumer organisations.

Although GAS are identified in some territories as a movement seeking healthy food along with a sense of solidarity with small farmers (PREISS; CHARÃO-MARQUES; WISKERKE, 2017), GAS do not promote the collectivisation of farmers and are managed by consumers. This means greater participation, autonomy, and self-organisation of consumers, but those do not include farmers. This dimension and reach of GAS in the Trentino territory can also be explained by the national movement that connects the *Rete GAS* (National Network of Solidarity Purchase Groups) with other networks that work to promote new production-consumption relationships, such as the Slow Food Movement and the *Rete di Economia Solidale* (RES), the national solidarity economy network (*Ibid*.).

The civil organisations that developed from farmer collectives are in their initial stage, as expressed in the two recently created associations L.E.N.A and CSA *Naturalmente*, which seem to point to new paths based on the collective action of rural actors. Some of these

experiences emerge as collaborative organisations for marketing and can also strengthen other interactions, such as the exchange of information on agroecology.

Initiatives such as the Solidarity Economy Market and the *Nutrire Trento* project are actions aimed at promoting new relationships, as well as a short food supply chains. In the *Nutrire Trento* case, we have the promotion of a space for the collective discussion for community-based solutions in the territory. The contribution of CFNs, on their turn, is to create new production-consumption arrangements, aiming to generate a social and critical fabric that includes various actors in the territory, including farmers and consumers.

The *Nutrire Trento* is approaching a process of democratic participation that can be appropriated by the actors of the territory. Therefore, in the same way, it enables the consumer to cease being a mere consumer, and the farmer to become more than a producer of food and more an agent of civil and political participation and of transformation of the food system. In the same direction, Santini *et al*. (2020) identified that spaces for interaction can foster a process of community empowerment and social innovation by stimulating dialogue among involved stakeholders. However, the effective participation of farmers in the meetings *(tavolo*) of *Nutrire Trento* is still low, and the collectivisation of farmers encounters difficulties in the territory.

CSA *Naturalmente* illustrates the network action with appropriation of discussion spaces by civil society. Farmers appropriated the *Nutrire Trento* project and, from it, established relationships amongst themselves and with the consumers and the entities involved – thus generating new organisational arrangements and providing innovative practices. Despite showing potential, the initiative is small and the participants report organisational difficulties, as well as difficulties linked to territorial structures and to other organisations that hinder alternative networks and production diversification.

Hence, this initiative showcases the appropriation of institutionalised spaces and markets in order to build new relations. In this case, the new organisation arose from the need to confront a crisis and establish relations that were not dependent on the institutionalised space.

Networks between farmers have great potential for the sharing of information on agroecological production practices, are strongly present in the interaction between farmers in the network, and can be used as a potential for strengthening Civic Food Networks in the territory. Despite the existence of food networking initiatives and the existence of farms with

agroecological production, in Province of Trento, a strong agroecological movement was not identified amongst farmers and their initiatives.

The network of farmers identified forms a small, embryonic Civic Food Network (CFN). Table 8 provides a synthesis of the elements of citizenship and agroecology found in the studied network and their contributions.

Table 8. Characteristics of the found CFN in the Province of Trento

Categories	**Characteristic of CFN**
Citizenship	It is an embryonic CFN linked to collective mobilisation and self-organisation of rural actors, which have been strengthened through institutional spaces and support entities such as the public university. They have been operating through a SFSC, providing more autonomy for farmers and consumers, as well as local control over food production and distribution. This networks are recent, involve a few farmers, and do not have a strong political action in the territory.
Agroecology indicators (biodiversity, resource efficiency, production for self-consumption)	The embryonic CFN presented a higher degree of natural biodiversity and production for self-produced food, which may be stimulated by the action of networks and the increased circulation of information about agroecology. However, the most significant promoter of agroecology are the short food supply chains, which are a central element of CFNs.

Source: created by the authors

The presence of some improved agroecological indicators among the interconnected farmers in the Civic Food Network, may be linked to the existence of farmer networks and organisations, as well as the increased flow of sharing information about agroecology within these networks.

In the propagation of innovations and the search for collective solutions, interaction in social networks emerges as an important element. Horizontal information sharing favours the maintenance of traditional knowledge and ways of farming, meanwhile providing alternatives to systems that monopolise technology and knowledge (AGNE; VAQUIL, 2010; AVELINE; SABOURIN, 2017; H.L.P.E, 2009).

Another characteristic of CFNs is collaboration for commercialisation, which is explained by the fact that some farmers have felt the need to collectivise ir order to strengthen their autonomy and enlarge their access to markets, in a context where conventional markets in the

territory give farmers less autonomy and participation. The collective farmer groups and associations present in these networks are mainly related to collective marketing initiatives and have propitiated other forms of participation in the territory.

Despite this small difference in agroecological indicators among CFN farmers and outside CFN farmers, it is important to highlight that all respondent farmers presented positive indicators, especially regarding agrobiodiversity. In this regard, it is relevant to point out two important points: 1) the CFNs found are embryonic and recent, indicating that they are still in the early stages of development; 2) the sample studied was limited to farmers engaged in short food supply chains, and there are studies that suggest short food supply chains promote agroecology, particularly in terms of agrobiodiversity.

Rover *et al.* (2020) investigated the impact of retail strategies on the diversification of organic production establishments and analysed them from the perspective of the conventionalisation of organic farming. The authors argue that the production needs to meet markets' demands, which may bring about a loss of biodiversity. As a counterpoint, they identified that the proximity between producers and consumers, by means of direct sales and spatial proximity, was fundamental in order to foster biodiversity in the studied farms.

The diversified production favours the production for the families' own consumption. Pozzebon *et al*. (2018) identified that the participation of agroecological farmers in short food supply chains (street markets) in the West of Santa Catarina, Brazil, is an important income generation strategy and allows the concretisation of self-consumption that promotes families' food security.

There is also a tendency for SFSCs to sell organic (especially in the Southern European region) or even biodynamic produce (DAROLT; LAMINE; BRANDEMBURG, 2013; NIEDERLE; ALMEIDA; VEZZANI, 2013; KNEAFSEY *et al.*, 2013). The ecological indicators demonstrate that the respondent farmers, both within and outside what we refer to as a CFN, differ from the logic of the hegemonic food system. They sustain biodiverse production, some degree of autonomous input production, agroecological practices, and production for self-consumption.

Therefore, we conclude that an important factor promoting agroecology is the adoption of short food supply chains (SFSCs), regardless of the action of CFNs, which have been trying to strengthen a movement around the actors of the agri-food system but have encountered barriers in the existing social and organisational structures in the territory.

4.5 CONCLUSIONS

The Civic Food Network in the Province of Trento is embryonic and one of the reasons is the difficulty in the collective organisation of farmers. This challenge relates to the territorial structures that favour long commercialisation chains, monoculture, and individualisation of farmers, imposing restrictions on innovative and sustainable processes.

However, there are initiatives aimed at contributing to the promotion of short food supply chains and the establishment of spaces for debate and participative construction of innovations for a more sustainable local food system. The projects identified have more participants from public administration and the university than from producers themselves.

The Civic Food Network in the Trentino territory promote agroecology, though primarily through short food supply chains, which directly benefit agrobiodiversity and sustainable practices.

Civic Food Networks have the potential to facilitate greater participation of consumers and producers in the food system, allowing for local control over production, distribution, and marketing of food through short food supply chains. They can also support, through SFSC, farms with agroecological practices, creating alternatives to the dominant systems in the territory. However, this process faces challenges in mobilising both rural and urban actors and in strengthening both Civic Food Networks and agroecology.

This work contributes to the academic debate by aiding in the understanding of how farmers have integrated into Civic Food Networks, as well as how these networks contribute or not to agroecology. Finally, this work points to the possibility of using social network analysis methodology to study Civic Food Networks.

4.5.1 Limitations

This research, due to its lack of knowledge regarding potential Civic Food Networks in the territory, focused the investigation on farms involved in short food supply chains. As a result, the comparison between farmers participating or not participating in CFNs may not have yield significant differences in agroecological indicators, as short food supply chains themselves have been shown to promote agroecology.

5 ARTICLE 2: CIVIC FOOD NETWORKS IN THE GRANDE FLORIANÓPOLIS REGION – AGROECOLOGICAL FARMERS CONNECTED TO SHORT FOOD SUPPLY CHAINS

ABSTRACT

Civic Food Networks (CFNs) are the result of the citizenly articulation of diverse social actors operating in the food system, such as institutions, social organisations, farmers, and consumers. CFNs have arisen because of food insecurity and unequal power distribution generated in the hegemonic food system. They act through short food supply chains (SFSCs). This work aimed to analyse the network relations between farmers participating in agroecological short food supply chains and around food initiatives in the Grande Florianópolis Region, Southern Brazil. The goal was to identify the presence of the elements of citizenship (participation, self-organisation, actors' autonomy, and local control in the food system) and how they contribute to the promotion of agroecology locally. The investigation took place using direct and participatory observation, database consultation, document analysis, semi-structured interviews with key actors, and structured interviews, through the application of questionnaires, with farmers. For data analysis, we used agroecology indicators and social network analysis. There are Civic Food Networks in the GFR that encompass a wide variety of farmers' organisations, including both formal and informal ones. They are connected with a significant presence of support organisations, both governmental and non-governmental, and they involve instances of political representation. CFNs have been part of a strategy of the actors to promote agroecology through SFSCs. The maintenance of agroecological family farms has occurred through SFSCs, but additionally, the existence of CFNs strengthens an agroecological movement that expands through the conduct of actors and their organisations. They operate in representative bodies such as city/state councils and lead to changes in existing power structures, such as the creation of public policies and alterations to laws.

Keywords: Food supply chain; Agroecology, Social Network, Family Farming, Biodiversity

5.1 INTRODUCTION

Food networks have emerged as essential arrangements around the food system and spring up from the connection between the needs of both farmers and consumers (ANJOS; CALDAS, 2017). The so-called hegemonic food system weakens farmers and consumers, as large corporations dominate the production of agricultural inputs and the global food supply chain (CHIFFOLEAU *et al*., 2019; DAROLT; LAMINE; BRANDENBURG, 2016; ANJOS; CALDAS, 2017). In addition to oppressing farmers and consumers, this system proves ineffective in providing food security to the world's population and it is environmentally and socio-economically unsustainable (FAO *et al*., 2018; HESS, 2018; VEIGA, 2017; HOWARD, 2012; CARNEIRO, 2015; STEFFEN, 2011; GALINDO *et al*., 2021).

From this context, new arrangements have emerged, in which the main element is the shortened distance between production and consumption through the short food supply chains (SFSCs). In addition, they incorporate relational and social aspects in local development and food territorialisation (AUBRI; CHIFFOLEAU, 2009; BRANDENBURG, 2002). These new arrangements can be addressed through different perspectives, among which the concept of Civic Food Networks (CFNs) aims to emphasise the citizen character and the social actors in networks acting in the food system (RENTING; SCHERMER; ROSSI, 2012).

Through SFSCs, CFNs appear to be moving towards constructing fairer and more sustainable food systems (ROSSI; FAVILLI; BRUNORI, 2013; ROVER; DAROLT, 2021; PUGAS; ROVER, 2021). However, some authors argue that some food networks perpetuate the existing systems of domination and social inequality, besides contributing to the marginalisation of small farmers (GOODMAN *et al.*, 2012; MARSDEN; MORLEY, 2014; BRUNORI *et al.*, 2008; FRANKLIN; NEWTON; MCENTEE, 2011).

Agriculture in the Southern Brazilian state of Santa Catarina is characterised by small family farms responsible for most of the state's food supply (EPAGRI/CEPA, 2018). Recent studies have observed that in the Grande Florianópolis Region (GFR)[12], which comprises the state capital and its surroundings, initiatives are emerging towards more sustainable food systems, promoting new arrangements for short food supply chains through social actors' mobilisation (FANTINI *et al.*, 2018; SOUZA *et al.*, 2021).

Miranda *et al.* (2021) and Souza *et al*. (2021) observed, in the GFR, a strong collective farmers' organisation involving diverse experiences of direct sales of food. Those initiatives also present various configurations of collective action and short food supply chains.

This work aimed to understand the network relations in the surroundings of the agroecological food supply chains in the aforementioned region, to identify its citizenship elements, and to evaluate the contribution of CFNs to promote agroecological food systems.

The CFN concept guiding this work entails the articulations of social actors, such as institutions, social organisations, farmers, and consumers, acting citizenly throughout the food system (production, supply, and consumption) (RENTING; SCHERMER; ROSSI, 2012). The

[12] The Grande Florianópolis Region is one of the six mesoregions in Santa Catarina state. It is formed by 21 municipalities, namely: Águas Mornas, Alfredo Wagner, Angelina, Anitápolis, Antônio Carlos, Biguaçu, Canelinha, Florianópolis, Governador Celso Ramos, Leoberto Leal, Major Gercino, Nova Trento, Palhoça, Paulo Lopes, Rancho Queimado, Santo Amaro da Imperatriz, São Bonifácio, São João Batista, São José, São Pedro de Alcântara, and Tijucas. Available on IBGE Automatic Recovery System (SIDRA): https://sidra.ibge.gov.br.

elements of citizenship present in these networks are participation, self-organisation, actors' autonomy, and local control in the food system.

This study evaluated the promotion of agroecology in the farms to understand the contributions of Civic Food Network(s) to their reality. Agroecology was chosen for this assessment as it provides the basis for building a sustainable agriculture (ALTIERI, 2012; GUZMÁN CASADO *et al.*, 2000) and establishing alternative models to the agro-industrial (hegemonic) production standard by applying ecology principles (GLIESSMAN, 2000). For data analysis, we used agroecology indicators and social network analysis.

5.2 THEORETICAL REFERENCE

5.2.1 Civic Food Networks (CFNs)

Food networks refer to groups and organisations around the food system that operate articulately on the production, supply, and consumption axes (RENTING; SCHERMER; ROSSI, 2012; ANJOS; CALDAS, 2017). In their different varieties and contexts, the food networks contribute to new food strategies and policies (PORTILHO; BARBOSA, 2016; RENTING; SCHERMER; ROSSI, 2012).

Among the terminology used to discuss food networks, Civic Food Network appears as an analytical category for 'alternative food networks' (AFNs). AFN is an umbrella term for social players who have emerged seeking alternatives to the established food supply model (RENTING; MARSDEN; BANKS, 2003). CFN comes to emphasise the motivation of civil society in these networks and challenges the term "alternative", considering that the latter term does not bring a clear outline. In addition, these networks are not always completely opposed to the existing models, and there are hybrid networks that combine elements of Alternative Food Networks and mainstream networks (RENTING; SCHERMER; ROSSI, 2012).

In the face of successive agrifood scandals, consumers seek to know the origin and guarantee the quality of the food they eat. This movement has been driving the growth of organic and agroecological food consumption in urban centres and stimulating the inclusion of consumers in new organisational arrangements (DAROLT *et al.*, 2013; MIRANDA *et al.*, 2021, KNEAFSEY, 2013). Hence, in regards to consumption, CFNs are consolidated in part because of doubts and insecurities consumers have towards the hegemonic food system – in

which they have no access to information and, individually, have little influence over (CHIFFOLEAU *et al.*, 2019).

CFNs focus on embedding food purchase and selling exchanges in social relations. In CFNs, citizens cooperate to coordinate most or all stages from production to consumption (RENTING; SCHERMER; ROSSI, 2012). These networks highlight the participation, cooperation, local control of the production, supply, and marketing of food, self-organisation, and autonomy of players, all of which reflect on greater empowerment of citizens in the design of the agrifood system (ANDERSON *et al.*, 2016; RENTING; SCHERMER; ROSSI, 2012).

The concept of CFN used in this research is based on Renting, Schermer, and Rossi (2012), who point to Civic Food Networks as the result of citizen articulation of diverse actors, such as institutions, social organisations, farmers, and consumers, acting throughout the food system (production, supply, and consumption).

5.3 METHODOLOGY

The research method employed was a case study. The aim was to identify Civic Food Networks in the studied territory, understand the relationships present in these networks, identify elements of citizenship, and assess their contributions to agroecology.

This research consisted of two distinct stages. In the first stage, we collected data to understand the specific characteristics of the territory and identify key stakeholders. Information and documents were collected in this stage, and direct and participant observation were used. For information and document research, we utilised the official websites of institutions, academic publications, and institutional reports. We also accessed LACAF's database (Laboratory of Family Farming Commercialisation – UFSC), which operates in the same territory where this work is situated and is involved in research and community outreach related to commercialisation, agroecology, family agriculture, and food networks. The participant and direct observation period occurred from August 2018 to October 2019 and June 2021 to December 2022. The participant[13] observations took place in the activities linked to LACAF/UFSC.

[13] It consisted of participation as a consumer and researcher in the Responsible Consumer Cells Project and in the Agroecology and Food Short Food Supply Chains research group.

In the second stage, the actors involved with the food supply chain, agroecological production, and food network initiatives in the territory were analysed. We began by semi-structured interviewing key stakeholders and, later, moved on to the structured interviews with farmers (by questionnaires application). This stage occurred from August 2022 to December 2022. After being identified in the first stage of the research, 11 key players were interviewed.

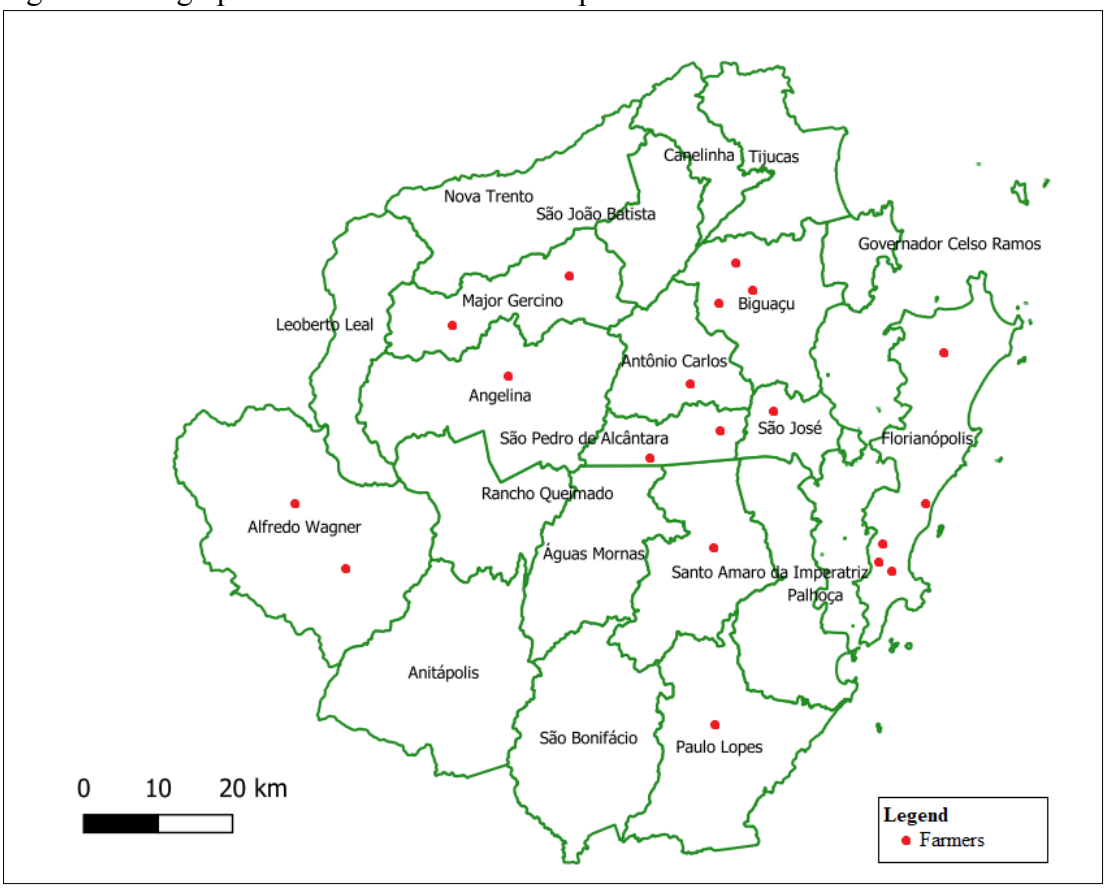
As a starting point for identifying these players we chose the project Map of Civic Food Networks of the Grande Florianópolis Region (*Mapa da Rede de Cidadania Agroalimentar*) [14]. The tool was developed in 2019 by LACAF to assist in the exchange and access to information about the short food supply chains of agroecological food in the Grande Florianópolis Region. Subsequently, structured interviews by questionnaires application with qualitative and quantitative questions were applied to agroecological family farmers who carry out short food supply chains. Farmers' selection was through indication by key stakeholders and from previously identified farmers in the Map of the Civic Food Networks of the GFR.

Differences between organic and agroecological farming are acknowledged (NIEDERLE; ALMEIDA 2013), but organic production was chosen as the initial reference. In cases indicated by the main actors, structured interviews were also conducted with non-certified agroecological farmers. This methodological choice pertains solely to sample selection, since the assessment of agroecology promotion was based on agroecological indicators, in addition to institutionalised organic certification.

