

Establishing alternative grain networks: A comparison of case experiences in South Tyrol, Italy, and Colorado, United States

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Abstract

Alternative grain networks (AGNs) are micro-systems that supplement conventional food production and distribution systems, emphasizing high quality food and leveraging regional, socio-cultural,

and socio-economic values. In this multiple case study analysis we compare two AGNs, Regiokorn in South Tyrol, Italy, and the Colorado Grain Chain (CGC) in the U.S., using qualitative and comparative analysis to explore the indicators of geographical proximity, cultural homogeneity, commercial viability, and community involvement. Regiokorn and the CGC differ in various ways in


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Conflict of Interest

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these operational dimensions as well as in their organizational setups, the former as a pure business network and the latter including consumer members. Our findings highlight how these two different organizational structures can be leveraged to achieve similar outcomes, and provide valuable insights for other AGNs in finding their own paths.

Keywords

agri-food, alternative grain networks, community, sustainable food systems, value chains, cereals, consumers, farmers, Italy, United States

Introduction

Alternative agri-food networks, also called alternative food networks (AFNs), are characterized by value generation mechanisms that generally complement conventional food production and distribution systems. AFNs are often built on personal long-term relationships among small producers, processors, and consumers, and emphasize high food quality, regionality (e.g., the *terroir* concept), proximity, resilience, environmental sustainability, and both socio-cultural and socio-economic values (Michel-Villarreal et al., 2019; Witter et al., 2021).

Alternative grain networks (AGNs) are a type of AFNs that focus on cereals. Like AFNs, AGNs function outside the dominant commodity system. The reliance of conventional, “industrial” agriculture on monoculture, causing soil degradation and loss of biodiversity (Kremen et al., 2012; Poore & Nemecek, 2018; Pretty, 2018), is one of the primary criticisms of such systems. Furthermore, while a simple black-and-white characterization of agricultural systems may be misleading and distinctions between individual operational approaches in practice can be blurry, conventional agriculture, i.e., larger-scale commodity farms primarily selling to international markets, is often criticized for leading to loss of cultural food traditions and knowledge (Jacques & Jacques, 2012).

In contrast, AGNs tend to place a higher priority on crop diversification and sustainable farming methods such as crop rotation, agroforestry, and low-till organic agriculture (Renting et al., 2003). AGNs are more likely to maintain traditional and adapted seed varieties, crops, cultivation

techniques, and foods, and to include community members in the food production and distribution processes (Hergesheimer & Wittman, 2012; Sacchi et al., 2019). By offering communities access to wholesome, culturally appropriate food, and by paying farmers a fair price for their produce, AGNs may help address concerns of food security and food sovereignty. As is known from AFNs in general (Testa et al., 2020), AGNs have the potential to build local grain economies through diversification of small and medium-size farms and the production of flour, malt, and end products such as bread, beer, and other value-added products (Forrest & Wiek, 2021), with potential benefits to farmers and processors (e.g., handlers, millers, maltsters, bakers, brewers) while also feeding the local community.

Starting from these premises, this paper presents a multiple case study analysis of two AGN initiatives in Italy and the U.S. to illustrate differences in organizational structures, actors involved, and consumer motivations in participating in such experiences: Regiokorn in the autonomous province of South Tyrol and the Colorado Grain Chain. Their selection was motivated by the interests of the authors in the research question of whether similar commercial and social endeavors, operating in diverse cultural, agricultural, and legal environments, could achieve comparable outcomes in terms of community development and sustainability practices.

Background

Since 2000 there has been a steady rise in in Europe and the U.S. of localized grain efforts, aiming to re-establish regional grain economies by reducing the distances among farmers, millers, maltsters, bakers, chefs, brewers, and distillers, and expanding their collaborative networks. AGNs also enhance access to, and meet an increased consumer demand for, healthier and more locally produced food and drink. This is accomplished through small-scale, regionalized grain processing infrastructure, often initiated through regional mills (e.g., Anson Mills, North Carolina, USA; L’Azienda Agricola Biologica Floriddia, Tuscany, Italy). In addition, AGNs require a strong farmer interest in cultivating diverse, ancient, and specialty grains and

bakers buying the flour to make artisan breads, leveraging the grains' flavor, baking, and nutritional qualities (Gualandi & Williams-Gualandi, 2021; Halloran, 2015).