The structured interviews with questionnaires were applied to 19 farmers across the GFR (Figure 8), which has 5,837.4 km² (IBGE, 2019). We consulted farmers from the municipalities of Biguaçu, São José, Florianópolis, Paulo Lopes, Alfredo Wagner, São Pedro de Alcântara, Major Gercino, Antonio Carlos, Santo Amaro da Imperatriz, and Angelina were consulted.

[14] Available at: https://lacaf.paginas.ufsc.br/mapa-da-rede-de-cidadania-agroalimentar-rca-da-grande-florianopolis/

Figure 8. Geographical distribution of the respondent farmers in the GFR



Source: created by the author

For data analysis, we used agroecology indicators and social network analysis tools. The agroecology variables, and their respective indicators, as presented in Table 1, were constructed based on agroecological principles on the arguments presented in Section 2.1 of this thesis. These variables encompass ecological and socioeconomic aspects: biodiversity, self-consumption, resource efficiency, and exchange of information on agroecological practices. Mean dispersion measurements, standard deviation and quartiles were used for quantitative data analysis.

The knowledge and interpretations related to the field of study of social networks were used to help us understand the actors and their relations. To support the analysis in this research, we referenced and described knowledge from Social Network Analysis (SNA) in Section 3.1.1.

The interactions among farmers and their connection with local institutions and organisations were investigated in this work. The structural configuration formed by these relations was also analysed. These data helped to identify the elements of citizenship present

in CFNs, which include participation, self-organisation, actors' autonomy, and local control in the food system. The variables and indicators used in the network analysis have been systematised and presented earlier in Table 3, in section 3.2.

The methodology to analyse the interactions between farmers was asking them which five farmers they had the most frequent contact with and what kind of relationship existed between them. Based on the answers, we built directional matrices with the 19 respondent farmers versus nominated farmers, illustrated in graphs. This methodology allowed us to identify a sample of the most relevant existing relationships.

The relations investigated were: marketing collaboration; seeds exchange; sharing information on agroecology; joint participation in an association or group; participation and social organisation through co-management of resources; local projects development; public policies' development; and friendship. In addition, density measures were applied to assess connectivity and betweenness. The density measure is the number of ties in the network, expressed as a proportion of the number of possible relations (BORGATTI; EVERETT; JOHNSON, 2013). Total possible connections were calculated considering that each farmer could cite up to five farmers with whom they had the most contact[15].

To investigate the actions of organisations, farmers responded to which of them they were or had been part of in the last year. The relations between farmers and the aforementioned organisations formed a matrix, and these connections have also been illustrated in graph form. Centrality measures were applied (betweenness centrality), highlighting the actors with the most remarkable intermediation capacity. It was possible to analyse how organisations interconnect through farmers.

All graph illustrations and measurements were processed in the UCINET software (BORGATTI; EVERETT; FREEMA, 2002). In graph visualisation, the actors with the highest centrality (betweenness centrality) were represented with a larger size. Then, we analysed organisations as to how they interact with these farmers, the degree of farmers' confidence in these institutions, and how they contribute to agroecology promotion based on the perception of farmers and stakeholders.

[15]It was considered that there were 19 respondent farmers and 5 farmers who could be mentioned, thus 95 possible links.

5.4 FINDINGS

5.4.1 The components of the Civic Food Networks in the GFR and its history

In the Grande Florianópolis Region, we identified a significant diversity of actors participating in the food system through the establishment of new production and consumption arrangements in short food supply chains. Two Civic Food Networks were identified, within which a variety of actors and organisations operate with varying degrees of influence. Next, we will describe the main characteristics and components of the identified networks.

We understand that there is not just one, but multiple networks that organise around the agenda of agroecology and short food supply chains in the area. The Civic Food Networks in the GFR include a diverse range of farmers' organisations (both formal and informal) with a substantial presence of support organisations, and also with instances of political representation. The support organisations are governmental and non-governmental, operating in the food system and providing support to other segments of society. The organisations identified in the CFNs of GFR mainly work in supporting family agriculture and rural development, though they also engage with consumers and promote food security. These networks are linked to organisations that specifically focus on these objectives, albeit in connection with support organisations for family farming that may not necessarily be dedicated solely to this theme.

The most central organisations which are directly engaged with short food supply chains and agroecology include: the farmers' collective groups Ecovida Agroecology Network and Coopafrem (Recanto da Natureza Cooperative for Organic and Family Farming); the support entities NGO Cepagro (Centre for Studies and Promotion of Group Agriculture) and LACAF (Family Farming Commercialisation Laboratory, a Public University Laboratory); and the Agroecological Mandate of Councilman Marcos José de Abreu/Marquito (municipal political representation instance). In addition to these, other organisations play central roles in the territory among family farmers, although they do not directly promote agroecology. These include Epagri (Governmental Agricultural Research Company and Rural Extension of Santa Catarina State) and SENAR (National Service of Rural Learning).

Next, we will present the actors who are most actively involved in promoting agroecology and short food supply chains. The central organisation in this network is the

Ecovida Agroecology Network. Ecovida brings together several groups of organic producers in the state of Santa Catarina and is involved in the participatory certification of organic farmers (ROVER; LAMPA, 2013). Participatory network certification promotes integration between farmers because it is a producers' network and for having rules on visits and supervision between farmers and local farmers groups.

Ecovida is an essential actor of the networks identified in this work, providing space for the exchange of information, strengthening the social capital among family farmers, as well as giving space for discussion, political representation and organisation. In these spaces, new collective groups and partnerships between farmers arise. In addition, the farmers in the local groups facilitate the collaborative organisation for food supply. Ecovida Agroecology Network promotes meetings where collective issues relating to organic farmers are discussed. In its scope, most of the participation and social arrangements among farmers are connected to resource co-management, projects for the territory, and discussion of public policies.

Another relevant organisation, Coopafrem is one of the leading regional channels to access institutional markets, and it has a structure for food processing and distribution. The cooperative also hosts meetings, thus being where social participation and arrangements identified in farmer relations are developed.

Historically, in Brazil, with the green revolution, categories not included in agricultural incentive programs – such as family farming and ecological agriculture – gave rise to resistance initiatives. Some of these were composed of farmers, while others were support organisations, operating in technical assistance for farmers and with an ideological bias against the agriculture promoted in the conservative modernisation (BRANDENBURG, 2002; SCHERER-WARREN; 1993).

One such endeavour is Cepagro, a non-governmental organisation (NGO) that is located within the Federal University of Santa Catarina. It works with several projects to promote agroecological agriculture in rural and urban areas. Currently, it acts as a technical support of Ecovida Agroecology Network and, among other projects, with technical assistance for green manure, assistance to farms, and seeds distribution.

Finally, the Family Farming Commercialisation Laboratory of the Federal University of Santa Catarina (LACAF/UFSC) is active in teaching activities, research studies, and community outreach programs on family farm markets. It aims to promote markets with better prices for farmers, make agroecological food markets accessible, and expand consumer's

access. In 2017, LACAF developed the Responsible Consumer Cells (*Células de Consumidores Responsáveis* - CCR) project, which consists of innovative social arrangements for directly purchasing and selling organic food as pre-selected baskets[16] – paid for with monthly subscriptions[17]. LACAF's CCRs are supplied by local groups of Ecovida Agroecology Network. Thus, though the idea started with LACAF, it mobilised other actors such as Cepagro, Ecovida, and local associations linked to consumers (schools, municipal councils, etc.). According to the responsible farmers, the CCRs have also inspired other "basket" initiatives in the territory, mirroring the one by LACAF.

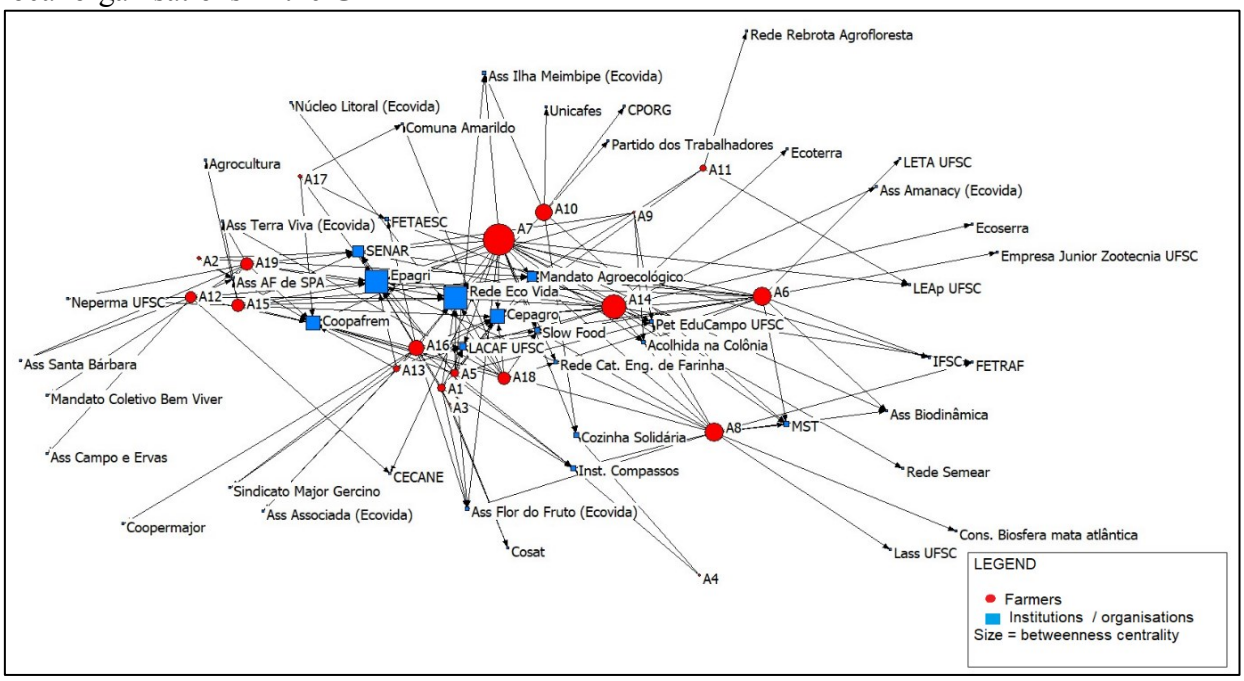
Another important type of component in the GRF's CFNs are instances of political representation, whether they be participatory councils or elected representatives. The participation of actors in these political instances materializes into public policies and laws.. For example, in the GFR, Councilor Marquito is a mandate that acts in agroecology at the municipality of Florianópolis (SC), state capital of Santa Catarina and the city densely populated in the GFR. Some relevant political events are linked to this mandate to strengthen agroecology in the GFR. For instance, Florianópolis has recently approved the Municipal Policy of Agroecology and Organic Production (PMAPO) (FLORIANÓPOLIS, 2017). In October 2019, Florianópolis sanctioned the law establishing its island region as an Agrochemicals-free Zone, making it the first Brazilian municipality to ban pesticides from its territory (FLORIANÓPOLIS, 2019). Currently, the law is in force, and the supervisory bodies act with notifications to offenders, but the law awaits regulation in order for punishments to also be applied. This firmly embedded network with social movements and civil society has made these actions possible, thus showcasing the relevance of those entities in the territory.

Figure 9 shows the most central institutions, organisations, and farmers (represented with the most significant size), considering the current (up to last year's) relations of farmers with these institutions. The actors (farmers and organisations) are disposed of according to relational proximity.

[16] The items in the basket are defined by the farmers according to seasonality and following pre-established criteria of weight and variety

[17] Currently, there are 13 CCRs along the municipalities of Florianópolis and São José in Santa Catarina.

Figure 9. Interation between agroecological farmers linked to short food supply chains and local organisations in the GFR



Source: created by the author

Figure 9 shows us that the 19 respondent farmers relate to a wide variety of actors. It is possible to identify the presence of two CFNs. The first one congregates most of the organisations linked to organised civil society and is where some of the most central actors work in a coordinated manner – including Cepagro, LACAF, and Ecovida Agroecology Network. The other CFN is more closely related to institutional entities, such as Epagri, SENAR, and farmer organisations like Coopafrem and Ecovida. Coopafrem is a farmer cooperative that has strong connections with institutional facilities because its main scope is the commercialisation of food for institutional purchases.

The network configuration found involves individuals making connections between different groups. These groups belong to the two Civic Food Networks identified and connect with one another, primarily through the Ecovida Agroecology Network and through spaces and interactions related to short food supply chains.

Next, we will look in detail to local institutions and organisations. Several national, regional or local farmers' organisations, support organisations, SFSC experiences, and public and representative bodies have been identified (Table 9). In Table 9, laws, policies, and programs related to agroecology in the territory were also systematised. These are the results of collaborations between civil society organisations and governmental institutions.

Table 9. Organisations and institutions linked to agroecological farmers carrying out short food supply chains in the GFR.

FARMERS' ORGANISATIONS	**SUPPORT ORGANISATIONS**	**Organisational AGROECOLOGICAL SFSC EXPERIENCES**	**PUBLIC AUTHORITY Policies**
National Unicafes (National Union of Family Farming and Solidarity Economy Cooperatives) MST (Landless Workers Movement) **Regional** Ecovida Agroecology Network (Regional hub Litoral Sul) and its local groups: associations Terra Viva, Associada, Flor do Fruto, Amanacy and Ilha Meimbipe. Coopafrem (Organic and Family Farming Cooperative) Acolhida na Colônia (Agrotourism Association) Rede Rebrota Agrofloresta (Agroforestry Network) Rede Catarinense de Engenhos de Farinha (Santa Catarina Flour Mills Network), FETAESC – Federação dos Trabalhadores na Agricultura do Estado de Santa Catarina (Federation of Farmers of Santa Catarina State), FETRAF – Federação dos Trabalhadores na Agricultura Familiar da Região Sul (Federation of Workers in Family Farming of the Southern Region) Semear Urban Agriculture Network ABDSul: Biodinâmic Association **Local** Comuna Amarildo Settlement (Águas Mornas) Santa Bárbara Association (São Pedro de Alcântara) Family Farmers of São Pedro de Alcântara (SPA) Campo e Ervas Association (São Pedro de Ancântara) Sabor da Terra Cooperative (COSAT/Biguaçu) Coopermajor (Major Gercino) Major Gercino's Rural Farms Union (Major Gercino)	**Federal Educational Institution** LACAF – Laboratório de Comercialização da Agricultura Familiar (Family Farming Commercialisation Laboratory) (UFSC) NEPEA-SC: Centre for Teaching, Research and Extension in Agroecology (UFSC) Neperma – Centre for Permaculture Studies (UFSC) Educational Tutoring Program (PET) Educampo and Orgânico Solidário (UFSC) LEAp – Applied Ecology Laboratory (UFSC) Lass – Laboratory of Forestry Systems and Ecological Restoration (UFSC) LETA – Laboratory of Applied Ethology (UFSC) CECANE/SC – Collaborating Centre on School Food and Nutrition of Santa Catarina State (UFSC) Zootechny Course Junior Company (UFSC) IFSC – Federal Institute of Santa Catarina **Technical assistance and rural extension** EPAGRI – Agricultural Research Company and Rural Extension of Santa Catarina (State Government) NGO Cepagro (Centre for Studies and Promotion of Group Agriculture) SENAR – National Rural Learning Service (National Government) NGO Slow Food	Street markets **Baskets** Responsible Consumer Cells Community Supported Agriculture (CSA) of Compassos Institute Muvuca Agroflorestal Conscious Consumer Cells – Comuna Amarildo Da Horta à Mesa (from crop to the table – Baskets delivery by Acolhida na Colônia) Acolhida na Colônia Agroturismo (rural tourism association) Faz a Feira Online Plataform A Tenda Agrocultura Moinhos de Luz **Solidarity Actions** Ação Compassos Orgânico Solidário (UFSC) Cozinhas comunitárias (Community kitchens) PT Solidário (Workers' Party Solidarity)	Municipal Agroecology Policy. Municipal Law No. 10.392/2018 Municipal Law establishing Agrochemicals-free Zone Tax on urban land and property exemption for agriculture in urban areas State Agroecology Policy National Decree No. 6323/2007 – Organic Regularisation by Participating Conformity Assessment Bodies (OPAC) Programa Nacional de Alimentação Escolar (National School Nutrition Program – PNAE) Programa de Aquisição de Alimentos (Food Purchase Program – PAA) **Organisations** **Nacional** Conselho Nacional da Reserva da Biosfera da Mata Atlântica (National Council for the Atlantic Rain Forest Biosphere Reserve) PT (Workers' Party) **Regional (State)** Conselho Estadual de Segurança Alimentar e Nutricional (State Food and Nutrition Security Council – Consea) Comissão da Produção Orgânica no Estado de Santa Catarina (Organic Production Commission in the State of Santa Catarina – CPOrgSanta Catarina) **Local (Municipalities) Organisations/Institutions** Mandato Agroecológico (Florianópolis Agroecological Mandate - Councillor Marquito) Mandato (Mandate Bem Viver)

Source: created by the authors

These networks also encompass various organisational experiences related to short food supply chains, such as agroecological baskets. Initiatives for short food supply chains have been stimulated by support organisations like LACAF and Cepagro. The latter has assisted in connecting farmers and consumers and has worked on organising consumers. The experience

of Responsible Consumer Cells, the most significant consumer group experience in the GFR (SOUZA *et al*., 2021), were developed by LACAF at the university, in collaboration with other organisations. From these initiatives, similar efforts have been replicated in the region. These experiences have gained strength and expanded, primarily through the efforts of farmers and organisations seeking access to markets for agroecological foods.

The most currently accessed short food supply chains are sales in the farms, cooperatives, farmers' collective groups, public procurement, consumer groups and home deliveries. Sales to consumer groups are in the form of baskets, which may have different configurations, some being defined by consumers, others being selected by farmers according to the seasonality.

The varied SFSC initiatives in basket format and for consumer groups expanded in 2017. Those initial farmers' collectives gained strengthen in conjunction with the new SFSC arrangements, in which there was an increase over time in baskets/consumer groups' initiatives, along with an increase in farmers' collective groups for supply.

No identified consumer group studied in the GFR initially emerged from consumer organisations. They all came from organised farmers and are managed by them. Even initiatives defined as Community Supported Agriculture (CSA)[18] do not involve collectively organised consumers and do not work in an agricultural funding model – but rather constitute basket deliveries, sometimes with prepayment.

These observed networks are based on the diversity of various actors and are not concentrated around a few, highly centralised organisations. We can observe non-hierarchical networks with a horizontal distribution. Though all the respondent farmers belonged to the GFR territory, we identified that these farmers also access some organisations outside of this geographic boundary.

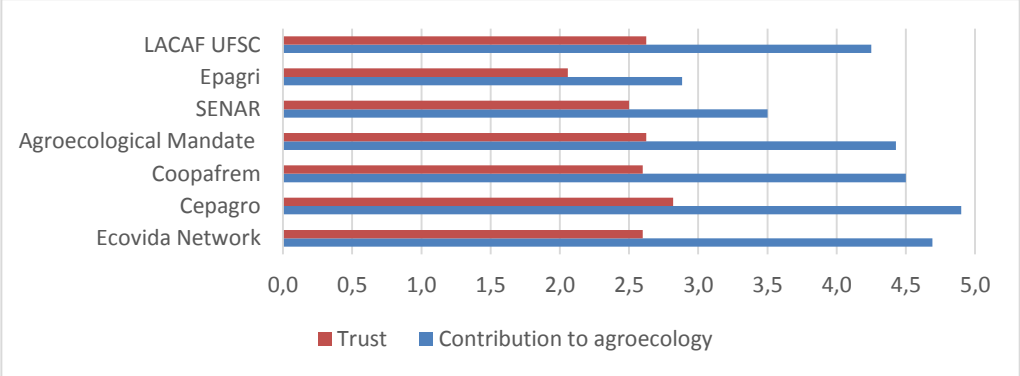
Farmers were asked about their trust in the organisations and how much they would contribute to agroecology promotion. In addition to exploring the presence of a relationship between farmers and the local organisations, we sought to understand the effective participation of the institutions and their contributions. Here is the result of this analysis as to

[18] Community supported agriculture (CSA) are direct partnerships based on the relation between some people and one or more farmers who share the risks, responsibilities and benefits of agriculture through the conclusion of a binding long-term agreement. Definition according to the European CSA Declaration adopted during the 3rd European CSA Meeting, held in 2016 in Ostrava, Czech Republic. Available at: https://urgenci.net/wp-content/uploads/2016/09/European-CSA-Declaration_final-1.pdf

institutions with greater centrality (betweenness centrality and centrality degree[19]) (Figure 10).

The contribution to agroecology was analysed on a scale from 0 (zero) to 5 (five), based on the farmer's choice. As for farmers' confidence, the scale was from 0 to 3, where zero is no confidence, 1 is too little, 2 is enough, and 3 is too much.

Figure 10. Assessment of farmers as to main institutions and organisations acting in the GFR



Source: created by the author

Responses averages were calculated for each institution and organisation. Epagri, a governmental technical assistance and rural extension institution from Santa Catarina state, was the only one that received sufficient confidence on average. The others were ranked as very trustworthy. Despite farmers' trust in it, Epagri's result was lower than 3 for its contribution to agroecology. Cepagro, Ecovida Agroecology Network, Coopafrem, LACAF and Agroecological Mandate, on their turn, had results above 4 for agroecology promotion. SENAR, a rural education institution, scored 3.5 out of 5 in agroecology promotion.

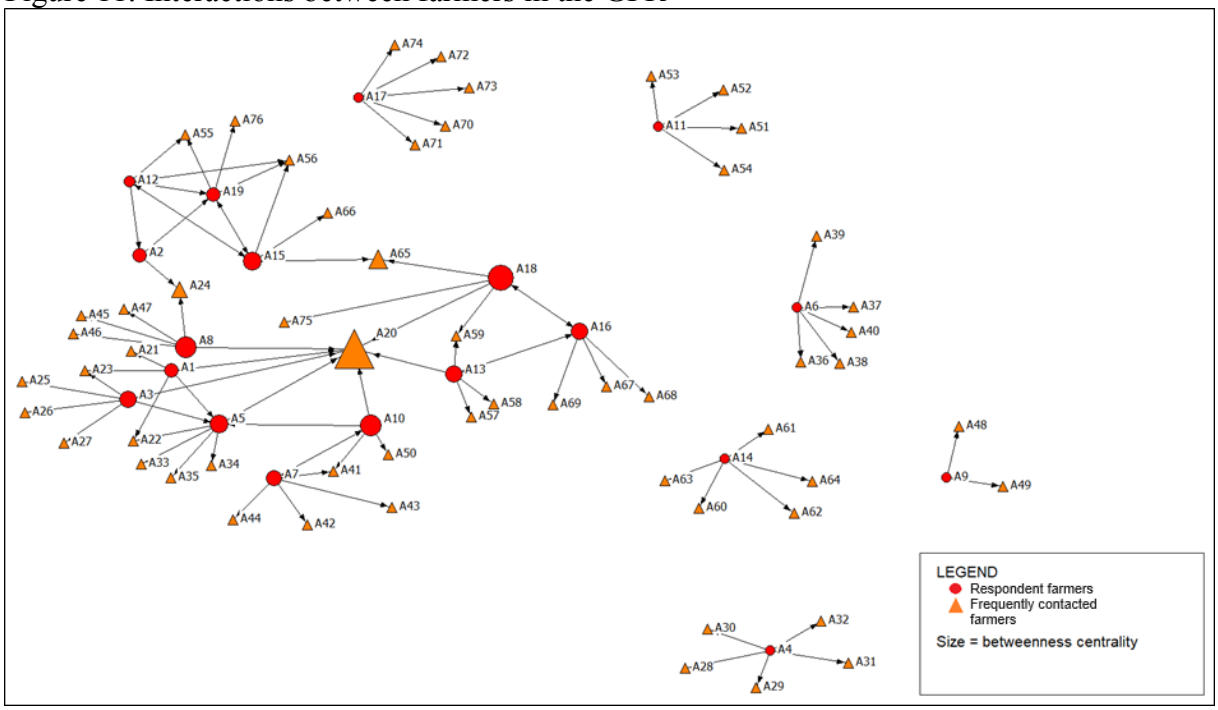
We point out that high confidence in these organisations does not indicate that they are free from internal conflicts, utilitarian or individualistic practices and actions. Rather, it highlights that the networks also include collective interests and motivations that go beyond purely economic interests and individual utility. For example, in the perception of farmers, their groups (Ecovida and Coopafrem), the public university laboratory (LACAF), and the NGO Cepagro contribute more to agroecology than the governmental agency, despite Epagri's great centrality.

[19] Centrality degree is the number of links incident upon a node (BORGATTI; EVERETT; JOHNSON, 2013)

5.4.2 The farmers and the interactions involved in Civic Food Networks

To understand the relationships present in the CFNs, a social network analysis was conducted among farmers. First, the goal was to identify the farmers involved in the networks, and then assess the interactions that took place within them. The relations between the respondent farmers are represented in Figure 11. This figure shows the relations of the 19 farmers involved in agroecological SFSCs who were consulted, along with the (up to) five farmers with whom they had the most frequent contact. Since the indication of farmers was unrestricted, they could mention farmers with whom they had any kind of relation, including neighbours and relatives. This methodology was used to identify the main relationships among these farmers and, as a result, understand if the identified Civic Food Networks are significant. A total of 89 connections were identified. The farmers represented with the most significant size are those with the largest betweenness centrality.

Figure 11. Interactions between farmers in the GFR



Source: created by the author

There is a connection between most of these farmers, although the respondent farmers belong to the GFR municipalities that can be up to 150 kilometers apart. The farmers could mention farmers from any location.

We identified that the two CFNs imbricate into a network where 13 of the respondent farmers interact either directly or indirectly with one another. They are located in the municipalities of Biguaçu, São José, Florianópolis, São Pedro de Alcântara (SPA), Antônio Carlos, Angelina, and Paulo Lopes, that can be up to 150 kilometers apart. Although we have identified two CFNs with the prominence of different organizations, we will base our analyses without distinguishing the farmers involved in the different networks, as these networks are interconnected. This network does not have a closed configuration, and it is divided into subgroups (cliques) that are linked through players that connect with other players.

The remaining (6) farmers are connected to other farmers, but are not apparently related to these networks through those connections. We understand that farmers who are not part of these CFNs appear to be distant from the main group for various reasons. Some may be individualistic, while others may be engaged in other networks with different geographical scopes or for specific purposes – for example, they might be involved in agroforestry or the production of specific products, like mushrooms.

The relationships between the networked farmers are related to their participation in local groups and associations. These interviewees have indicated that the most frequent relations with the five nominated farmers occur predominantly within the Ecovida Agroecology Network. Next, the most cited spaces for these interactions are collective marketing groups: cooperatives and groups of farmers for marketing. The participation of farmers in the aforementioned collaborative groups has encouraged other types of relations, such as the exchange of seeds and seedlings, and collective organisations for land management, political participation and friendship.

To understand the relations between the respondent farmers, we consulted them about specific interactions they have. Table 10 presents a detailed analysis of the most prevalent interactions among farmers using density measures, distinguishing the findings in the network of farmers who are part of the identified CFNs from those who are not integrated into this group. The interactions investigated were: marketing collaboration; seeds exchange; information exchange on agroecological production practices; participation and social organisation through co-management of resources, local projects development, public policies' development, and friendship.

Table 10. Degree of interaction between farmers, inside and outside the CFNs by purpose (density measures), in the GFR

		All	Sharing information on agroecology	Friendship	Marketing collaboration	Joint participation in association or group	Participation and social organisation	Seeds exchange
CFN Farmers	Density*	0,96	0,82	0,86	0,82	0,82	0,65	0,61
	Total (N of ties)	63	53	56	53	53	42	40
	Std Dev	0.254	0.234	0.240	0.234	0.233	0.210	0.205
	Avg. Degree	4.846	4.077	4.308	4.077	4.077	3.231	3.077
Farmers outside CFNs	Density**	0,87	0,83	0,81	0,57	0,53	0,46	0,4
	Total (N of ties)	26	25	21	17	16	14	12
	Std Dev	0,232	0,228	0,210	0,189	0,184	0,173	0,160
	Avg. Degree	4,333	4,167	3,500	2,833	2,667	2,333	2,00

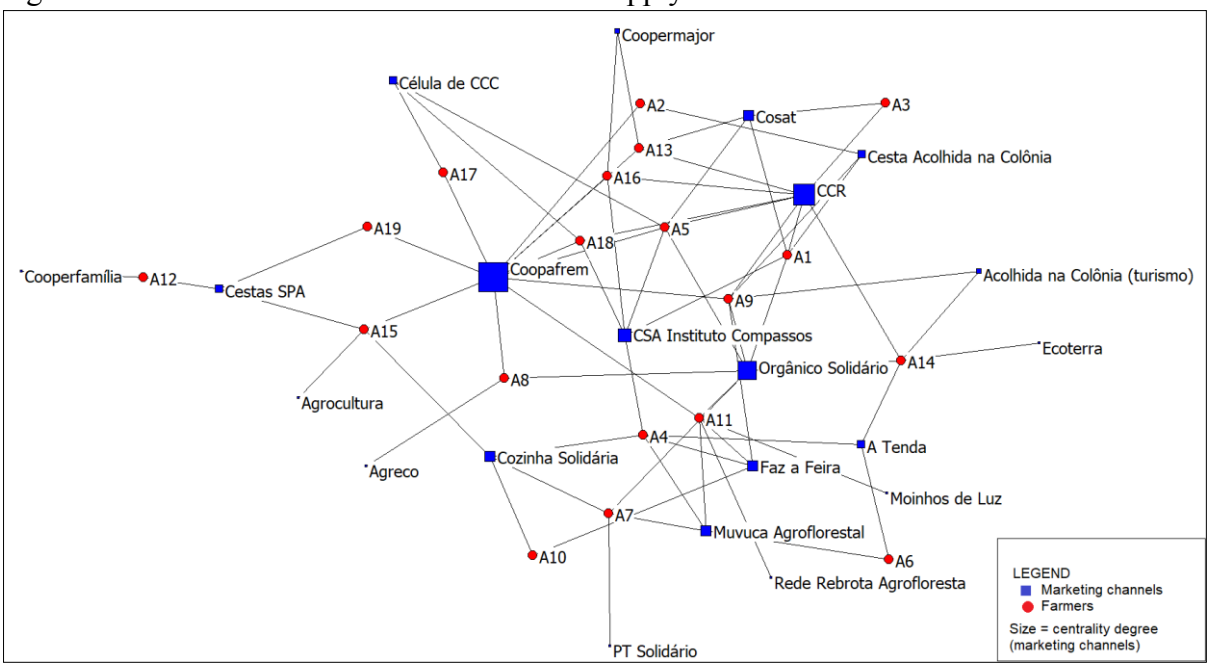
* Largest possible number of ties: 65
** Largest possible number of ties: 30
Source: created by the author

Several interactions point to the character of multiple relations (multiplexity) between these farmers. It is noticeable that the sharing of information about agroecology and friendship are inherent in the relationships among farmers, regardless of whether they are part of the CFNs or not. In the CFNs, a higher level of collaboration for marketing was observed, along with increased joint participation in groups and associations, greater social and organisational participation in territorial actions (co-management of resources, local project development, public policies), and a higher degree of seed exchange. It is important to highlight that, for CFN farmers, these flows encompass the entire group of farmers, because both CFNs are interconnected in a network. The interactions observed for farmers outside the networks are scattered and pertain to isolated relationships between each farmer and their peers.

Farmers within the CFNs connect through participation in groups and associations that provide insight into the spaces where these interactions take place and how these relationships are encouraged. It also demonstrates that these farmers are interconnected with each other, local organisations, and have strong ties to SFSC groups.

In regards to supply initiatives, some are managed by farmers' collective groups, while in other cases they are run by just one farming family – supported by partner farmers. Figure 12 illustrates how the various supply initiatives interconnect. The represented relations involve sale and exchange.

Figure 12. The connection between short food supply chains in the GFR



Source: created by the author

Through farmers and institutions, this network has the outstanding characteristic of horizontal information sharing. In the CFNs, each network is also connected to several organisations and to the production of qualified scientific knowledge through the university. In that case, we see great potential for social innovations, which have already materialised in different organisational arrangements for short food supply chains.

To ensure the variety needed for consumer loyalty, farmers interconnect and buy, sell and exchange products with each other. The supply of consumer groups, home deliveries and baskets demand high diversity of products. Farmers have been making it possible to supply these new arrangements through these relations with other farmers.

Next, we will present the agroecology indicators that we measured on the farms belonging to the CFNs and those outside of them, in order to subsequently analyse the role of the CFNs in these indicators.

5.4.3 Agroecological performance of farmers

Agroecology was analysed on the farms of the 13 farmers from the identified CFNs and the 6 farmers outside of them. The results of agroecology indicators for biodiversity (agrobiodiversity and natural ecosystems) (Table 11) in the CFNs shows that the

agrobiodiversity by the farmers studied includes, on average, 56 different cultivars/breeds per farm, versus 62 by those outside of them. On average, 19 breeds and cultivars are traditional varieties among these in the CFNs, against 21 outside. Regarding natural ecosystems, 50% of native vegetation was found for CFN farmers, and 56% for those outside of them. In terms of biodiversity indicators, there were no significant differences between farmers integrated into the CFNs and those who were not.

Table 11. Biodiversity in the GRF

	CFN FARMERS				FARMERS OUTSIDE OF THE CFNs			
	AGROBIODIVERSITY			natural ecosystems (%)	AGROBIODIVERSITY			natural ecosystems (%)
	species	cultivars/ breeds	traditional cultivars/ breeds		species	cultivars/ breeds	traditional cultivars/ breeds	
Average	39	56	19	50	39	62	21	56
Minimum	7	12	0	0	7	8	0	32
1st quartile	16	23	6	14	25	34	2	45
Median	37	53	15	50	35	53	13	58
3rd quartile	58	82	31	88	60	105	40	70
Maximum	81	142	60	99	67	113	63	70
Std. Dev	24	35	17	35,46	19,5	36,1	21,5	13,7

Source: created by the author

The farms generally associate the productive areas with places of native vegetation, which comprise 50% of the total farm area in this study, as well as native forest, native pasture, and forest in recovery. In addition, some farms maintain areas of agroforestry systems.

As for inputs, besides the commercial ones, most of them are produced on the farm (Table 12).

Table 12. Input source in the GRF

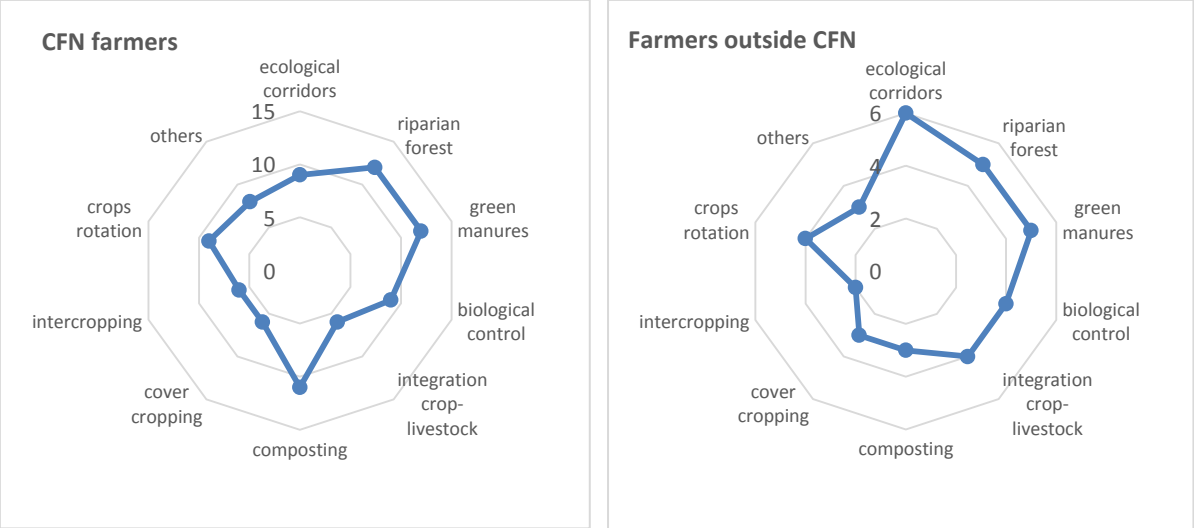
Fertilisings' sources produced on the farm or from low-cost sources* (%)				Breeds and seedlings produced on the farm or obtained through exchanges (%)		
	CFN FARMERS	OUTSIDE CFNs			CFN FARMERS	OUTSIDE CFNs
Average	60	45		Average	41	34
Minimum	0	0		Minimum	0	0
1st quartile	15	0		1st quartile	10	0
Median	70	45		Median	20	40
3rd quartile	100	90		3rd quartile	88	56
Maximum	100	90		Maximum	100	75
Std. Dev	39,4	39,5		Std. Dev	37,6	27,4

* Low-cost sources: reuse and donations (rock dust, cane bagasse, and dung from neighboring farms etc.)
Source: created by the author

On average, for CFN farmers, 60% of fertilisers are produced on the farm or sourced from low-cost sources and through the reuse of waste materials, such as rock dust, cane bagasse, and manure from neighboring crops, while 40% are commercialfertilisers. An average of 41% of seeds are produced on the farm or exchanged with other producers. We found that CFN farmers exhibited a slightly better average percentage of resource independence.

Many agroecological practices are developed and maintained by all the participant farmers. They comprise riparian vegetation maintenance and ecological corridors, green manure, crop rotation and intercropping, composting, cover cropping, and crop-livestock integration (Figure 13).

Figure 13. Agroecological practices in the farms in the GFR



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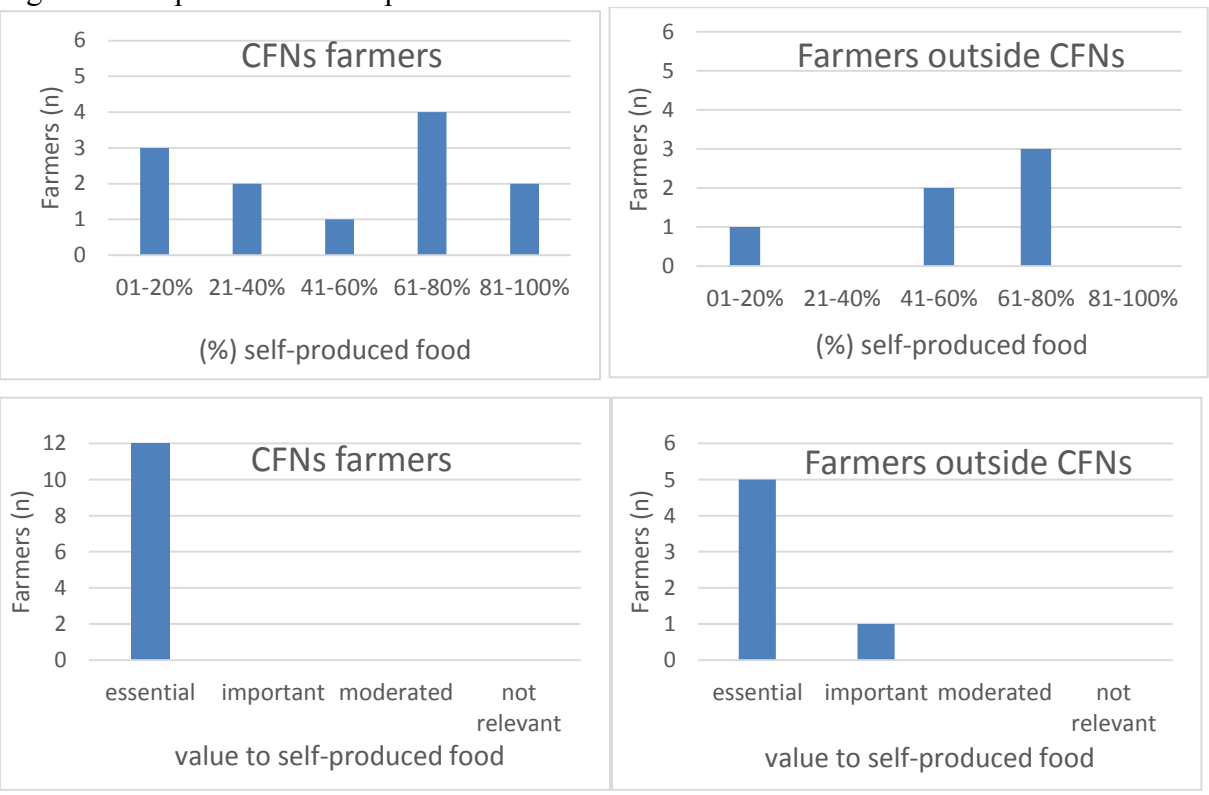
Regarding self-produced food, it proved to be very significant for the farmers who answered the questionnaire, being considered essential for almost all of the repondent farmers, as well as the primary source of food for a substantial portion of them (from 61-100% of their total food), both within and outside of the CFNs (Figure 14).

Figure 14. Importance of self-produced food in the GFR



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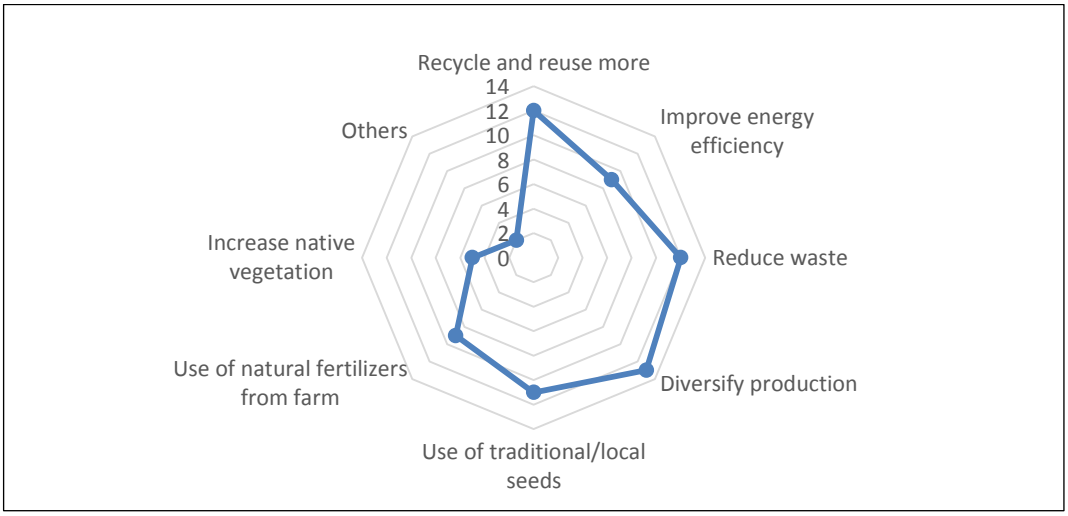
According to the perception of farmers, short food supply chains influence production practices (Figure 15), causing them to recycle and reuse more, pay closer attention to reducing discards, and seek to insert more traditional crops and varieties. The practices cited as 'others' are more often agroforestry cultivation and the insertion of unusual crops, such as unconventional food plants (UFPs).