In the U.S., AGNs are often supported by educational, community-focused, and nonprofit organizations (Appendix A), as re-organization into localized grain value chains may be a difficult task within the industrialized, large-scale, consolidated commodity system. Cooperative businesses have been very important in marginal, rural regions of the U.S. since the 1840s (Rasmussen, 1991). Today, U.S. grain cooperatives are mostly larger farmer-owned commodity systems and quite opposite in scale to AGNs. Nevertheless, AGNs are well-positioned to adopt some of the principles of cooperation (Democracy at Work Institute, 2021). In Europe, AGNs are often grain cooperatives, supported by rural associations, universities, and farmers' markets, as well as solidarity-based purchasing groups such as Gruppi d'Acquisto Solidale (GAS, in Italian) (Appendix B). AGNs provide farmers a viable way to sell their products directly to consumers as well as through wholesale channels, such as through direct-to-restaurant, retail, or institution pathways (Stevenson et al., 2011), bypassing the traditional commodity market system.

Overall, AGNs are important initiatives for building more sustainable, equitable, and resilient food systems by focusing on long-term relationships among all actors in the grain chain, preserving genetic diversity and agroecological practices, fostering community food and nutrition security, and supporting economic development (High Level Panel of Experts on Food Security and Nutrition, 2019). However, it is also important to note that AGNs are often small-scale and may not have the capacity to meet the food needs of a large population, and it can be difficult for the initiatives to compete with the low prices of agricultural commodities, especially for grain products. Furthermore, AGNs are not always dedicated to more ecologically appropriate production methods or to on-farm diversification, particularly in the unique niche of alternative grains (Brunori et al., 2016). Thus, these networks are highly heterogeneous, and some may be at risk for discontinuation due to their small sizes.

Various AGNs exist in both the U.S. and Italy. A good example of a U.S. AGN is a recently published Arizona case study by Forrest and Wiek (2021), which illustrates the economic growth potential of AGNs in all sectors along the grain chain: milling, malting, baking, brewing, and restaurants. At the time of this work, we counted 14 U.S. initiatives, mostly tied to nonprofit organizations (Appendix A). This is not an exhaustive number of initiatives, and among those missed there may be some with well-developed alternative grain chains; for example, contractual relations, including cooperative structures among farmers, millers, maltsters, bakers, and brewers within the networks (Halloran, 2015; Maenpaa, 2022). In Italy, many initiatives have produced AGNs, that explore the diversity of alternative bread value chains and their valorization practices of the final product (Sacchi et al., 2019). These initiatives typically start with awareness of the need to consider soil, climate, and crop as a single whole, and then set up farming practices that choose crops and varieties adapted to the environment. At least eleven initiatives in Italy have been currently recorded by the Rural Seeds Network (Appendix B), an association of agricultural organizations that promotes the collective management of agrobiodiversity.

Developing AGNs is complex, requiring many steps from field to food or beverage product (e.g., bread, pasta, beer). Infrastructure needs are large, and the consolidation of farms is a risk. Increasing acreage on fewer but larger-scale farms may seem a necessary step to ensure supply, especially for the production of beer and distilled spirits, but then there tends to be less focus on social factors, such as affordability of end products, potential workforce development with diverse ethnic inclusion, and accessibility by those with lower economic means (Edwards, 2015; Forrest & Wiek, 2021; Hinrichs, 2003; Sacchi et al., 2022). AGNs may also remain small and isolated, lacking needed infrastructure to ensure quality and leveraging opportunities for brand development, and thus may not effectively address the issue of scalability (Navin, 2015). Scalability can also relate to shifting the focus to educational initiatives or community engagement, while not addressing the simple need for more farmers to grow grains, and engage in

production planning that offers greater diversity and supply stability, or establish regionalized infrastructure for grain handling and processing. These practices could promote collaboration, while also decreasing competition. Thus, AGNs clearly have both risks and opportunities.