Figure 15. Influence of short food supply chains on practices for all respondent farmers in the GFR



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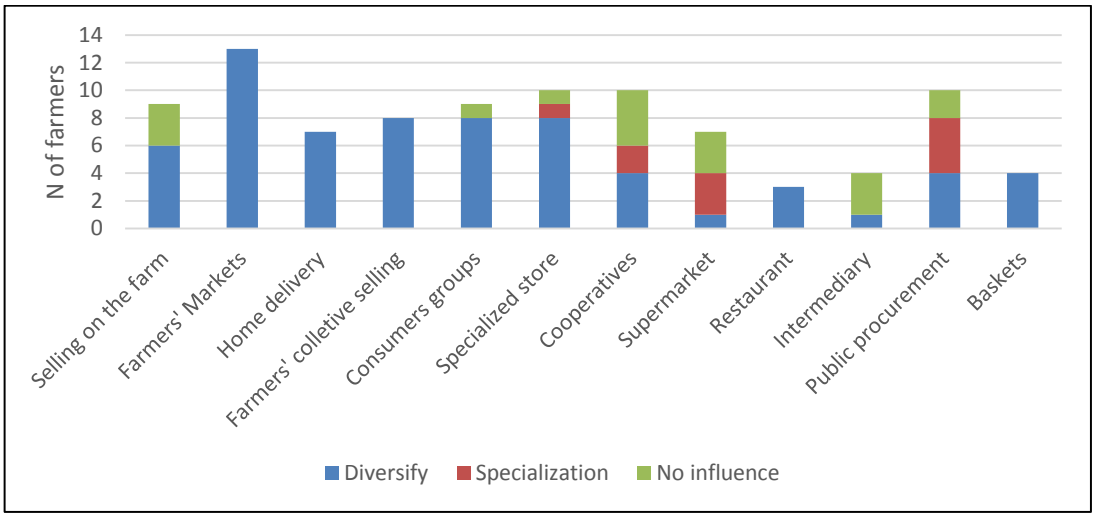
Additionally, we can see a direct relationship between short food supply chains in crop diversity. These SFSCs are street markets, farm sales and new organisational arrangements involving collective framers and/or consumer groups. They usually materialise in direct sales by prepayment of organic food baskets. Figure 16 shows farmers' perception of the supply channels' influence on the choice to diversify or specialise in production.

Figure 16. Farmers' perception of supply chain channels influences on crop diversification in the GFR



Source: created by the author

This graph indicates that SFSCs have directly stimulated agrobiodiversity in the farms, especially concerning street markets and new organisational arrangements in the form of baskets, farmers' collective groups, home deliveries, and consumer groups.

5.5 DISCUSSION - PROMOTION OF AGROECOLOGY IN CIVIC FOOD NETWORKS

The relations between the farmers studied in this work and local organisations are part of a networks shaped as a Civic Food Networks. The CFNs bring together consumers and producers through short food supply chains, eliminating the intermediaries that unbalance power relations, besides allowing farmers and consumers to act directly in this system. In addition, these networks are linked to political participation bodies, with spaces for discussion, participation, and social organisation.

As mentioned by Renting, Schermer, and Rossi (2012) and Rossi, Favilli and Brunori (2013), a CFN is based on actors' willingness to take a proactive role as a civil society organisation, improving relations and taking on political roles as far as producers are concerned. In addition to the citizen's desire, CFNs collectivise, intending to create an appropriate structure to manage technical aspects and their market presence (ROSSI; FAVILLI; BRUNORI, 2013).

The Civic Food Networks in the GFR are connected to historical family farmers' organisations and support organisations that have jointly formed an agroecological movement aimed at promoting agroecology and rural development. This movement emerged as a

response to the lack of inclusion in conventional policies promoted during the Green Revolution, as described by Brandenburg (2002), who traced the trajectory of this agroecological movement.

Scherer-Warren (1993) describes the development of these organisations and the strengthening of social movements, including rural ones, in Brazil an in the state of Santa Catarina, as a struggle for the redefinition of citizenship, encompassing economic, political, and social dimensions. Through the strengthening of community relations, these movements pave the way for a more democratic society (*Ibid.*).

This movement has more recently connected with the 'quality turn', as described by Goodman (2003), where consumers seek healthier foods that promote greater social well-being and environmental preservation. This movement incorporates elements of trust and embeddedness into food choices, thereby strengthening social relationships around food.

Although the emergence and the expansion of agroecological food SFSCs are directly related to the 'quality turn', the consumer movement, in its organisational dimension, to access these foods is low in the GFR, with new arrangements for connecting production and consumption being initiated and managed primarily by farmers. This contrasts with experiences of CFNs and AFNs in European contexts, where consumers are very active in the processes of purchasing and distributing food (FORNO; MAURANO; VITTORI, 2019; RENTING; SCHERMER; ROSSI, 2012; BRUNORI; ROSSI; GUIDI, 2012).

In the GFR, there are many emerging initiatives for connecting production and consumption, especially in the form of agroecological baskets. In many cases, these initiatives presuppose greater consumer responsibility and awareness, with prepayment and seasonal products chosen by the farmers. These new SFSC arrangements have contributed to the inclusion of consumers in the agroecological movement and increased their participation in CFNs. This is because they are participatory processes that require organisational development and network building, providing consumers with spaces for learning and connecting with the food production and distribution context (SOUZA *et al*., 2023).

Critiques to so-called Alternative Food Networks emphasise that some networks that label themselves as alternative are, in fact, promoting a consumerist and utilitarian model, characteristic of the capitalist production-consumption model (GOODMAN *et al*., 2012; MARSDEN; MORLEY, 2014; TREGEAR, 2011). This model perpetuates social inequalities and environmental issues of the hegemonic food system. Additionally, it is linked to the

phenomenon of conventionalisation within organic agriculture, as described by Darnhofer *et al*. (2010). In this process, there is a reduction in biodiversity, a substitution of ecological processes with inputs, and a shift away from family farming models towards a more business-oriented approach (*Ibid*.; PARRA *et al.*, 2018).

The measurement of agroecology indicators identified that CFN farmers maintain a high degree of biodiversity (natural ecosystems and agrobiodiversity), partial utilisation of traditional genetic material (cultivars/breeds), partial autonomy in the use of resources (seeds and fertilisers), and a high degree of self-produced food. These indicators are the result of three main elements that are interconnected: family farming, short food supply chains, and the social and organisational fabric of CFNs.

Despite the CFNs showing good agroecology indicators for biodiversity, resource self-sufficiency, and self-produced food, these same indicators are also present among farmers outside of the identified CFNs. These indicators can be justified by two aspects: farmers outside of the identified CFNs are also involved in participation and collaboration actions for marketing, albeit to a lesser extent, and they may identify some degree of participation, which is a fundamental element in CFNs. Moreover, all farmers are agroecological and participate in SFSC initiatives.

Rover and Darolt (2021) and Lamine *et al.* (2012) noted that a common point among farmers in short food supply chains was that most of them were categorised into family farming. Therefore, the marketing in SFSCs, aligned with agroecology, has resulted in forming a democratic food market, promoting sustainable rural development and strengthening family farming (BRANDENBURG, 2002; MARSDEN; BANKS; BRISTOW, 2000).

It is important to highlight that family farming has been recognised as a category that constitutes a social basis for agroecology, since it is responsible for much of the world's food production. It provides diversified food, cultivated in production systems that preserve natural resources, being less dependent on systematic energy and materials input or external technologies (ALTIERI, 2012; MCINTYRE, 2009; H. L. P. E., 2019).

For agroecology, a key point for the resilience and sustainability of agroecosystems is biodiversity. Monocultures generate losses in biodiversity and cause a general change in agroecosystems (NICHOLLS; HENAO; ALTIERI, 2015). The preservation of natural biodiversity on the farms analysed is in accordance with Bauer (2012). The author used aerial

images, remote sensing studies, and interviews with local stakeholders and identified, in the GFR municipality of Biguaçu, that traditional land use practices by family farmers promoted a significant increase in native vegetation from 1978 to 2011. This operation, observed in Bauer's work (2012) and studied by other authors, encompasses the management of native forests, combining agrobiodiversity food production and short food supply chains (BAUER, 2012; CARRIERI *et al*, 2014; FANTINI *et al.*, 2010).

A diverse production (agrobiodiversity) aligns with the ways of life of family farmers because it simultaneously allows for the maintenance of the landscape through ecological management and ensures the family's dietary needs (ALTIERI, 2012; DUVAL *et al*., 2008). For Van Der Ploeg (2008), control over the quality of self-produced food is becoming increasingly important for farmers around the world.

Schneider and Gazolla (2005) point out that, to this day, food production for personal use and consumption (self-produced food) is a fundamental element of family agriculture, playing a key role in its social reproduction. It is also a strategy for giving those producers autonomy to face the markets, food security, as well as preserving their cultural identity. Through self-produced food, the farmer gains greater resilience to withstand market fluctuations and greater farm autonomy (GAZOLLA; SCHNEIDER, 2007). Duval *et al*. (2008) discuss the relationship between agroecology and sef-produced food, emphasising that family farming is more conducive to a diversified production that ensures a more varied and nutritious diet, beyond being associated with a production system that preserves genetic variety and values traditional practices.

The maintenance of traditional seeds is another strategy for preserving locally adapted genetic diversity and maintaining the autonomy of farming families (DE BOEF *et al*., 2007). The family farm is a place that allows for a relative degree of autonomy, both economically and in terms of decision-making (VAN DER PLOEG, 2008). This autonomy is at risk due to low prices and market difficulties that oppress family farmers, preventing them from contributing to society by maintaining their ways of life and supporting sustainable food production *(Ibid.*).

In the hegemonic food system, farmers are dependent on the external resources, which decreases their autonomy vis-à-vis the system, and at the same time increases the cost of production (VAN DER PLOEG, 2008; ANDRIOLI; FUCHS, 2008; MACHADO, 2014). In this sense, strategies for maintaining the ways of life of family farmers have involved the

development of new market strategies with new organisational dynamics. (ALÉSSIO; ROVER, 2014; FANTINI *et al.*, 2018; DAROLT; LAMINE; BRANDEMBURG, 2013; SILVA; AMORIM JUNIOR, 2013). The need for production to meet market demands has resulted in a loss of biodiversity.

The evaluation of sustainability indicators in this research reinforces the relationship between short food supply chains and the promotion of agroecology. SFSCs directly influence the choice to diversify production, connecting market demands and serving as a strategy to maintain the way of life of family farmers associated with agroecological practices. These findings align with the idea that the proximity between producers and consumers through SFSCs, involving direct sales and spatial closeness, can be fundamental in fostering biodiversity, as described by Rover *et al.* (2020).

Carrieri, Pugas, and Rover (2023) identified that, in the context of productive inclusion of family farmers, even individualised farmers sustain good agroecology indicators through SFSCs. Thus, the promotion of agroecology can occur through SFSCs, regardless of CFNs. In the GFR, the formation of a network of farmers through collaboration to overcome historical exclusion created network connections and collaboration for market access in SFSCs. These actors, their organisations and support organisations for agroecology strengthen network actions and drive CFNs.

In this study, we inquired whether CFNs promote agroecology and how, and we understand from the obtained results that SFSCs are fundamental to the promoting element of agroecology, and CFNs are part of the actors' strategy for strengthening SFSCs and agroecology. However, CFNs are not prerequisites for promoting agroecology in the production units, since they occur equally in farms more or less involved in the CFNs.

The CFNs in the GFR are directly involved in promoting short food supply chains, with a focus on the role of support organisations that have contributed to the development of these initiatives by connecting consumers and farmers. Given the strong historical organisation of farmers and their current mobilisation for collective marketing actions, the main differentiator in the work of these initiatives is to assist in the organisational process of consumers and connect them with farmers. The lack of organisation among consumers in the food system results in them having little decision-making power and low autonomy (GOODMAN, 2003).

The farmers' networks showed a very high level of horizontal information sharing about agroecology within the farmers' networks. In the CFNs, this flow is also connected to the

work of support organisations that promote qualified technical assistance, as well as various instances of public federal educational institutions engaged in advanced research and community outreach. Engagement within social networks and the horizontal exchange of information within these networks are crucial components in this collaborative process. They offer alternatives to the monopolisation of knowledge and technologies while also fostering innovation (AGNE; VAQUIL, 2010; SABOURIN, 2001).

The social fabric among farmers also facilitates the preservation of traditional knowledge, as evidenced by the exchange of seeds and seedlings and the utilisation of traditional cultivars and breeds. Preserving traditional breeds and seeds is directly connected to food sovereignty and the maintenance of ecologically adapted processes within the territory and biodiversity (DE BOEF *et al.*, 2007).

The indicators measured in this study relate to the ecological-productive indicators of agroecology. Agroecology can be simultaneously understood as science, agricultural practice, and a social movement (GUZMÁN CASADO *et al.*, 2000). In this sense, it is essential to highlight that beyond the effects of SFSCs in promoting agroecology, CFNs have a unique role in sustaining an agroecological movement that connects various actors in a citizen-oriented manner, focusing on actions within the food system and not merely originating from SFSCs. These actions are strengthened through political discussions linked to these networks.

CFNs have also been acting in promoting food democracy in the sense that they are strengthening consumer participation and organisation in the agri-food system. SFSC initiatives originate from the need to access markets for family farmers, but with coordinated action from CFN organisations, they have progressed in raising awareness and engaging consumers.

The social fabric of CFNs enables the organisation of actors around the creation of more agroecological and democratic markets. Additionally, this social fabric allows for collective efforts to bring about transformations in the territory, collaborating with government bodies and advocating for programs and policies promoting agroecology and democratisation of the food system.

According to Mier y Terán Giménez Cacho *et al.* (2018), markets contribute more to agroecological movements when they are integrated into networks whose unifying elements are environmental and social values.

According to Castells (1999), the social segments that hold power organise the structures and institutions of society in accordance with their values and interests. People and groups whose values and interests are not addressed enter into conflict to assert their right to exist within these institutions, forming counter-power movements. The Civic Food Networks in the GFR have been acting as counter-power movements, integrating family farmers into marketing dynamics and promoting discussions and the development of policies and programs to support agroecology and food sovereignty.

5.6 CONCLUSION

The Civic Food Networks in the GFR encompass a wide variety of farmers' organisations, including both formal and informal ones. They are connected with a significant presence of support organisations, both governmental and non-governmental, and also involve instances of political representation.

CFNs in the GFR have strengthened due to the need to mobilise rural actors and their organisations to overcome social and productive exclusions. They have been part of a strategy by these actors to promote agroecology through SFSCs. The maintenance of agroecological family farms has occurred through SFSCs. Moreover, the existence of CFNs strengthens an agroecological movement and food democracy that expands through the actions of actors and their organisations. They operate in representative bodies such as city/state councils and lead to changes in existing power structures, such as the creation of public policies and modifications to laws.

5.6.1 Limitations

The sample of farmers participating in the research was limited to those engaged in short food supply chains and even the farmers from the identified CFNs are also involved, to some extent, in participation and collaboration actions for marketing in SFSCs. It would be interesting to compare these farmers with those who have no involvement in short food supply chains or farmers with more significant distance from food networks. This would help highlight and differentiate the effects of participating in SFSCs and participating in CFNs.

6 ARTICLE 3: COMPARATIVE ANALYSIS OF CIVIC FOOD NETWORKS IN SOUTHERN BRAZIL AND NORTHERN ITALY

ABSTRACT

Food insecurity and the unequal distribution of power in the hegemonic food system have mobilised, in the search for solutions, social actors acting in all axes of this system. Civic Food Networks (CFNs) are the links of social actors, such as institutions, social organisations, farmers and consumers, who act in a citizen way in the food system. These networks work through food supply chains (SFSCs). This research studied the existing social relations in the surroundings of short food supply chains of agroecological foods in the Province of Trento (IT) and the Grande Florianópolis Region-GFR (BR, comparatively). Our aim was to understand whether Civic Food Networks are formed in the territories, and if so, what contributes to agroecology in the food systems. We carried out direct and participant observation, database consultation, document analysis, semi-structured interviews with key actors, and structured interviews, through the application of questionnaires, with farmers. In the GFR, we identified a consolidated CFN with broad reach, strong participation of organisations supporting agroecology and political representation instances. In the Province of Trento, an embryonic CFN was found, with limited mobilisation of farmers and developed through public university and government initiatives. Family farmers involved in Italian and Brazilian SFSCs, regardless of their degree of involvement in CFNs, demonstrated high biodiversity, partial autonomy in resource utilisation, and high degree of self-produced food. We concluded that in the establishment of markets of interest for local producers and consumers, SFSCs are formed in both studied territories, creating conditions for expanding the coordination between individual and organisational actors, enhancing the formation of networks. This complex movement fosters agroecology.

Keywords: Food supply chain; Agroecology, Social Network, Family Farming, Biodiversity

6.1 INTRODUCTION

The hegemonic food system is characterised by intensive agriculture with ecologically damaging production techniques that operate in long chains governed by large corporations and agro-industrial complexes on a global scale (CHIFFOLEAU *et al*., 2019; DAROLT; LAMINE; BRANDENBURG, 2016; ANJOS; CALDAS, 2017).

Alternative Food Networks have emerged in different territorial contexts in the face of the need to build new production, distribution and consumption models to counterpose the hegemonic food system's environmental and social unsustainability (ANJOS; CALDAS, 2017; HOWARD, 2012). AFN is a terminology used to emphasise that these experiences seek to address the shortcomings of conventional systems (PREISS; DEPONTI, 2020). However, these networks may present trends of conventionalisation that, instead of deconstructing the

dominant model, give way to mere strategies for adding value to the product (ANJOS; CALDAS, 2017).

The Civic Food Network is an analytical category derived from the AFN idea. It emphasises the motivation of the actors involved and challenges the term "alternative" to better discuss food networks while highlighting their citizenship elements. These elements include participation, cooperation, local control of food production, distribution, and marketing, self-organisation, and autonomy of the actors. All of these aspects contribute to greater citizen empowerment in shaping the food system (ANDERSON *et al.*, 2016; RENTING; SCHERMER; ROSSI, 2012).

These networks consist of a group of actors within the food system, including individuals and organisations, who collaborate across various aspects of production, distribution, and consumption. They often involve diverse territorial actors, such as farmers' organisations, consumer groups, government organisations, and support organisations. A central element of these networks is the proximity between producers and consumers, which is frequently associated with short food supply chains (SFSCs) (RENTING; SCHERMER; ROSSI, 2012; BRUNORI; ROSSI; GUIDI, 2012; SOUZA; PUGAS; ROVER, 2021). In SFSCs, consumers are aware of the origin and identity of the product consumed (MARSDEN; BANKS; BRISTOW, 2000), i.e. consumers have the necessary tools to identify how this product was produced (production system), where it was created (territory), and by whom it was grown (producer) (ROVER; DAROLT, 2021).

There is a tendency for short food supply chains to be linked to higher quality foods such as organic and agroecological (DAROLT *et al.*, 2013; NIEDERLE, 2013; KNEAFSEY *et al.*, 2013). SFSCs are also linked to agroecology because they make it possible to lower the risk of losses in marketing, generate work and income, and value natural resources and the landscape, contributing to the transition to more sustainable systems (DAROLT; LAMINE; BRANDENBURG, 2016).

Some authors dispute whether these food networks are, in fact, bringing about changes in the food system or perpetuating existing inequalities, including the marginalisation of small producers (GOODMAN *et al*., 2012; MARSDEN; MORLEY, 2014; BRUNORI *et al.*, 2008; FRANKLIN; NEWTON; MCENTEE, 2011). However, the term CFN was constructed precisely to make it possible to discuss these networks from the perspective of citizenship and the democratisation of food systems.

Given the need to promote the transformation of the food system (ANJOS; CALDAS, 2017; HOWARD, 2012), this paper raises the question of whether Civic Food Networks can promote agroecology in food systems. Agroecology is emerging and consolidating in contrast to the hegemonic system. As a result, it is sparkling interest worldwide, among a wide range of players, as an effective model for responding to climate change and the food systems' challenges (GLIESSMAN, 2000). Agroecology consists of applying ecology's principles and concepts in managing and designing sustainable agroecosystems. It establishes alternative models to the agro-industrial standard (hegemonic) of production (*Ibid.*), and is the basis for the development of sustainable agriculture in various environmental, socio-economic and cultural contexts (CAPORAL; COSTABEBER, 2004; ALTIERI, 2012; BRANDENBURG, 2002).

This work aimed to determine whether Civic Food Networks are established in the studied territories and, if so, what role they play in developing more agroecological food systems. To achieve this goal, the study analysed the actors participating in food networks, their interactions, the elements of citizenship within these networks, and agroecology indicators on the farms. Two case studies were conducted in distinct territorial contexts, one in the Global North (Italy) and the other in the Global South (Brazil).

6.2 METHODOLOGY

This study conducted a comparative analysis of two territories to investigate the formation of Civic Food Networks and their role in promoting agroecological food systems. The research focused on the Province of Trento, Italy, and the Grande Florianópolis Region (GFR) in Santa Catarina, Brazil, using a combination of social network analysis and agroecological indicators.

For each case of study, two steps were carried out: firstly, exploring and describing the empirical context of each territory to them to concentrate on the stakeholders and agroecological farmers. The survey data collection took place from 2018 until December 2022.

Secondary data were collected to describe the empirical context, aiming to understand each territory's specific characteristics and identify key players. To this end, research on documents and direct observations, both participating and non-participating, were carried out.

For information and documents, we consulted the official websites of institutions, academic papers, news, and institutional publications. Also, the databases of the Laboratory of Family Agriculture Commercialisation (LACAF/UFSC) and of the *Nutrire Trento* project. LACAF develops teaching, research and extension actions in commercialisation, agroecology, family agriculture and food networks in Brazil. The *Nutrire Trento* project is developed in partnership with Trento's town hall (*Comune*) and the University of Trento - UniTN (*Università degli Studi di Trento*), in Italy, promoting spaces of integration of food stakeholders for discussion of food policies for the city and articulations of experiences.

In the second stage, we focused our attention on the short food supply chains and agroecology stakeholders by interviewing representatives of producer organisations, consumer organisations, support entities, institutions, and researchers. Twenty-two key stakeholders were interviewed (11 in the GFR and 11 in the Province of Trento), in addition to the structured interviews with questionnaires applied with farmers – we will go in detail next.

In the territories studied, there are previously known initiatives related to food networks and short food supply chains. The agroecological SFSCs served as a starting point for the identification of possible Civic Food Networks, since a central element for citizenship of the players is the greater participation in the food system that occurs through the SFSCs, in which consumers and farmers have greater participation and autonomy compared to the long food supply chains.

Subsequently, we applied structured interviews using questionnaires to agroecological[20] farmers who carried out short food supply chains in each territory. We used 38 a structured interviews with farmers (19 in the GFR and 19 in the Province of Trento) to understand the territory's networks and evaluate the promotion of agroecology. This selection of farmers for the structured interviews combined the previous mapping[21] of the initiatives and indication by stakeholders.

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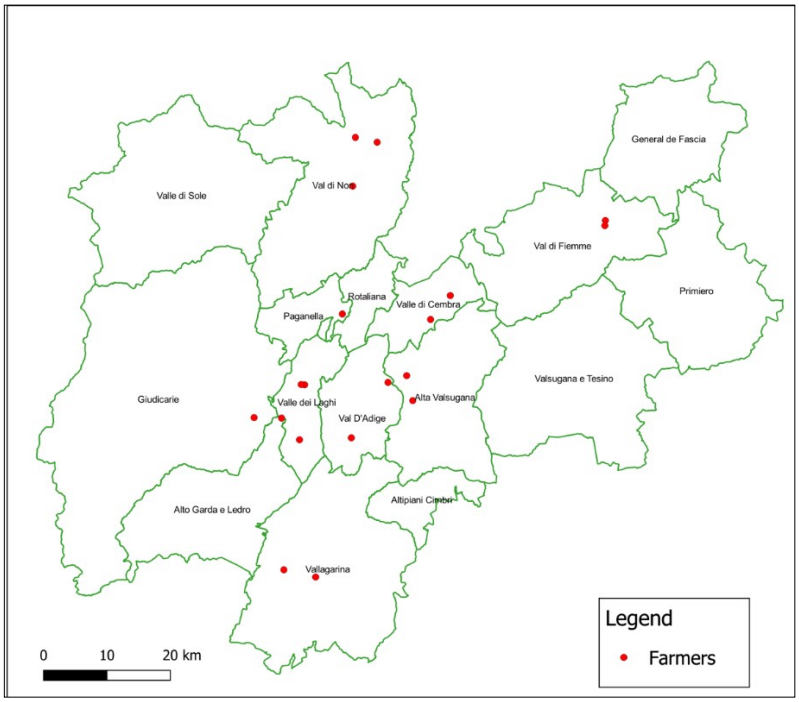
[20] We understand that there are differences between organic and agroecological farming (NIEDERLE; ALMEIDA; VEZZANI, 2013), but we chose to use organic production as an initial reference. In the cases indicated by the main stakeholders, non-certified agroecological farmers were also consulted. This methodological choice is only relative to the choice of the sample, but the verification of the promotion of agroecology took place on the basis of agroecology indicators, in addition to institutionalised organic certification.

[21] Map of *Nutrire Trento* Project and Map of GFR Civic Food Network by LACAF.

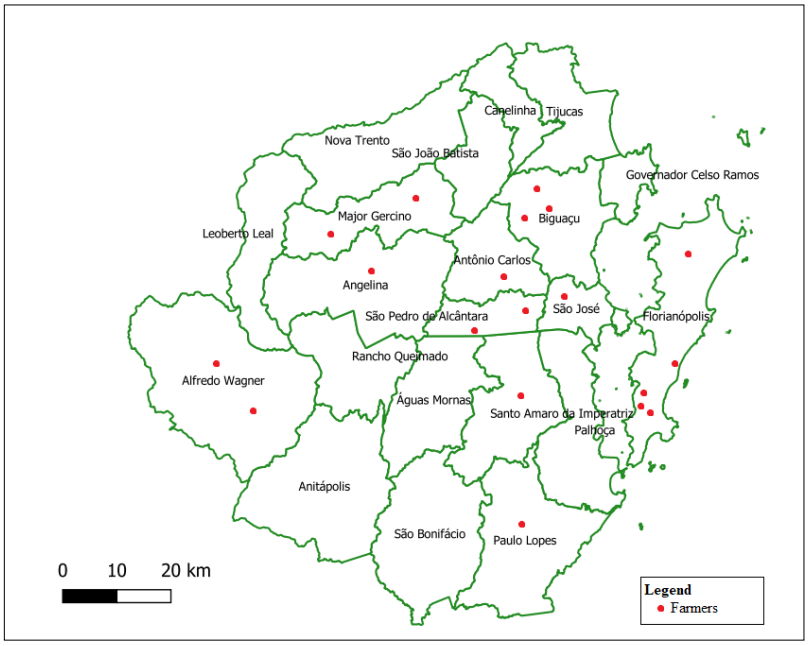
The questionnaire applied to farmers was divided into sub-themes: characterisation of farmers and farms; investigation of production and marketing practices; and investigation of the relations of these farmers with organisations, institutions and other farmers. The first two subthemes contributed towards understanding agroecology in the farms, and the last one to identifying and characterising the networks and their contributions to agroecology. Figure 1 shows the location of the studied territories. The farmers who participated in the survey are distributed according to Figures 17 and 18. The Province of Trento has an area of 6,206.86 km² (SPAT, 2014), and the Grande Florianópolis Region has 5,837.4 km² (IBGE, 2019).

Figure 17. Farmers consulted in the Province of Trento



Source: created by the author

Figure 18. Farmers consulted in the GFR



Source: created by the author

For data analysis, following the identification of Civic Food Networks (CFNs) through network interactions analysis tools and information from interviews, we assessed agroecological indicators on the farms involved in these networks and evaluated the networks' contribution to the promotion of agroecology.

We designed the analytical framework for the evaluation of the promotion of agroecology descriptors (Table 1) based on the theoretical review presented in section 2.1. The variables cover ecological aspects – namely: biodiversity, resources efficiency, and agroecological practices – and socioeconomic aspects – namely: self-produced food. The results of variables and indicators come from different data collection tools (semi-structured interviews, structured interviews by questionnaires, as well as direct and participant observations).

To support the analysis in this research, we referenced and described knowledge from Social Network Analysis (SNA) in Section 3.1.1. In this work, we investigated the farmers' relations among themselves. Their connection with institutions and organisations of the territory was also investigated in order to understand the configuration of the network(s) that these relations formed. The variables and indicators used in the network analysis have been systematised and presented earlier, in Table 3, in section 3.2.

For the analysis of the relations between farmers, we asked them which were the five farmers with whom they had the most frequent contact and what kind of relationship existed

between them. Directional matrices were constructed from the answers from 19 respondent farmers versus those mentioned, illustrated in graphs. Broadly, the aim was to understand the most critical networks for these farmers. In addition, the idea was to have a starting point to understand the existence or formation of Civic Food Networks around these farmers.

The relationships investigated were: collaboration for marketing; seed exchange; exchange of information on agroecological production practices; participation and social organisation (co-management of resources, development of projects for the territory, and construction of public policies); and friendship. Density measures were applied to measure the degree of connectivity and the betweenness degree. We calculated the total number of possible links to measure density, considering that each farmer could cite up to five farmers with whom he had the most contact[22].

To investigate the actions of organisations, farmers have responded to which they are currently connected or have had a relationship in the last year. The relationships between the 19 farmers and the organisations they are part of/relate to in each territory were illustrated in graphs. In addition, measures of centrality (betweenness centrality) were applied to them, highlighting the actors with a greater capacity for intermediation and allowing us to analyse how the organisations interconnect through the farmers.

All graphic illustrations were processed in the UCINET software (BORGATTI; EVERETT; FREEMA, 2002). In graph visualisation, the actors with the highest centrality (betweenness centrality) were represented with the largest size. Based on interviews with key actors and observations, we analysed how organisations interact with these farmers and how these relationships contribute to the promotion of agroecology.

6.3 FINDINGS

6.3.1 Characterisation of the territories and their Civic Food Networks

Based on the results obtained in the consultation of data and interviews with key players of the territory, we will bring initial information about the territorial contexts of the locations.

[22] It was considered that there were 19 respondent farmers and 5 farmers who could be mentioned by each, thus 95 possible links.

Following this, within this section, we describe the Civic Food Networks identified in the studied territories.

6.3.1.1 PROVINCE OF TRENTO

The Province of Trento is an Italian province whose capital is the municipality (*Comune*) of the same name, Trento. It has a total area of 620,686.37 hectares and 542,739 inhabitants (ISPAT, 2014).

According to data from the 2010 agricultural census the utilised agricultural area (SAU) is 80% (110,000 ha) per pasture, 16% (22,000 ha) for perennial woody crops[23] and only 2% for herbaceous[24] crops. Within perennial woody trees, viticulture and apple trees predominate, representing 93% of the total (SPAT, 2014). The agricultural landscape has a predominance of monocultures of these two main crops of the territory, apple and grape, which together account for more than 81% of the agricultural area. Monoculture is also a trend for organic agriculture, where about 80% of the organic cultivated area is of these crops (SPAT, 2014).

Monoculture did not always characterise the territory, which used to have typical mountain agriculture and adapted to the landscape of valleys and mountains, with multiple crops, horticultural production, cereals and livestock. The change in agriculture occurred in the second half of the 20th century, when there was a need to rebuild the territory with the aggravation of the economic crisis after two world wars. This reconstruction occurred through sustained state policy in strengthening agricultural cooperatives and encouraging monocultural production aimed at long food supplys chains to exportation.

The farms are characterised by being family and minor, where 84.3% of the farms have less than 10ha (ISPAT, 2014). Cooperatives have played an essential role in this context of small farms, allowing financial stability for producers. About 95% of the territory's fruit and vegetable production is distributed among five cooperative organisations (FORNO; ANDREOLA, 2023). The cooperative system is linked to intensive, monocultural production and farmers' low autonomy and participation in productive choice and marketing.

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[23] *'LegnoseAgrarie':* non-rotating woody agricultural crops, which have been in the field for more than five years and provide repeated harvests

[24] *Seminativi*: crops of herbaceous plants subject to crop rotation with a growing period not exceeding five years. Available at ISTAT Glossary: https://www.istat.it/it/files//2011/01/GLOSSARIO.pdf

Concerning short food supply chains, the Solidarity Purchasing Groups (*Gruppi di Acquisti Solidale* - GAS) are consumer groups organised for the collective purchasing of highly consolidated foods in Italy and the Province of Trento (FORNO; MAURANO; VITTORI, 2019). Thirty-three GAS have been identified in the Province of Trento, which are fairly widely distributed in the territory, especially in the areas with the highest urban concentrations.

In the Province of Trento, several network initiatives were identified that mobilise the participation of farmers and consumers, building new social relationships and sustaining short food supply chains for agroecological foods. These initiatives are part of what we consider an embryonic CFN in the territory. Following, we will describe these components, and throughout the article, we will discuss their citizenship elements and why this network is considered embryonic.

Two initiatives identified in this research bring together various actors, operating in a civic and coordinated manner across the food system, covering the production, distribution, and consumption aspects. These initiatives exhibit the elements of citizenship, including participation, self-organisation, actors' autonomy, and local control within the food system. These initiatives are: Solidarity Economy of Trentino and Association L.E.N.A (informal), and *Nutrire Trento* project and CSA *Naturalmente*;

The municipality (*Comune*) and the province of Trento have initiatives to contribute to agroecological production and stimulate short food supply chains. The province of Trento has created and implementing a law to promote a solidarity-based economy, the Provincial Law 13/2010, which aims to enhance the solidarity-based economy and local producers. The main result of this act is a weekly market held in the centre of the municipality.

This market is a small initiative that gathers approximately six exhibitors, mostly farmers. The market aims at being a mobilisation space and has hosted events to promote the market and solidarity economy. However, it is an initiative with few farmers and limited reach, and it faces difficulties related to self-management. Nevertheless, this space has facilitated the organisation of farmers into an informal association. This association mobilised to reach consumers during the COVID-19 emergency when markets were closed, and it continues to operate after the markets reopened. This informal association is called L.E.N.A., named after the initials of the participants' names.

The *Nutrire Trento* project, an initiative of the University of Trento and the Municipality (*Comune di Trento)*, is a project that aims to mobilise actors, participation and policies for the construction of an urban food system in the territory. The project worked with a mapping of the short food supply chains on the territory, instituted a public work table (*Tavolo Nutrire Trento*) for a discussion about the food issues of the territory, and acted in the construction of networks between producers and consumers.

From this project, mobilisations began, discussed within multi-stakeholder meetings to address food policies in the territory. A project attempted to organise consumers and farmers for the purchase and sale of food during the pandemic. This project received support from the University and the municipality of Trento. It was an experimental project, and based on it, the farmers involved, along with the support organisations, mobilised to create the Community Supported Agriculture (CSA) *Naturalmente.* Additionally, this initiative was supported by a researcher from the University of Bolzano in the neighbouring Province.

The CSA *Naturalmente* involved 12 farmers from the Province of Trento and 40 consuming families who would buy regularly, with the commitment to maintain an active relationship for a period of one year. The initiative encountered organisational difficulties linked to the collectivisation of the farmers because there is no tradition of farmer organisation outside of formal cooperatives in the territory. Similarly, the active participation of farmers in the multi-stakeholder meetings of the *Nutrire Trento* project is low.

The farmers report that their collaborative experience in these SFSCs initiatives has strengthened their friendships and fostered a sense of belonging. It has also facilitated various forms of collaboration, promoted the exchange of knowledge among them, and enabled the development of collective solutions to common challenges This network was identified as an embryonic CFN because it is a recent network, small in size, and with limitations in terms of actors participation within the territory. While not yet connected to a strong citizen movement supported by the networked actions of various actors, there is a social fabric in the process of formation.

Figure 02 shows the graph of organisations connected to the farmers consulted in this research, who are all ecological farmers involved in SFSCs. The 19 farmers are connected to 16 organisations. The most central actors (organisations and farmers) in this network are presented with greater size. The actors were distributed in the graph illustration according to their relational proximity. As can be observed in the figure and by cross-referencing with the

identification provided in Table 13, the main organisations associated with the respondent farmers are the trade unions Coldiretti (*Confederazione Nazionale Coltivatori Diretti*) and CIA (*Agricoltori Italiani Trentino*), the Solidarity Purchase Groups (GAS), and the two initiatives mentioned earlier, *Nutrire Trento Project* and Solidarity Economy of Trentino.

Table 13. Organisations and institutions linked to agroecological farmers carrying out short food supply chains in the Province of Trento

FARMERS' ORGANISATIONS	**SUPPORT ENTITIES**	**ORGANISATIONAL ORGANIC FOOD SFSC EXPERIENCES**	**PUBLIC AUTHORITY**
Associations/Marketing Collectives **Locations** LENA Association CSA Naturalmente **Associations** **Locations** Biodistretti **Regional** Bio Bono Trentino Association **Domestic** Ass Biodynamics F.T.Bio Donne in Campo Association **Category Renditions** **Domestic** Confagricoltura Coldiretti C.I.A A.C.L.I. Earth	*Nutrire Trento* *Comune di Trento* Slow Food **Educational Institution** Universitàdi Trento	**Organised Consumers** Solidarity Purchasing Groups (GAS) and Trento Consumo Consapevole **Organised farmers** C.S.A Naturalmente LENA Association **Other (intermediate)** Bio cesta del gusto Bioexpo La Botega di Samuele	**Initiatives** **Regional** Nutrire Trento Trento Solidarity Economy Market [25] **Organisations** **Regional:** Province **Locations:** Municipality of Trento

Source: created by the author

The collective organisation of farmers in the Province of Trento outside the trade union and cooperative organisations is recent in the territory and encounters difficulties because farmers are finding stability in the cooperative system. However, farmers and stakeholders report that short food supply chain initiatives face obstacles because the territory's political and economic interests and actions are focused on maintaining this system based on monoculture and long-chain trade through cooperatives.

[25] Provincial Law 13/2010, available at https://www.consiglio.provincia.tn.it/leggi-e-archivi/codice-provinciale/Pages/legge.aspx?uid=21678

In Province of Trento, a smaller diversity of organisations was found. Several farmers' associations and trade unions were identified that are vertical farmers' organisations and do not involve horizontal participation from farmers.

Farmers' arrangements for joint SFSCs have recently been stimulated by spaces and actions provided by the Municipality of Trento and the University of Trento through the *Nutrire Trento* project (CSA *Naturalmente*), and were developed based on existing connections at farmers' market (L.E.N.A).

The central role of GAS is notable, indicating that this is an important sales channel for these farmers. However, it is a group of organised consumers and does not imply significant participation and organisation of farmers in its management and decision-making processes.

6.3.1.2 GRANDE FLORIANÓPOLIS REGION (GFR)

The Grande Florianópolis Region (GFR) is a geographic macro-region of the state of Santa Catarina, where the state capital is located, in southern Brazil. The GFR has 10,088 farming establishments, among which 7,466 are managed by family farmers [26] (74%). In farms, land use is divided into: crops (29%, 5% perennial crops and 24% temporary crops), pastures (28%, 22% natural and 6% planted), and forests (42%) – 29% natural and 13% planted (IBGE, 2019).

The main temporary crops are horticulture, vegetables and floriculture (48%), tobacco (12%), and cereals and sugar cane (10%). In addition, perennial crops are fruitful, especially for grape production (*Ibid.*). From this data, we note that GFR agriculture has the character of family farms and diversified production, emphasising the production of fruits and vegetables.

Before the so-called conservative modernisation that implanted the hegemonic food system, the practical fundamentals of agroecological agriculture already existed. Therefore, Brazil brings together elements of the knowledge of the traditional peoples and the European immigrants. In Brazil, family farmers who were not included in the incentive policies of conservative modernisation formed alternative groups. Since they did not have the formal technical assistance, they were assisted by organisations that developed technical assistance services for farmers. Those enterprises aimed to criticise conservative modernisation and

[26] Family farming pursuant to Decree 9.064 of 31/05/2017

rescue farmers' traditional practices and the social reproduction of family farmers (BRANDENBURG, 2002).

In this context, in the Grande Florianópolis Region (GFR), institutions and initiatives have also emerged from social organisation linked to a critical conception of conservative modernisation and the social reproduction of family farming. The CFNs identified in the GFR are connected to this historical context.

In the GFR, it is possible to identify two central CFNs. These CFNs are characterised by the strong presence of farmers' organisations, support organisations, political representation bodies, and a wide variety of new SFSC arrangements. The support organisations, in the CFNs, are governmental and non-governmental organisations that operate in the food system. The organisations identified in the CFNs of Florianópolis mainly work in supporting family agriculture and rural development, though they also engage with consumers and promote food security.

The most central organisations found that are directly engaged with short food supply chains and agroecology include: the farmers' collective groups Ecovida Agroecology Network (*Rede Ecovida de Agroecologia*), and Coopafrem (Recanto da Natureza Cooperative for Organic and Family Farming); the support organisations Cepagro (Centre for Studies and Promotion of Group Agriculture, an NGO), LACAF (Family Farming Commercialisation Laboratory, a public university laboratory), and the agroecological mandate of Councilor Marcos José de Abreu/Marquito (municipal political representation instance). In addition to these, other organisations play central roles in the territory among family farmers, though they do not directly promote agroecology. This includes Epagri (Governmental Agricultural Research Company and Rural Extension of Santa Catarina State) and SENAR (National Service of Rural Learning).