Previous studies on organizing, scaling up and reducing failure risks of AFNs have demonstrated that customer engagement and transparency of operations significantly increase sales (De Bernardi et al., 2020). The pivotal role of trust and effective communication in European agri-food, including grain chains, has been described in detail in earlier literature (Fischer, 2013). More recently, it has been demonstrated that among the constraining and facilitating factors impacting emergence and consolidation of different types of AFNs, trusted relationships with people who share similar goals are not only important for their long-term success but are also critical preconditions for starting them (Poças Ribeiro et al., 2021). Active member participation in AFNs can foster and grow trusting relationships while absence of trust generally constrains collaboration. In this regard, a wide scope of actions such as capacity building and promotion and/or subsidies by governmental and nongovernmental actors are needed to support the emergence of more AFNs and to facilitate the growth of trust and the assurance of process transparency. Regarding scaling up AFNs, Navin (2015) concludes that increasing network size may not be desirable for various reasons (environmental, social, etc.). However, a critical mass of financial revenues, and more crucially, of profits for all or at least the most involved actors, is crucial to ensure network long-term commercial viability, meaning sufficient incomes for the network participants who depend on such payments (Corsi et al., 2018).

The design and operation of AFNs can differ in various ways. Based on previous literature, to compare different AFNs we use the indicators of (i) geographical proximity, (ii) cultural homogeneity, (iii) commercial viability, and (iv) community involvement. Geographical proximity is a characterizing feature of many AFNs as, for instance, physical closeness of producers to consumers defines the concept of short supply chains. More generally, geographical proximity is an argument in

the innovation literature that it enhances knowledge creation and exchange. For instance, Maté-Sánchez-Val & Harris (2018) show that geographical proximity favors agri-food firm innovation by fostering knowledge spill-overs via the interaction of economic agents operating close to each other. Cultural homogeneity is also considered a facilitator of AFNs; for instance, a comparison of eight AFNs indicates that a shared culture positively affects the development and continuation of the networks (Hubeau et al., 2018). Commercial viability is essential for the long-term existence of any business endeavor. Without a stable and sufficient income, network members generally cannot sustain activities unless they are participating for non-commercial reasons and live from other income or savings. Community involvement strongly characterizes some AFN types, such as community-supported agriculture (CSA), and more broadly constitutes the inner workings of most other AFNs (Miralles et al., 2017). Hence, these selected variables overall represent different performance dimensions that collectively cover large spaces of the operational spectrum of AFNs.

The following sections deal with the methods applied and the analysis of the two case studies. The next sections discuss findings and present our conclusions.

Applied Research Methods

This multiple case studies analysis involves an in-depth examination of a small number of cases (Stake, 1995; Yin, 2016). Case study analysis is commonly used in the social sciences, in education, and business research to explore complex social, organizational, or educational phenomena. Its purpose is to gain an in-depth understanding of a particular issue, phenomenon, or concept by examining it from multiple perspectives (Crowe et al., 2011; Leavy, 2020; Meyer, 2001). Case studies may be limited by low generalizability, but offer insights from multiple sources of data, including interviews, observations, and secondary data analysis. The richness of information can help researchers gain a comprehensive view of the topic being. Furthermore, in the present study, comparing the Italian and American experiences not only advances the understanding of strengths and challenges faced by

the two initiatives, but also has many other advantages. First, the comparison identifies best practices that can be adapted and implemented in other contexts, which could help improve the efficiency and effectiveness of AGNs in different regions of the world. Moreover, comparing case studies in various regions, as done here, can improve understanding the determinants of AGN success or failure. This can be particularly important when identifying strategies for engaging farmers, consumers, and other stakeholders. Finally, it can also generate new insights and ideas that can be applied to developing and improving alternative farming systems—a rapidly evolving field, where new ideas and approaches are constantly emerging (Altieri, 2009; Garibaldi et al., 2017; Majiwa et al., 2018).

Our case study interviewees were selected from existing membership lists of the Regiokorn and the CGC AGNs. Since not all members were willing to participate in the interviews, the recruitment strategy was based on convenience sampling techniques, a type of nonprobability-based data collection that involves the sampling units (here, network members) being drawn from a part of the population that is easy to reach (Morgan, 2008). There are different types of non-random (i.e., convenience) sampling methods such as voluntary sampling, snowball sampling, quota sampling, or judgement sampling. In our case, voluntary sampling was used: all network members were contacted by e-mail and those who agreed to participate were interviewed. In the case of consumers, as Regiokorn lacks consumer members we conducted voluntary interviews with general store customers at the point of sale of Regiokorn and CGC products. To allow for better comparability of the consumer responses, CGC consumers were not chosen from network members. While convenience samples may not fully represent the population of interest and therefore can be a source of bias, this data collection approach may in some cases be the only option, especially if interview participation can only be implemented on a voluntary basis (Morgan, 2008).

Taking these considerations into account, a systematic case study procedure and protocol were developed, based on the scheme in Table 1. This study was approved by the University of Colorado,

Colorado Springs (UCCS) Institutional Review Board.

Key actors were first selected through considering all steps in the grain value chain: from growing the wheat and milling the grain to the final product and its consumption. Semi-structured interviews ($N = 46$) and participatory observations were carried out between April and September 2022 with stakeholders recruited through voluntary sampling (e.g., producers, millers, bakers, and brewers) and during specific events in the AGNs. In addition, key informants ($N = 3$) who contributed to the development of the AGNs were also interviewed as important sources of information. Table 2 reports the number of members per AGN analyzed and the stakeholders involved in the analysis per professional category.

A cross-referencing system of annotations (Jackson, 2001) was used to analyze the on-site observations alongside a word-by-word transcription of the semi-structured interviews. In Italy, the interviews were conducted in Italian and answers were translated into English before data coding. Afterwards, a verbal analysis was conducted to discern codes, relying on word similarity (Bazeley & Jackson, 2013). This process unveiled recurring items, which in turn shed light on subtopics pertaining to stakeholders' viewpoints. Coding of data and identifying significant themes underwent comprehensive discussion and received approval from the research team members. This facilitated the analysis and interpretation of findings.

The verbal analysis revealed three dominant topics (Figure 1). The emerging themes were grouped into sub-themes based on co-occurrences and reciprocity, i.e., when similar terms were mentioned repeatedly under the same topics.

The following sections report outcomes of analysis and comparisons of the AGNs, based on the identified themes of (i) network functioning and organization from the producer/processor viewpoint; (ii) product flows and prices at different stages of the network; and (iii) consumers' knowledge and motivation in participating in AGN experiences. Where it seemed insightful to do so, we used direct quotations to illustrate and support our summary results.

Table 1. Protocol Adopted in the Multiple Case Study Analysis







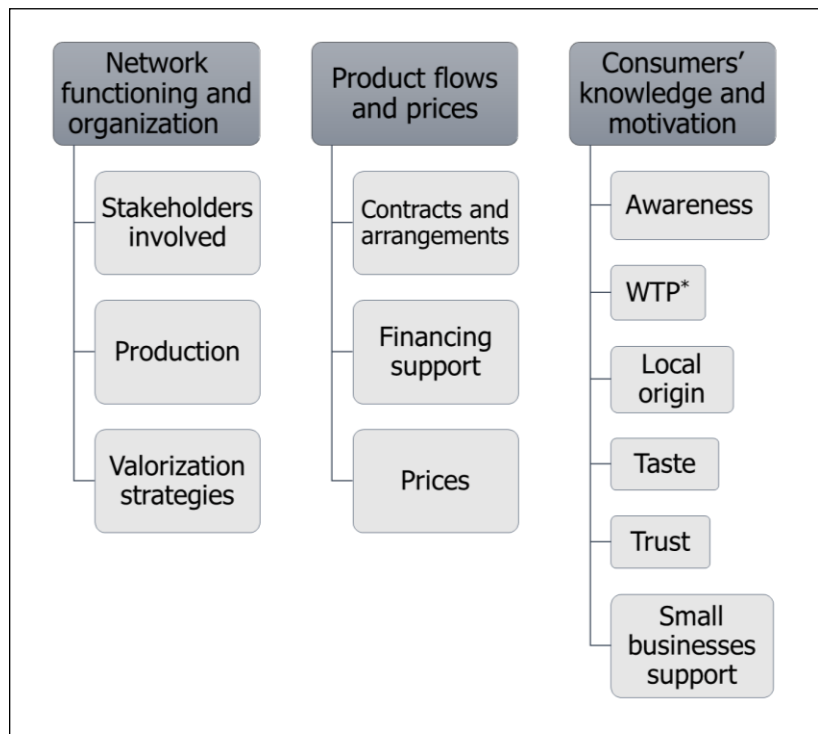
Process	Description
Study proposition 	To shed light on two different models of AGN using a comparative approach in a case study inquiry
Unit of analysis 	Two case studies: <ul style="list-style-type: none"> • Regiokorn, South Tyrol, Italy • Colorado Grain Chain, Colorado, U.S.
Study questions 	<ol style="list-style-type: none"> 1. What are the main differences between the AGNs (i.e., organizational model, actors involved, structure, motivation in participating)? 2. Which are the main drivers and motivations for consumer participation?
Research procedure 	<ul style="list-style-type: none"> • Observation of naturally occurring interactions among AGN members • Participant observation of interaction and organizational activities of AGNs • Semi-structured interviews among AGN stakeholders and key actors • Semi-structured interviews among consumers on their knowledge/motivation
Timing 	April–September 2022
Data analysis 	<ul style="list-style-type: none"> • Cross-referencing system of annotations • Verbatim transcription of semi-structured interviews • Verbal analysis of data gathered from on-site observations and semi-structured interviews • Themes/sub-themes identification • Interpretation of findings