The Ecovida Agroecology Network brings together groups of organic producers, connecting them to organisations. It articulates social actors interested in developing organic production, agroecology and family farming in the southern region of Brazil. The Ecovida Agroecology Network is active in the participatory[27] certification of 164 of the 170 participative-certified organic production units in Santa Catarina (MAPA, 2021). In addition

[27] Certification mechanism (participative) provided for in Brazilian legislation (BRASIL, 2003)

to certification, Ecovida discusses issues related to the adequacy of regulations for the reality of family farming. Productive aspects are also discussed, such as the approval of products that can be used, and broader issues, such as gender equality.

Cepagro emerged in 1990 as a representation space for family farming to promote ecological agriculture and strengthen agroecology groups. Originated as a technical entity of the Ecovida Agroecology Network, it liaises with other organisations, acting in a network to strengthen and bring together the relationship of production and consumption. Cepagro also operates politically through the representative councils: the Council for Nutrition Security and the Alliance for Healthy Food.

In the political arena, it is important to mention relevant current events in the GFR, results of social organisations and collective representations to strengthen agroecology in the area. In Florianópolis, the state capital of Santa Catarina, the Municipal Policy of Agroecology and Organic Production (PMAPO) was recently approved (FLORIANÓPOLIS, 2017). In October 2019, Florianópolis approved and sanctioned the law establishing its island region as a Agrochemicals-free Zone and making it the first Brazilian municipality to ban pesticides from its territory (FLORIANÓPOLIS, 2018). These initiatives took place with the social participation and intermediary of an agroecological mandate of the municipality in the city council[28].

LACAF is a living lab at the Federal University of Santa Catarina, created in 2010, that has been working on building markets for family agriculture. They were the creators of the Responsible Consumers Cells (Células de Consumidores Responsáveis - CCR), which were established in 2017. Currently, it is the largest initiative for organising consumers to directly purchase products from family agriculture in the Grande Florianópolis Region (SOUZA *et. al*, 2021).

Although they operate with the active involvement of farmers in management, the CCRs also allow for consumer participation and promote consumer awareness (MIRANDA *et al*., 2021). This initiative was made possible because ecological farmers are already highly organised within the Ecovida Agroecology Network and also received support from the Cepagro organisation.

[28] Represented by Councilor Marcos José de Abreu (Marquito).

The organisations LACAF, Cepagro, the Ecovida Agroecology Network, and Councilor Marquito are key components of one of the identified CFNs. This CFN mobilises social actors and civil society entities around agroecology.

The second network is linked to institutions associated with the government agency Epagri and SENAR. These institutions provide technical assistance and training to family farmers and are involved in rural development, but not specifically focused on agroecology. It also includes Coopafrem (Recanto da Natureza Cooperative for Organic and Family Farming), which mobilises farmers for public procurement contracts to supply schools and public institutions. Additionally, the Ecovida Agroecology Network also connects with this network through farmers who are linked to the organisations above (SENAR, Epagri e Coopafrem).

These networks are interconnected with each other and linked to various other actors. Figure 09 illustrates the relationships between farmers and organisations in the GFR, with the most central actors (organisations and farmers) in the network shown in larger size. The actors are positioned based on their relational proximity.

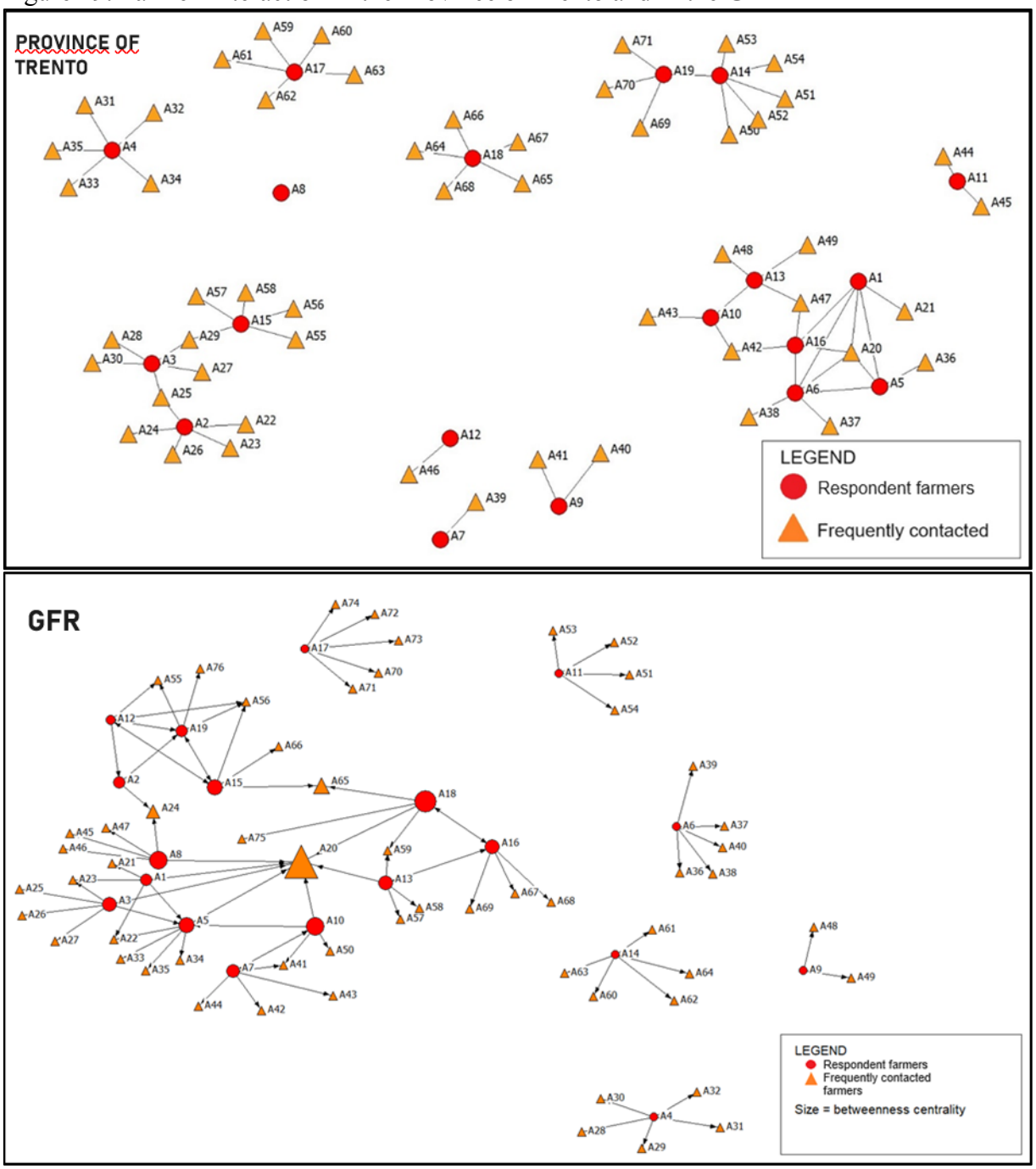
Table 9, previously presented, lists the organisations linked to the agricultural and ecological farmers consulted and carrying out SFSCs in the GFR, differentiated by typology and scale of action. Next, we will highlight those institutions, mentioned by farmers, that are directly connected with the promotion of agroecology. The 19 respondent farmers are connected to 89 organisations, among which we can identify a wide range of farmer organisations, initiatives supporting agroecology, numerous farmer organising arrangements for commercialisation in SFSCs, and various political representation entities.

Next, the interactions among the farmers who are part of these networks in the two territories are analysed, followed by the evaluation of the agroecology indicators and a discussion of the role of CFNs in promoting agroecology.

6.3.2 Interactions among farmers in CFNs

The networks between farmers linked to agroecological production and the other territory farmers will be presented bellow. The relationship between the 19 respondent farmers in each territory, with up to five farmers with whom they had the most frequent contact, is represented both, in Province of Trento and GFR (Figure 19).

Figure 19. Farmer' interaction in the Province of Trento and in the GFR



Source: created by the author

We can see that the farmers consulted in the GFR are more connected to each other, either directly or through other farmers. However, at a distance of up to 150 kilometers, 13 of the 19 farmers are connected in the same network with subgroups, which are connected by farmers who act as bridges between subgroups. This denser grouping (A1, A2, A3, A5, A7,

A8, A10, A12, A13, A15, A16, A18, and A19) connects actors linked to the Ecovida Agroecology Network, Coopafrem and short food supply chain experiences of marketing agroecological foods. These connections link farmers from the same initiative and farmers from various SFSC initiatives that are part of the CFNs in the GFR. The remaining farmers appear isolated or part of networks with diverse specificities, connected to actors in other locations, or due to relational dynamics and conflicts.

In the Province of Trento, the farmers consulted may be up to 95 kilometers away. The two densest groups bring together farmers involved in the short food supply chains initiatives articulated by the *Nutrire Trento* project and/or farmers involved mainly in the fairs linked to the Solidarity Economy Market. The densest group brings together 6 of the respondent farmers. The SFSC initiatives stimulated by the *Nutrire Trento* project were an experimental SFSC[29] project and Trento's first Community Supported Agriculture (CSA), the CSA *Naturalmente*, which resulted from this first experiment. This group, which is part of an embryonic CFN, consists of the respondent farmers A1, A5, A6, A10, A13 and A16. We understand it to be an embryonic CFN because, as we will demonstrate shortly, the established relationships involve few actors and are recent, and because the element of social and political participation does not present high degrees.

In Table 14, it is possible to observe the density present for each relationship in the networks of farmers in the CFNs in the GFR and in the Province of Trento. Although some relationships are more present than others, we can see a character of multiple connections between farmers. We observe that farmers of the GFR have a greater density of relations for all aspects investigated. The friendship relationships have the same density in both territories. Friendship and sharing information about agroecology are elements that are high in the CFNs of both territories. When it comes to marketing collaborations, joint participation in groups and associations, participation and social arrangements, and seedling exchange, we found substantial differences, with a higher density of these relationships in the GFR.

[29] Called *Nutrire Trento* Project 2

Table 14. Relations between farmers involved in CFNs (density measures) - comparison between Province of Trento and GFR

	All	Sharing information on agroecology	Friendship	marketing collaboration	Joint participation in an association or group	Participation and social arrangements	swap seedlings
Prov. of Trento							
Density	0,86	0,74	0,86	0,51	0,54	0,37	0,17
Total (N oftiess)	30	26	30	18	19	13	6
StdDev	0,403	0,375	0,396	0,328	0,335	0,284	0,194
AvgDegree	1,364	3,714	4,286	0,818	0,864	0,591	0,857
GFR							
Density	0,96	0,82	0,86	0,82	0,82	0,65	0,61
Total (N oftiess)	63	53	56	53	53	42	40
StdDev	0.254	0.234	0.240	0.234	0.233	0.210	0.205
AvgDegree	4.846	4.077	4.308	4.077	4.077	3.231	3.077

Source: created by the author

6.3.3 Promotion of agroecology on farms

The results of the agroecology indicators related to biodiversity (agrobiodiversity and natural ecosystems) for the two territories are represented in Table 15.

Table 15. Biodiversity - comparison between Province of Trento and GFR

	Province of Trento				GFR			
	species	cultivars/ breeds	traditional cultivars/ breeds	natural ecosystems	species	cultivars/ breeds	traditional cultivars/ breeds	natural ecosystems
Average	30	56	10	41	39	58	20	52
Min.	4	9	1	0	7	8	0	0
1st quart.	27	34	1	12	17	28	3	24
Median	33	43	8	40	37	53	15	50
3rd quart.	41	73	11	69	58	86	32	80
Max.	44	151	36	81	81	142	63	99
St. Dev	12,1	42,4	11,3	24,2	22,7	35,6	18,6	30,46

Source: created by the author

The data indicates that the farmers in the Province of Trento have, on average, 56 cultivars and breeds per farm, while farmers in the GFR have, on average, 58 different cultivars and breeds per farm.

The farm generally reconciles the productive areas with areas of native vegetation. In the GRF, 52% of the total studied farms area is covered with native vegetation, which comprises native forest, native pasture and forest in recovery. Some farms maintain areas of agroforestry systems. In the Province of Trento, 41% of farms' areas correspond to natural ecosystems. In the Province of Trento, the predominant natural ecosystem in these ecosystems is the native pasture, and in the GFR, they are forests. These areas demonstrate a more significant conservation of native vegetation in the GFR regarding the amount of vegetation.

Regarding inputs, in the Province of Trento and the GFR, other sources were identified in addition to commercial inputs (fertilisers and seeds) (Table 16 and Table 17). The sustainability indicators for self-sufficiency in the use of fertilisers showed similarities in both territories, with an average of 64% (Province of Trento) and 60% (GFR) coming from on-farm or low-cost sources, as well as the reuse of discarded materials such as rock dust, cane bagasse, and dung from neighboring farms. Regarding seeds, on average, 30% (Province of Trento) and 41% (GFR) are produced on the farms or exchanged with other producers, while the rest are purchased seeds and seedlings.

Table 16. Origin of fertilisers - comparison between Province of Trento and GFR

	Province of Trento			**GFR**		
	farm	commercial	others*	farm	commercial	others*
Average	34	36	28	33	40	27
Minimum	0	0	0	0	0	0
1st quartile	0	0	0	0	0	0
Median	10	45	10	10	30	0
3rd quartile	84	70	49	60	85	60
Maximum	100	100	100	100	100	100
Std. Dev	40,2	31,4	34,7	36	39,4	36,2

* Low-cost sources, reuse and donations (rock dust, cane bagasse, and dung from neighboring farms etc.)
Source: created by the author

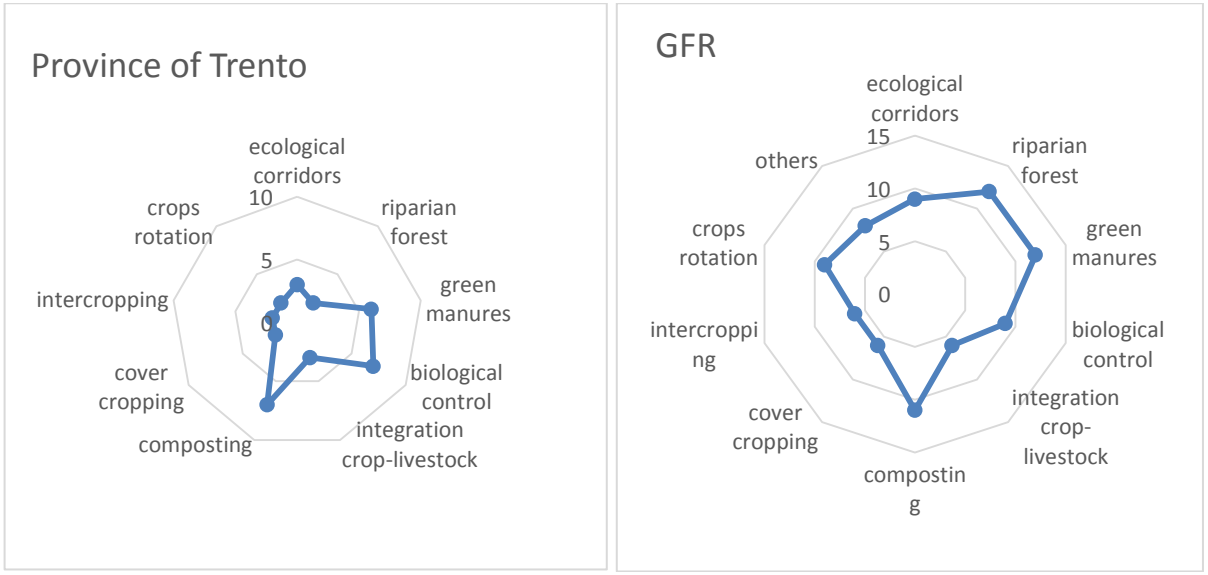
Table 17. Origin of seeds - comparison between Province of Trento and GFR

	Province of Trento		**GFR**	
	farm/exchange	commercial	farm/exchange	commercial
Average	30	70	41	59
Minimum	10	40	0	0
1st quartile	15	50	10	13
Median	25	75	20	80
3rd quartile	50	85	88	90
Maximum	60	90	100	100
Std. Dev	17,1	17,1	37,6	37,6

Source: created by the author

Various agroecological practices are developed and maintained by these farmers (Figure 20). It is important to note, for comparative purposes, in the analysis of Figure 20, that in the GFR we have more responses because the CFN includes 13 farmers, while in Trento, the embryonic CFN has only 6. For both territories, green fertilisation, composting and biological control were observed. In the GFR, the maintenance of riparian vegetation and ecological corridors, crop rotation and intercropping, soil cover and integration of livestock farming also occur significantly.

Figure 20. Agroecological practices in the CFN farms - comparison between Province of Trento and GFR



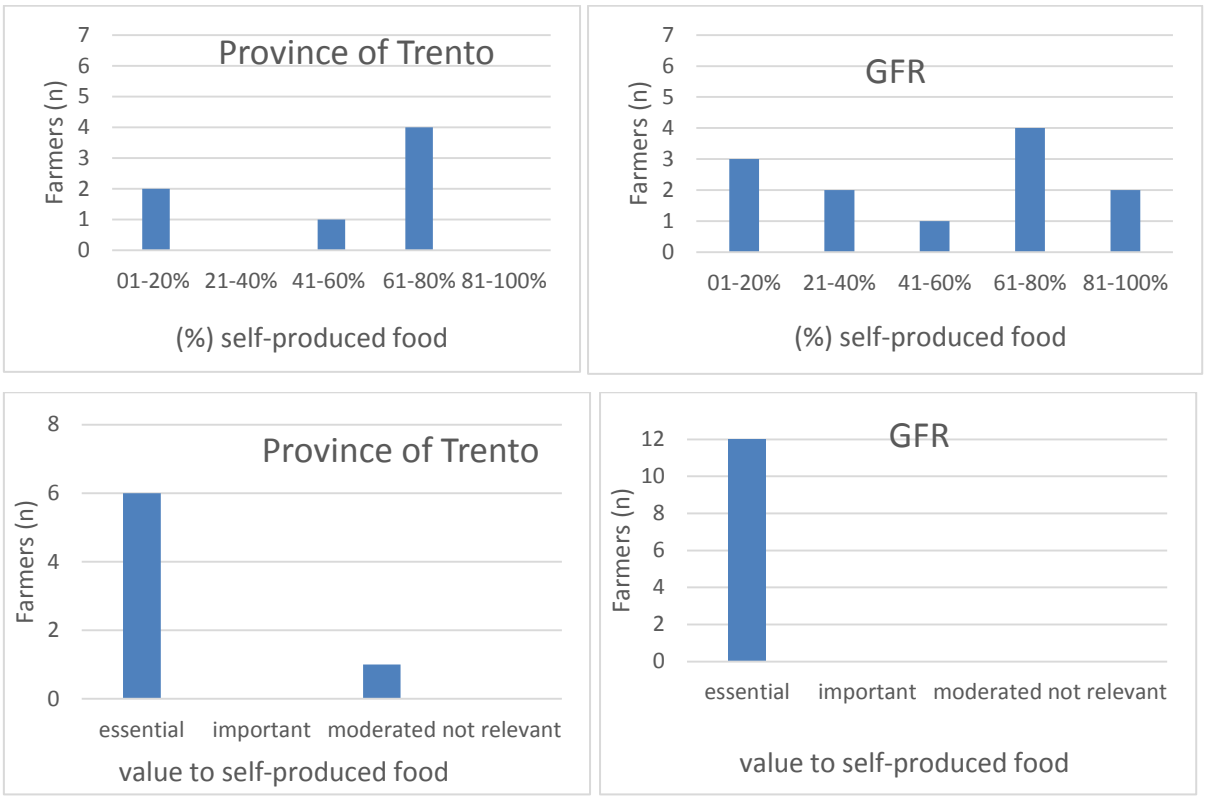
Source: created by the author

Other practices freely mentioned by farmers include agroforestry, wormwood, evapotranspiration ponds, renewable energy production, fertilisation techniques such as bokashi[30], fertigation and biofertilisers, pest and disease control with plant macerations, sustainable construction and breeding of traditional seeds.

Self-produced food proved expressive for the respondent farmers (Figure 21). Self-produced food was essential for most farmers in both territories. Also, for both territories, a significant portion of the farmers – 57% (Province of Trento) and 49% (GFR) – have more than 60% of their food coming from self-production,

[30]Bokashi is an organic fertiliser obtained from composting with liquid addition of microorganisms (HAFLE *et al.*, 2009).