Table 2. Members of the Alternative Grain Networks (AGNs) and Number of Informant Stakeholders

Stakeholders	Members of the AGNs (2021–2022)		Stakeholders serving as informants	
	Regiokorn	Colorado Grain Chain	Regiokorn	Colorado Grain Chain
Farmers	55	11	4	3
Mills	1	1	1	on-site observations (1)
Bakers/Pasta makers	35	15	5	7
Brewers/distillers	0	3	0	3
Consumers	NA	members (50)	9	10 (non-members)
Key informants	NA	NA	2	1
Total	91	80	21	25

Figure 1. Topics and Subtopics Identified with the Verbal Analysis



* Willingness to pay

Comparison of Italian and American Case Studies

Regiokorn, South Tyrol (Italy)

Regiokorn is a project born in 2011 in South Tyrol, a northern Italian province near Austria. It was started by the local organizations of TIS Innovation Park (today IDM South Tyrol), the local Laimburg Research Centre for Agriculture and Forestry, the South Tyrolean Farmer Association, and the Advisory Service for Mountain Agriculture (BRING). The aims were to revitalize grain cultivation in South Tyrol and to develop and increase profitability of the grain network through the technical support and coordination of actors from cultivation to processing and marketing. For network structure and features see Tables 3 and 4.

Network functioning and organization from the producer/processor viewpoint. As of December 2021, Regiokorn farmers cultivated around 223 acres (90 ha), growing rye and an ancient variety of spelt called “Oberkulmer

Rotkorn.” These varieties were selected for their disease resistance and capacity to grow in alpine soils. The yearly production was about 330 metric tons with an average cultivated area of about 3.5 acres (1.43 ha). The initial project was financed by the European Social Fund (ESF), through a start-up grant to cover network coordination activities. Today, Regiokorn is a successful, financially self-supporting and regionally established AGN.

At the beginning of the initiative, with the help of a lawyer a partnership contract among all Regiokorn partners was established under the name Regiokorn Interest Group. Through this written commitment, involved partners agreed to support the project and participate in a meeting at least once a year. One initial partner was a seed-growing cooperative which provided grain seeds to the involved farmers.

Organizationally and legally, Regiokorn today remains an informal network based only on the written partnership contract to coordinate production, price arrangements, and processing quantities. At the time of writing, the Regiokorn partnership comprised one mill, Molino Merano, acting as a central hub, coordination partner, brand holder and trademark owner, as well as 55 farmers and 35 bakers. The initiative falls under the umbrella brand Quality South Tyrol. The label is controlled by the South Tyrol Quality Control (SQK), a section of the Bolzano Chamber of Commerce, which regulates the specifications granted to products that meet precise rules of origin. In the case of bakery products, local flour content must not be below 75%.