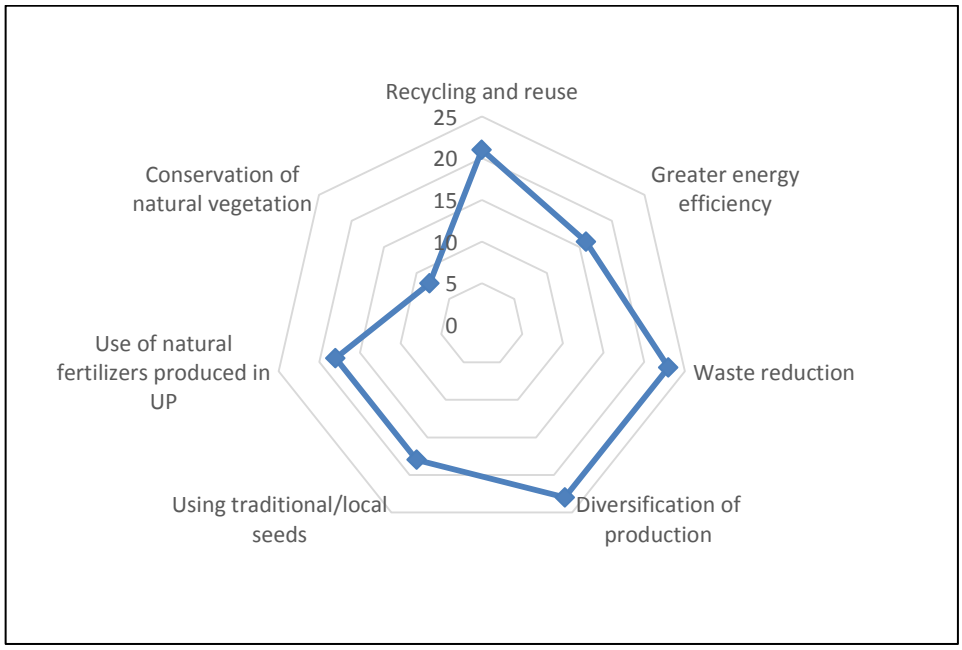
Figure 21. Importance of self-produced food to CFN farmers - comparison between Province of Trento and GFR



Source: created by the author

Farmers perceive short food supply chains as influencing production practices. In Figure 22, we present the responses obtained for the 38 farmers consulted in the two territories regarding the influence of SFSCs on practical methods. According to the farmers consulted, self-produced food causes them to recycle and reuse more, pay more attention to reducing discards and try to insert more traditional crops and varieties. The practices cited as others are more often agroforestry cultivation and insertion of unusual crops, such as unconventional food plants (UFPs) and ecological packaging.

Figure 22. Influence of short food supply chains on practices in farms of Province of Trento and GFR



Source: created by the author

The perception of the direct influence of the marketing channels on agrobiodiversity was analysed in both territories (Figure 5 and Figure 16). SFSCs have directly stimulated agrobiodiversity in the production units, especially concerning fairs, sales in the production units and new organisational arrangements in the form of baskets supplied by farmers' collectives.

In the Province of Trento, the cooperatives are pointed out as channels that favour specialisation, connected to networks of actors – trade unions, provincial and communal administration and research institutes related to monocultural agriculture linked to the two main crops of the territory (apple and grape). In the GFR, cooperatives are mainly identified as a form of access to public purchases, and to most farmers (8) favour diversification or do not influence productive choices. In the GFR, the supermarkets are the channels that foster specialisation the most.

In the Province of Trento, the farmers' market primarily promote diversification. However, in some cases, markets managed centrally by a trade union favour specialisation because each farmer can bring only specific pre-registered products.

In the GFR, short food supply chains, such as street markets, sales in farms and new organisational arrangements involving farmers' collectives and consumer groups typically materialise in basket arrangements that favour diversification of production.

In the next section, we will discuss the data presented. Given that this is a comparative study, that section serves as both the discussion of the data in this third article and the final discussion for this thesis. It will lead to the answer to the guiding question and the conclusion.

6.4 DISCUSSION - PROMOTION OF AGROECOLOGY IN CIVIC FOOD NETWORKS

The findings regarding the existence of CFNs were diverse in the two territories. In the Grande Florianópolis Region, two strong and extensive CFNs were found, while in Trento a CFN was identified as embryonic due to it being recent, small, and having lower political and organisational participation in the territory. These networks in different territories are embedded in different historical and territorial contexts. Table 18 summarises the characteristics of the networks found and the results obtained for agroecology indicators in both territories.

Table 18. Comparison of CFNs and agroecology indicators between the Province of Trento and the GFR

	Province of Trento	**Grande Florianópolis**
Types of identified CFNs	One embryonic CFN	Two consolidated CFNs
Actors	• Two collective and recent farmer organisations for SFSC • Government institutions • Public university	• Numerous farmer organisations (focused on commercialisation and agroecology) • Support organisations for promoting agroecology (public university and NGOs) • Public institutions supporting family farming • Various political representation instances
Characteristic	• Smaller networks • Fewer farmers • Fewer organisations • High density of friendship • High density of information about agroecology • Low density of seed exchange • Low political participation and political organisation in the territory • Few participatory experiences in SFSCs	• Larger networks • More farmers • More organisations • High density of friendship • High density of information about agroecology • High density of seed exchange • High political participation and political organisation in the territory • Numerous participatory experiences in SFSCs
Indicators of agroecology	• High agrobiodiversity • Low use of traditional varieties/breeds • Slightly lower natural biodiversity • Partial independence in input use • Slightly less independent regarding seeds • High relevance of self-produced food for farmers. • Slightly higher self-produced food percentage	• High agrobiodiversity • Greater use of traditional varieties/breeds • Slightly higher natural biodiversity • Partial independence in input use • Slightly more independent regarding seeds • High relevance of self-produced food for farmers. • Slightly lower self-proded food percentage

Source: created by the author

The CFNs identified in the studied territories are influenced by the historical and organisational context in which they are situated. Shove, Pantzar, and Watson (2012) emphasise that practices are shaped by the social structures they traverse, evolve within, and perpetuate, known as social orders and systems. The networks can act in ways that either restrict or favor certain practices (*Ibid.*).

The CFNs in the GFR are connected to a social and organisational fabric that stems from the historical exclusion of family farmers from accessing public policies and markets. The dominant food system, driven by the Green Revolution and heavily reliant on inputs such as seeds, fertilisers, and pesticides – all produced by multinational organisations – is

interdependent within the production system (STAINER; 2001; HOWARD, 2012). In Brazil, this system was implemented through extensive technical assistance and access to credit policies (ANDRADES; GANIMI, 2007; MOREIRA, 2000).

We observed that, in the Grande Florianópolis region, CFNs are part of a strategy of farmer networks to counteract a system of social exclusion. These CFNs are driven by the need to establish short food supply chains and support organisational processes for the creation of SFSCs, as well as innovation and the development of new production-consumption arrangements.

While the credit policies excluded farmers who did not fit the assisted categories, they also generated environmental and social liabilities. The peasant resistance movement aligned with the environmentalist opposition to the production model promoted by the Green Revolution, giving rise to an agroecological movement. This agroecological movement materialised through farmer organisations and support organisations that engaged in political action, sought integration into formal institutions, and provided technical assistance to farmers (SCHERER-WARREN, 1993; BRANDENBURG, 2002).

On the other hand, in the Province of Trento, the collectivisation of farmers is hindered by vertical structures of representation and marketing connected to a network that supports a monocultural and intensive agricultural system through cooperative marketing structures. These social structures were essential for the reconstruction and maintenance of family farms in the post-war period. Currently, this system provides financial stability to family farmers, though it grants them limited autonomy in their production choices. As described by Andreola *et al.* (2021), these structures transformed the landscape and the production system of the territory from a diverse and subsistence agriculture to an intensive, monocultural agriculture focused on external supply.

In the Province of Trento, the aforementioned territorial context favors the individualisation of farmers due to financial stability and a preference for vertical organisational structures. This individualisation hinders the formation of farmer networks and, consequently, the strengthening of CFNs. Additionally, it impedes innovation on a larger scale and the spread of agroecology in the territory.

The farmers are collectivised, but there is no social and organisational fabric with a horizontal and decentralised character. In this case, as described by Shove, Pantzar, and

Watson (2012), networks are shaped by unequal patterns, which persist through the dominance and marginalisation of certain practices.

The agroecological indicators, such as biodiversity, agrobiodiversity, self-produced food, and self-sufficiency in the use of fertilisers were positive and similar in both territories – despite CFNs being more established in the GFR than in the Province of Trento. Our data lead us to conclude that these elements are linked to family farming and short food supply chains (SFSCs). Confirming this, it was found that SFSCs directly influence the promotion of agrobiodiversity, which was similar for both territories studied. The Province of Trento, despite not having a consolidated CFN, exhibits favorable agroecological indicators linked to SFSCs. This was influenced to the high organisation of consumers and the central role of GAS (Solidarity Purchase Groups).

The comparison between the GFR and the Province of Trento territories indicates that the formation of networks in the GFR was stimulated by the need for market access and the construction of networks for marketing in SFSCs.

In the GFR, we observed seed exchange among farmer networks and also a greater use of traditional varieties. Thus, the use of a greater diversity of traditional varieties is directly related to this network of farmers. However, there was no strong direct influence from the CFNs. Instead, it was a network of farmers strengthened by the existence of the Ecovida Agroecology Network and spaces for marketing in SFSCs. De Boef *et al*. (2007) highlight that biodiversity in agriculture has become increasingly critical for food security and emphasise the importance of community seed management, where communities take on the responsibility for agrobiodiversity in a participatory manner.

The network densities among farmers participating in the CFNs vary. It is important to note that friendships and the exchange of information are prevalent in both territories, reflecting inherent traits of farmer networks. We understand that these are inherent indicators of farmer networks. These indicators appear with the same density in both farmer networks, even in the Province of Trento where the CFN is embryonic – recent and small. In the GFR, these farmer networks are significantly more extensive, involving a larger number of farmers and organisations with a broader geographic reach. They are the result of a need to overcome the lack of technical assistance and reduce costs to access markets.

These farmer networks include the spaces of other relationships, such as collaboration for commercialisation and participation, characterised by multiple relationships that, according to

Crespo, Réquier-Desjardins and Vicente (2014), favour membership in collective actions. Additionally, the authors empirically found that family relationships or friendships in farmers' networks increased membership and permanence in collaborative efforts (*Ibid*.).

The interaction within social networks and the horizontal sharing of information within these networks are vital components of this collective construction. They offer alternatives to the monopolisation of knowledge and technologies, while also facilitating innovations (AGNE; VAQUIL, 2010; SABOURIN, 2001).

The indicators of agroecology in the Province of Trento, compared to the study in the GFR, lead to the understanding that what underlies the promotion of agroecology in both territories are the SFSCs, and not directly the actions of the CFNs. This is because both territories showed good indicators regardless of the density and development of the CFNs.

The movement of rooting production-consumer relationships and changing consumer practices, which was termed the 'quality turn' by Goodman (2003), is a fundamental element in understanding CFNs. In both territories, the consumer movement's quest to know the origin of food and to establish rooted production-consumer relationships has strongly supported agroecological family farms through SFSCs. This consumer movement arises from distrust in the food system and is also connected to a global ecological movement (POULAIN, 2013; TRUNINGER, 2013).

Despite the fact that the ‘quality turn’ movement is fundamental for understanding the CFNs in both territories, each territory has different actors taking on leadership and participation in these new SFSC arrangements. In the province of Trento, SFSCs have GAS as their primary market and as a central institution for farmers. These organisations have a significant consumer organisational structure and high consumer participation in food purchasing and distribution management. However, they do not horizontally integrate the participation of farmers and do not presuppose a greater awareness among farmers about the dynamics of family farming and food production.

The centrality of consumer-led groups in the formation of short food supply chains has been well documented in previous research (FORNO; MAURANO; VITTORI, 2019; RENTING; SCHERMER; ROSSI, 2012; BRUNORI; ROSSI; GUIDI, 2012). Renting, Schermer, and Rossi (2012) highlight the emergence of new production-consumption relationships in which consumers have an active role and operate as the initiators of these experiences, going beyond the mere act of buying and consuming. For the cases studied in

Trento, despite the importance of GAS as a SFSC, there was no identified joint action and integration of GAS with the farmers' networks in the embryonic CFN identified.

In the GFR, even groups referred to as consumer groups have a prominent role and actively manage rural organisations. Several authors have identified initiatives in Brazil that aim to bring consumers closer to farmers and their organisations, with these experiences being significantly structured by farmers (SOUZA *et al.*, 2021; CARRIERI *et al*., 2023; PUGAS *et al.*, 2023). Due to this characteristic and the strong history and active participation of rural organisations, SOUZA *et al.* (2021) used the term "agrifood citizenship" to discuss the food networks in the GFR.

The SFSCs in the territories studied are a strategy to access the market and, at the same time, maintain the livelihoods of family farmers. Authors like Duval *et al*. (2008), Aubri and Chiffoleau (2009), and Marsden, Banks, and Bristow (2000) reiterate that SFSCs provide a democratic food market and the strengthening of family farming.

For Duval *et al.* (2008), there is a strong correlation between agroecology and production for self-produced food. Family farming is more conducive to a diversified production that guarantees a more varied and nutritious food and is associated with a productive system that preserves genetic variety and traditional practices.

In both territories, SFSCs are central to the formation of the studied CFNs.These arrangements are linked to agrobiodiverse family farms that practice agroecological management, are partially self-reliant in resource use, preserve natural vegetation areas, and produce part of their own families' food.

As supported by the data from this research, Rover *et al.* (2020) have also demonstrated that short food supply chains are strategies that support agrobiodiversity and serve as a counterpoint to the trend of conventionalisation in organic farming. The importance of self-produced food on farms is directly related to short food supply chains, and they promote agrobiodiversity, thereby facilitating a balance between market services and a diverse family diet (POZZEBON *et a*l., 2017).

In both territories, there are good indicators of agroecology in terms of resource efficiency, agrobiodiversity, and the use of agroecological practices. However, these indicators are not directly related to CFNs, but linked to the maintenance of the livelihoods of family farmers through SFSCs. In the GFR, these strategies for maintaining livelihoods and

accessing markets also involve strengthening farmers' networks, which have proven to be efficient in conserving traditional species as well.

Agroecological production has encouraged some farmers, particularly those less established in structured supply chains, to organise into networks for marketing. Therefore, we observed that networks for marketing in SFSCs promote agroecology, and agroecology, in turn, promotes organisation into networks.

In other words, CFNs can be understood as a strategy employed by actors to promote agroecology, but not as the primary driver of agroecology. In both the studied territories, the agroecology is promoted by the creation of markets of interest for local producers and consumers. Additionally, in both territories that are upcoming SFSCs, which create conditions for expanding the coordination between individual and organisational actors, enhancing the formation of networks.

The CFNs in the GFR stand out significantly from the findings in the Province of Trento. They show greater collaboration in marketing, increased joint participation in collectives, and, most importantly, a higher level of farmer collectivisation for political actions in the territory. These actions encompass co-management of resources, development of projects for the territory, and construction of public policies. These data highlight two important aspects: the connection of these CFNs with SFSCs and the crucial role of this social fabric in mobilising actors for transformative actions in the territory.

Renting, Schermer, and Rossi (2012), when defining the CFN approach, highlighted the focus on the interaction of multiple stakeholders within the food system, working collaboratively in the axes of production, distribution, and consumption, all from a citizenship perspective. Additionally, Castells (1999) underscores the importance of collective network action for territorial transformations, opposing power structures, fostering democratic processes, and reducing inequalities.

This study highlights that the distinctive feature of CFN actions in the Grande Florianópolis Region was the reinforcement of an agroecological movement, establishing a social framework for collective and political initiatives in the territory. Thus, we can comprehend the difference between the mere existence of SFSCs and the presence of CFNs as the existence of an agroecological movement, a critical mass that enables social organisation for transformative actions and the accomplishment of political and structural changes.

Agroecology can be simultaneously understood as science, agricultural practice, and a social movement (GUZMÁN CASADO *et al.*, 2000). Regarding technical and productive indicators, in both studied contexts, SFSCs emerge as central for the promotion of agroecology, while CFNs is part of the strategy employed by actors to promote agroecology.

The comparative study between the GFR and the Province of Trento also reveals that the significance of CFNs lies in their capacity to strengthen agroecology as a social movement, enabling actors to organise and advocate for representative spaces and structural changes, such as the creation of public policies and laws. This movement was particularly pronounced in the context of the Grande Florianópolis Region, where social and productive exclusion drove the coordination of actors in networks.

6.5 CONCLUSIONS

In both territorial contexts, the CFNs found, even where they are less structured and more embryonic, are similar in terms of agroecological indicators on farms. In both territories, SFSCs have supported biodiverse family farms that are more autonomous and ensure food security through sef-produced food. The formation of farmer networks and CFNs is more prevalent in the GFR territory in a context of productive and social exclusion of rural actors. In the Province of Trento, economic resilience ensures stability for farmers and hinders innovations and network formation, privileging a monocultural and intensive system. In these territories, SFSCs are alternatives for farmers seeking greater autonomy, but do not guarantee significant and scalable transformations in the territory.

In the GFR, the presence of CFNs, in addition to maintaining family-based agroecological farms, enables the organisation of actors for transformative and structural actions in power relations. This is achieved through collective mobilisation, access to political decision-making spaces, and advocacy with public authorities, contributing to the development of public policies and the creation of regulations of interest.

7 FINAL CONCLUSIONS

The term Civic Food Network (CFN) emerged to designate food networks as the articulation of several players, such as institutions, social organisations, farmers and consumers that operate citizenly, collaborating on the production, distribution, and consumption aspects. The distinguishing feature of CFNs compared to other food network approaches is the emphasis on the citizen action of the actors. This approach underscores the involvement, cooperation, local control over food production, distribution, and marketing, self-organisation, and autonomy of the participants. All of these elements contribute to greater empowerment of citizens in shaping the agrifood system.

The emergence of what are referred to as "Alternative Food Networks" (AFNs) has prompted critiques regarding these novel food networks. There is a research gap that addresses whether these networks are effectively facilitating the restructuring of the food system towards greater inclusivity and sustainability, or if they are perpetuating existing imbalances and inequalities in the food system.

In this regard, this study used agroecology as a framework to assess the contribution of Civic Food Networks to the redesign of the food system. It questioned whether these networks, characterised by elements of citizenship such as actor participation, local control of production, and autonomy, were promoting agroecology in the food systems. This research conducted a comparative analysis to identify the existence or not of CFNs in the Province of Trento and the Grande Florianópolis Region (GFR), with the goal of understanding the role of CFNs in promoting agroecology within their respective territories. To achieve this proposed understanding, the following steps were carried out, as outlined in the specific objectives of this research:

1. Identification of farmers and organisations connected to Alternative Food Networks in the Province of Trento and the Grande Florianópolis Region;
2. Describe and characterise the networks and analyse their citizenship elements;
3. Evaluate agroecology indicators on the CFN farms (when these networks are present);
4. To comparatively analyse the contribution of CFNs in promoting agroecology within the studied territories.

Next, we will discuss the main findings and the conclusions drawn from them. The studied territories have different historical contexts and characteristics, which directly influence the formation or absence of Civic Food Networks and the characteristics within

these networks. The impact of the Green Revolution, combined with specific historical contexts, has led to different strategies and resulted in distinct characteristics for the agriculture in these territories.

In the Grande Florianópolis Region (GFR), there was a combined movement of response from family farmers and their organisations to the exclusion promoted by the Green Revolution, along with the ecological movements that aimed to counter the agriculture model also promoted by conservative modernisation.

In the GFR, from the mapping of actors in the territories, we found a diversity of family farmer organisations connected to various marketing initiatives in short food supply chains (SFSCs). These initiatives included access to institutional markets through cooperatives or formal and informal collective marketing arrangements, with a focus on new production-consumption arrangements, such as basket marketing and the formation of consumer groups. These organisational arrangements are linked to the territory's characteristic of diversified production, with a significant presence of vegetable production to supply consumers in the region.

Engaged in these initiatives are support organisations such as the public university and NGOs, which have been involved in organising and mobilising consumers, who are still weak in the territory. Additionally, public technical assistance institutions and public equipment – such as programs for accessing institutional markets –, as well as political representation bodies are connected to these farmers.

In the Province of Trento, the cooperative system has allowed the maintenance of small family farms in the post-war restructuring process. This cooperative system is predominantly connected to intensive and monocultural agriculture, focused on long-chain marketing for export. Short food supply chains in the territory has been a strategy for agroecological farmers seeking greater autonomy in their production choices and looking for a way to sustain a production model aligned with their livelihood. However, most of these initiatives are individual efforts by farmers. In the territory, there is an organisational weakness among rural actors and their initiatives, compared to the GFR.

However, in the Province of Trento, consumer organizations are more organised and active in the territory, with the Solidarity Purchasing Groups (*Gruppi di Acquisto Solidale* – GAS) taking a leading role. These consumer organisations are central in the territory and

serve as an important channel in SFSCs – despite not being connected to an agroecological movement that includes multi-territorial actors, including rural actors.

In the GFR, we identified two consolidated CFNs with broad reach and strong participation of organisations supporting agroecology and political representation instances. We understand that these networks are consolidated due to the density of actors and organisations, as well as the degree of participation. They are Civic Food Networks because they enable the proximity of production and consumption, generating greater autonomy for both farmers and consumers. In the GFR, the exclusion of farmers coupled with the need for collectivisation to overcome a history of lack of technical assistance and to access markets strengthened a network of farmers and their organisations, as well as CFNs, and the proliferation of innovations in SFSC.

In the Province of Trento, we found an embryonic CFN, with limited mobilisation of farmers. This network is embryonic because it is small and restricted, though it is an initiative that has generated the organisation of actors around consumer relations – and, from these, new social relations have been constructed. In the territory, social structures privilege the individualisation of farmers and have been hindering their collective and organisational inclusion, as well as their effective participation in the food system. Despite this, some initiatives have developed from specific acts of the municipal and provincial public administration, as well as the public university, and have achieved some advances based on the actors' interest in SFSCs.

The agroecological indicators analysed are biodiversity, resource self-sufficiency, self-food production and sharing experiences on agroecology. The studied farms showed good agroecological indicators in all categories, with no significant differences between farmers more or less involved in CFNs or between the two different territories. The only exception is that the GFR had a higher degree of utilisation of traditional varieties.

Comparing the two territories and their different contexts, we concluded that the good agroecological indicators are characteristics of family farms that participate in SFSCs. SFSCs have facilitated the maintenance of family farming livelihoods while also serving as a market insertion strategy. They enable the maintenance of diversified, self-sustaining family farms that are connecting market demands for diversity of products with family food needs, and ensuring ecological balance in the production system.

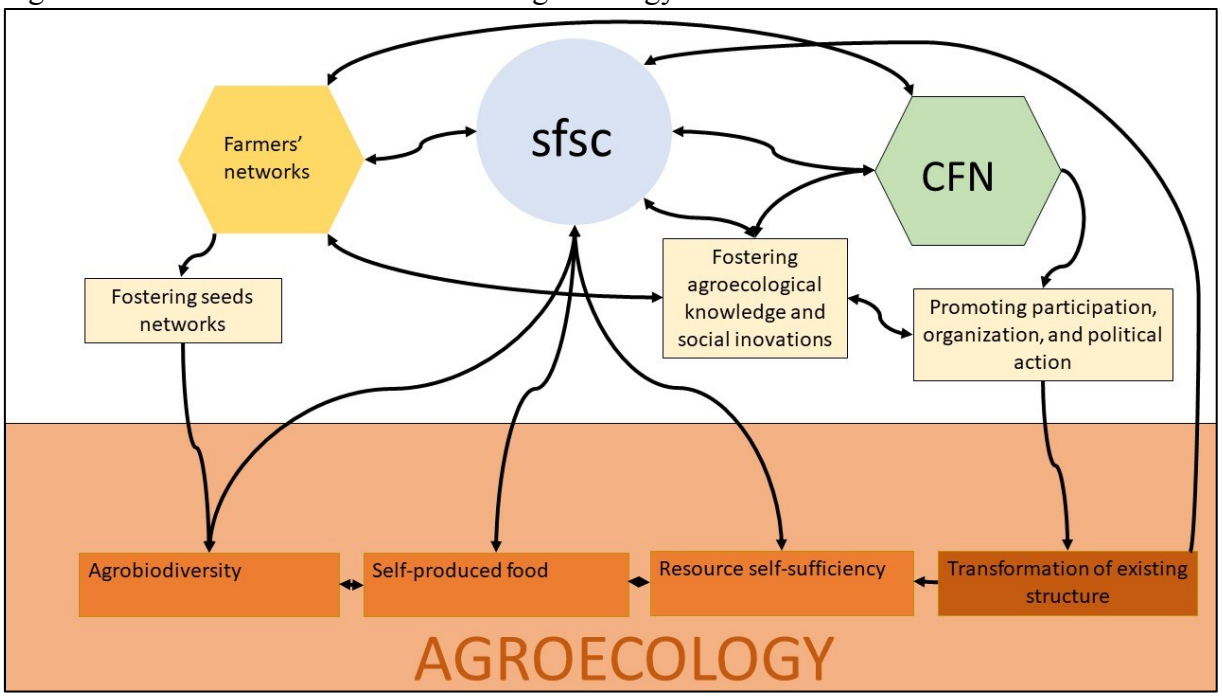
Information exchange about agroecological production and friendship are inherent in farmers' networks in both territories. In the GFR, traditional species and varieties also circulate within farmers' networks, ensuring the maintenance of agrobiodiversity and traditional knowledge. Seed exchange is present in the GFR, both among farmers identified as part of the CFNs and those less engaged, albeit to a slightly lesser extent.

CFNs stand out in the GFR, a region where they are robust and consolidated, promoting agroecology as a movement. This movement is articulated and accesses instances of representation and political action in the territory, which we did not identified in the Province of Trento. Where there are articulated relationships among various actors and organisations in a network, their capacity to influence the territory is enhanced. Conversely, in the Province of Trento, dispersed actors lose their capacity to influence and limit the development of innovations.

Analysing CFNs in light of criticisms directed at Alternative Food Networks – of perpetuating capitalist and individualistic consumption logics –, we understandd that these networks primarily focus on organising access to food and its commercialisation. It is the construction of mutual relationships and coordinated action involving both consumers and farmers that has the capacity to promote true citizenship and democracy in the food system. In the Grande Florianópolis Region, CFNs are working towards expanding the organisation and participation of consumers, whereas in the Province of Trento, they are striving to increase the participation of farmers and consumers in a coordinated manner, as well as strengthening farmers' networks to promote the expansion of an agroecological movement.

The figure 23 illustrates that agroecology and its indicators are influenced in their various aspects by the actions of networks, including production-consumption networks (SFSCs), farmer networks, and CFNs (which encompass SFSCs and farmer networks, among other actors and organisations).

Figure 23. Contributions of networks to agroecology



Source: created by the author

This research has demonstrated the potential of utilising social network analysis to examine Alternative or Civic Food Networks and has contributed to our understanding of the role of CFNs in agroecology. It emphasises that CFNs are not the exclusive driving force behind agroecology. There are agroecological family farms in territories where CFNs and an agroecological movements do not exist. However, CFNs play a pivotal role in instigating structural changes and facilitating the expansion of agroecology. In both of the studied territories, the formation of SFSCs, which create opportunities for increased coordination among individual and organisational actors, contributes to the development of networks. This intricate process further fosters agroecology.

8 LIMITATIONS

This research did not delve deeply into studying consumer networks, focusing on key actors and organisations within the territory and networks of farmers. Additionally, the comparison of agroecological indicators was limited to farmers within SFSCs, which restricted the ability to differentiate between the technical-agricultural agroecology indicators influenced solely by SFSCs and those affected by the presence of CFNs.

9 FURTHER DEVELOPMENTS

There are also several areas for further development and applications for the work undertaken in this dissertation, and we recommend further research to expand our understanding of networks by studying the networks formed among consumers. Additionally, the comparison of agroecological indicators to include farms that do not engage in SFSC activities would be interesting to better understand the impact of CFNs on agroecology.

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APPENDIX A - SCRIPT FOR SEMI-STRUCTURED INTERVIEWS

General goal: to analyse the influence of Civic Food Networks (CFN) in the promotion of agroecology
Specific goals: to know the players and initiatives (activities/projects) involved in local CFN; understand the mechanism of these initiatives; understand the relationship between the actors and identify the agroecology elements.

Respondents: organizations, institutions, researchers and other players involved in local food networks.

Name:
Education:
Do they work for an institution/organization:
How long:
What activities are in charge of:

OVERVIEW

1. What is the agriculture overview
2. What is the agroecological agriculture overview
3. How agriculture evolved
4. Which players take part in the production and distribution chain
5. What role do institutions play
6. What are the organizations. What are non-governmental organizations
7. What are the associations
8. What is the relationship between these organizations, institutions and associations
9. Are there farmers networks
10. What is the relationship between consumers, the territory and agriculture

SUPPLY CHAIN CHANNELS

14. What are the main local supply chain channels
15. What are the main local supply chain channels for agroecological agriculture
16. Are there alternative ways of selling/consuming food. How are they important
17. Are there networks between consumers and producers. How are these networks supported. Are there values underlying these networks.

18. How do these networks affect the territory.

THE INITIATIVES/PROJECTS

19. What is the initiative goal. What is the scope.

20. How was it created

21. Who is involved

22. What is the members' motivation. Are there non-economic motivations supporting the initiative

23. Which players/organizations/institutions were mobilized since the beginning of the initiative

24. What is the role of each of them

25. How are these players related

26. How are the members related. And between them and the other players

27. How is the relationship between farmers. How is the relationship between farmers and consumers

28. How are the relationships important

29.What are the impacts of the activity/project. What are the contributions to the territory (explore agroecology indicators).

30. How does it contribute to the sharing of experiences, to the expansion of the supply chain channels diversity, to the stimulation of organic agriculture, to crops diversity, to biodiversity(native vegetation) maintenance, to economic diversification and expansion of players' financial and political autonomy.

APPENDIX B – QUESTIONNAIRE

General goal: to analyse the influence of Civic Food Networks (CFN) in the promotion of agroecology
Respondents: organic farmers involved in food network initiatives and short food supply chains (SFSC).
Researcher: Marina Carrieri de Souza (48 9 99968508) – marinacarrieri5@gmail.com

I1. Questionnaire ID:	

pre1. Date:__/___/___
pre2. City/County:_____
pre3. Coordinates_____
pre4. Address_____

GENERAL INFORMATION

q1. What is your full name?_____

q.2.How old are you? _____

q.3.What is your education level?
1.Never attended school
2.Complete primary school
3.Incomplete middle school
4.Complete middle school
5.Complete high school
6.Vocational school
7.Undergraduate school
8.Graduate school (master's/doctor's degree)

q.4. What is the production unit (PU) total area?_____ha (hectare)

q.5. What is the production unit total cultivated area? _____ha (hectare)

q.6. How many people are included in your household?_____

q.7. How many family members work at the production unit?_____

q.8. How many employees work at the production unit?_____
q.8.a.How many of them are regular workers?_____
q.8.b.How many of them are temporary workers?_____

q.9. Most of the work carried out in the production unit is**:**
1. Contractor-based
2. Family-based

q.10. How long have you been a farmer?_____(years)

q.11. When did the production unit start?_____

q.12. Was the productive unit inherited?
1.Yes
2.No.
3.I don't know/not answered

q.13. How long has the production unit received the organic certification? _____ (years ago)

q. 14. Do you work in the production unit:
1.Part-time.
2.Full-time.

q.15. What % of family income comes from agricultural activity in the production unit?
1. 01 - 20%
2. 21 - 40%
3. 41 - 60%
4. 61 - 80%
5. 81 - 100%

q.16. Can you estimate what was the gross income of the productive unit last year?

q.17. Other sources of income?
1.Yes
2.No ----------□go to q.18

q.17a.What are the other sources of income?
1, Income from another job (please specify: .....)
2. Partner's salary
3. Retirement
4. Partner's retirement
5. Real state (properties, lease)
6. Other (please specify.....)

q.18. What are the main agricultural activities?

	Yes	**No**
q.18.1.Horticulture	1	0
q.18.2.Fruticulture	1	0
q.18.3.Cereals production	1	0
q.18.4.Silviculture	1	0
q.18.5.Production of medicinal/cosmetic plants	1	0
q.18.6.Beef cattle	1	0
q.18.7.Milk cattle	1	0
q.18.8.Aviculture	1	0
q.18.9.Goat/sheep farming	1	0
q.18.10.Fish farming	1	0
q.18.11.Apiculture	1	0
q.18.12.Other.	1	0

(please describe.....)		

q.19. What other activities take place in the production unit?

	Yes	**No**
q.19.1.Teaching	1	0
q.19.2.Agritourism	1	0
q.19.3.Primary products processing	1	0
q.19.4. Vegetables processing	1	0
q.19.5.Animal products processing	1	0
q.19.6.Energy production	1	0
q.19.7.Others. (please describe.....)	1	0

q20. What are the three main factors that contributed to your adoption of organic agriculture? Choose three and then select the priority order.

	q20.1.	q20.2.	q20.3.
1.Concern about your own health			
2. Influence of other farmers			
3.Cooperative influence (please describe.....)			
4. Direct request from consumers			
5. Financial governmental support (city, state, etc.)			
6.Technical assistance influence (please describe.....)			
7.Concern about the environment			
8. Desire to change the territory			
9. Soil degradation			
10. Chance of greater profit			
11. Part in a movement, association or group (please describe.....)			
12.Other (please describe.....)			

q21.Since when you started the certified organic production, please indicate if it:

	Decreased	Did not change	Increased
q.21.a. Organic production area:	-1	0	1
q.21.b. Production volume	-1	0	1
q.21.c. Profitability	-1	0	1

PRODUCTIVE AND COMMERCIALISATION PRACTICES

FOOD SELF-SUFFICIENCY

q22. Your production intended for self-consumption is an element that you consider:
1. Fundamental
2. Relevant
3. Moderate
4. Not relevant

q23. What is the food percentage (%) intended for family consumption that comes from the production unit?
1. 01 - 20%
2. 21 - 40%
3. 41 - 60%
4. 61 - 80%
5. 81 - 100%

CROP DIVERSIFICATION

q24. Are plant species grown for sale? Indicate the approximate amount: _____
How many (vegetables) plant species are grown for sale?
(Please indicate below)
How many cultivars of (vegetables) plant species are grown for sale?
(Please indicate below)
How many traditional/landraces cultivars are there? (Please indicate below)

	indicate whether this is produced	number of species	number of cultivars	number of traditional varieties[31]
1.Vegetables				
2.Fruits				
3.Medicinal plants				
4.Cereals				
5.Spices				
6.Silviculture				
7.Other (Please specify.....)				

q.25 You are a custodian farmer (*custode*) according to Italian national law 195/2015 (Italian version only - specific legislation)

31

q26. How many animal species are bred for sale? Indicate the approximate amount:

_____

How many animal species are bred for sale?
(Please indicate below)
How many animal breeds are raised for sale?
(Please indicate below)

How many are the rustic breeds? (Please indicate below)

	number of species	number of breeds	number of rustic breeds
1.Beef cattle			
2.Milk cattle			
3.Aviculture			
4.Goat/sheep farming			
5.Fish farming			
6.Other (please specify.....)			

q27. The total biological diversity in the production unit since the beginning of organic production:
1. Decreased
2. Did not change
3. Increased

q28. Indicate below: Do you sell your products directly through the following food supply channels? What period (starting and ending year) did you sell your products through these channels? Does this channel make you increase (plant and animal) species diversity?

	Do you sell your products directly through the following food supply channels?			When?	Does this channel make you specify or diversify production?		
	Yes	No	Yes, before		diversify	specify	did not change
1.Direct sales at PU	1	0	2		1	-1	0
2.Street markets	1	0	2		1	-1	0
3.Home delivery	1	0	2		1	-1	0
4.Collective sale with other farmers (outside of cooperatives)	1	0	2		1	-1	0
5.Organized consumer groups (please specify:.....)	1	0	2		1	-1	0
6. Direct sale to public institution	1	0	2		1	-1	0
7. Other form of direct sale. (please specify:.....)	1	0	2		1	-1	0
8.Small specialized (organic/natural) stores	1	0	2		1	-1	0
9.Cooperative	1	0	2		1	-1	0
10.Specialized (organic/natural) supermarket	1	0	2		1	-1	0
11.Supermarkets	1	0	2		1	-1	0
12.Other (please specify:.....)	1	0	2		1	0	0

q29. Of the sales channels listed below, can you tell which ones you currently participate/used or which ones you participated/used before?

(List of specific channels identified in each territory)

	Yes	No	Yes, before	I do not know
	1	0	2	3
	1	0	2	3
_____	1	0	2	3
_____	1	0	2	3
_____	1	0	2	3
_____	1	0	2	3
... (other)	1	0	2	3

q30. Since when you started selling your products in short food supply chains, have you changed any production practices?

***The short chain is characterized by a limited number of intermediaries and aims at greater contact between consumers and farmers (street markets, sales at the PU, sales to consumer groups, etc.) allowing the consumer to be aware of the product origin.**

	Yes	**No**	**Did before**
1.Recycle and reuse more	1	0	99
2.Being aware of energy efficiency	1	0	99
3.Being aware of waste reduction	1	0	99
4. Diversify production	1	0	99
5. Use traditional/local crops/breeds	1	0	99
6. Use more natural fertilizers produced in the PU	1	0	99
7.Increase native vegetation area	1	0	99
8.Other (please specify.....)	1	0	99

CROP DIVERSIFICATION AND CONSERVATION OF NATURAL RESOURCES

q31. What percentage (%) of PU total surface area is covered by:
q31a. _____ % non-commercial native forest
q31b. _____ % non-commercial recovering native forest
q31c. _____ % fallow area
q31d. _____ % native pasture
q31e. _____ % other (please specify.....)

q.32 What is the distance from the nearest conventional production unit? _____ kilometres

q.33. Is there a mechanical (physical) protection barrier against pesticide dispersal from other production units (drift)?
1. Yes
2. No
3. Not necessary

q.34. PU has:

	Yes	No
q.34.1. Ecological corridors	1	0
q.34.2.Riparian Forest	1	0
q.34.3.Green manures	1	0
q.34.4. Biological control	1	0
q.34.5. Crop-livestock production	1	0
q.34.6.Composting	1	0
q.34.7.Other agroecological practices (please describe.....)	1	0

USE OF EXTERNAL RESOURCES

q35. In percentage (%), where do the seeds and seedlings used in the PU come from?
q35a._____ % from the establishment itself
q35b._____ % from exchange with other producers
q35c._____ % bought in markets
q35d. _____ % cooperative (please specify:.....)
q35e. _____ % other (please specify:.....)

q36. What percentage (%) of external resources (fertilisers and others) used in the PU is:
q37a._____ % produced in the establishment
q37b._____ % bought in markets
q37c._____ % external donations (origin:.....)
q37d._____ % cooperatives. (please specify.....)
q37e._____% other (please specify:.....)

q.37.What are the main difficulties for agroecology? Choose three and then select the priority order.

	q.38a.	q.38.b.	q.38.c
Lack of guaranteed purchase of your product			
Getting traditional seeds and rustic breeds			
Lack of workforce			
Lack of technical assistance			
Difficulties with production techniques			
Lack of suitable fertilizers and proper phytosanitary products.			
Lack of production area			
Possibility of losing production			
External contamination			
Other please specify.....)			

FOOD NETWORKS

q38. From the list of organizations/entities below, could you tell me which ones you are currently a part of and which ones you were a part of in the past?
(list of local organizations/entities)

	Yes	No	Yes, before	I do not know/never heard before
	1	0	2	3
	1	0	2	3
... (other)	1	0	2	3

q38Extra 1. In your opinion, how much trust do organizations/entities listed below deserve**? (added in the RGF survey, for further information)**
(list of local organizations/entities with which had relationships)

	None	Little	Enough	Much
	0	1	2	3
	0	1	2	3
... (other)	0	1	2	3

q38 Extra 2. Does the relationship with these organizations/entities influence your permanence in agroecology? **(added in the RGF survey, for further information)**

no				**much**
0	**1**	**3**	**4**	**5**

(list of local organizations/entities with which had relationships)

	How much? (0-5)
... (other)	

q39 Extra 2. 2 Why?

q39. Can you tell me which are the five farmers with whom you have the most frequent contact?

- **Ag.1** _____
- **Ag.2** _____
- **Ag.3** _____
- **Ag.4** _____
- **Ag.5** _____

q40. What kind of relationship do you have with the farmers just mentioned?

	Family member	**Friend**	**Neighbour**	**Member of the same work association (Union)**	**Member of the same group/association**
Ag.1					
Ag.2					
Ag.3					
Ag.4					
Ag.5					

q.41. How often do you talk to them about the need to "change agriculture"?

	Never	**Rarely**	**Often**	**Very often**
Ag1				
Ag2				
Ag3				
Ag4				
Ag5				

q42. As to the five farmers mentioned above, which one did you collaborate with more often, exchange information or cooperate?

	Ag 1	Ag 2	Ag 3	Ag 4	Ag 5
COLLABORATIONS					
1. Joint products food supply.					
2. Exchange of work aid (exchange of working hours).					
3. Sharing machines and equipment					
4. Traditional seed/seedling sharing					
5. Acquisition of technology and inputs for organic farming.					
INFORMATION					
7. Exchange of information on agroecological and traditional production practices.					
SOCIAL AND POLITICAL PARTICIPATION AND ORGANISATION					
8. Social and political participation and organisation (co-management of the territory's resources, development of projects for the territory and construction of public policies).					

APPENDIX C – LIST OF KEY INTERVIEWED ACTORS

1. Key Actors Interviewed in the Province of Trento

Code	Position	Date
Int_1	Organic farmer from the solidarity economy	05/2018
Int_2	Organic farmer from the solidarity economy	05/2018
Int_3	Agent of solidarity economy	05/2018
Int_4	Organic farmer	05/2018
Int_5	Public administration - public policies for organic agriculture	04/2021
Int_6	Researcher	04/2021
Int_7	Public administration - technical assistance for organic agriculture	04/2021
Int_8	Researcher	04/2021
Int_9	President of organic farmers association	04/2021
Int_10	President of organic farmers association	04/2021
Int_11	President of agricultural consortium	04/2021

2. Key Actors Interviewed in the Grande Florianópolis Region

Code	Position	Date
Int_12	President of agroecology NGO	11/2022
Int_13	Organic farmer	11/2022
Int_14	President of organic cooperative	11/2022
Int_15	Coordinator of consumer group	11/2022
Int_16	NGO participant in SFSC	11/2022
Int_17	Municipal council member	11/2022
Int_18	President of agroecological farmers association	11/2022
Int_19	Researcher	11/2022
Int_20	Researcher	11/2022
Int_21	President of agroecological farmers association	11/2022
Int_22	NGO	11/2022