The admission of new farmers and subsequent selection of their cultivated land for growing Regiokorn grains takes place every year. Due to the predominantly mountainous characteristics of the region and its alpine climate, land available for



growing cereals is limited. Inclusiveness policies in the admission procedure translate into acceptance of many small farms, often run by part-time farmers or beginners in the cultivation of cereals. The farmers who join Regiokorn take advantage of the convenience of having stable sales conditions as specified in the general partnership contract. This contract offers advantageous and consistent prices for grains and access to consulting and management support from the mill:

Cultivating grains has made my life easier. I own five hectares of land and the work involved is much less compared to when I used to have cows. As a result, I can work full

time in another sector and still manage my fields. I am the sole person responsible for the crops, so there is no need for me to hire anyone. Cultivating grains also allows me to alternate the fields with potatoes. This approach has proven to be quite beneficial for me.
 (Farmer)

The partnership contract specifies that the mill and farmers must establish the quality criteria for the grains, the cultivation practices, and the price that the mill pays the farmer right after harvest. There was initially a formal, written price agreement between the mill and bakers guiding production planning for the following year. However, due

Table 3. Structural Data of the Two Alternative Grain Network (AGN) Case Studies (as of January 2022)

	Alternative Grain Network	
	Regiokorn	Colorado Grain Chain (CGC)
Network's geographical coverage	Province (2,856 sq mi; 7,397 km ²)	State (104,184 sq mi; 269,835 km ²)
Founding year	2011	2019
ACTORS		
No. of farmers	55	11
No. of mills	1	1
No. of bakers	35	15
No. of brewers & distillers	0	3
No. of others*	1	5
Support actors	<ul style="list-style-type: none"> • Local business associations (farmers, retailers) • Advisory service for mountain agriculture • Provincial research center 	<ul style="list-style-type: none"> • 50 consumer members • Universities • Agriculture organization • Local organizations
PRODUCTION		
Total grain growing area	~ 223 acres (90 ha)	~ 1,853 acres (750 ha)
Grain varieties	Ancient and modern	Modern and ancient
Farming method	Organic	Mostly organic
Average farm size range	0.7–13 acres (0.3–5.5 ha)	20–600 acres (8–243 ha)
Annual harvest quantity	330 tons	Data not available
Certifications	Certified Organic <ul style="list-style-type: none"> • Mill (ABCERT) • Farmers (Bioland) 	Certified Organic <ul style="list-style-type: none"> • Mill (USDA Organic) • Farmers (USDA Organic)
Logo		

* Others: Seed cooperative, educators and affiliates, restaurants.

Table 4. Network Features of the Two Alternative Grain Network (AGN) Case Studies, as of January 2022

	Alternative Grain Network (AGN)	
	Regiokorn	Colorado Grain Chain (CGC)
Network setup and governance arrangements	<ul style="list-style-type: none"> • Formal partnership contract between network members • Prices established every year at the board meeting • Grain cultivation guidelines and quality criteria 	<ul style="list-style-type: none"> • Business membership, nonprofit 501(c)(3) status since 2022 • Co-brand agreement • Organization does not establish prices • Informal agreements among members • Use of co-brand requires binding agreement
Financing support & initiatives	<ul style="list-style-type: none"> • European Social Fund funds until 2013 (project start-up grant) • Currently none 	<ul style="list-style-type: none"> • Multiyear USDA grant • Membership fees <ul style="list-style-type: none"> • \$130/year business • \$40/year consumer • Collaborative projects
Brand	<ul style="list-style-type: none"> • Private registered trademark 	<ul style="list-style-type: none"> • Not-registered logo and co-brand
Network coordination	<ul style="list-style-type: none"> • Molino Merano 	<ul style="list-style-type: none"> • Board of directors
Prices*		
Grains (paid to farmers)	<ul style="list-style-type: none"> • € 0.45/lb (€ 1.00/kg) + 4% VAT** 	<ul style="list-style-type: none"> • \$0.35/lb–\$2.00/lb • (\$0.77/kg–\$4.41/kg)
Flour (paid to mill)	<ul style="list-style-type: none"> • Spelt € 1.34/lb (€ 2.95/kg) + 4% VAT • Rye € 0.75/lb (€ 1.65/kg) + 4% VAT 	<ul style="list-style-type: none"> • Wheat \$0.60/lb (\$1.35/kg)
Bread (paid by consumers)	<ul style="list-style-type: none"> • € 3.63/lb–€ 4.40/lb (€ 8.00/kg–€ 9.70/kg) 	<ul style="list-style-type: none"> • \$4.20/lb–\$5.80/lb (\$9.30/kg–\$12.85/kg) • “Affordable Loaf” \$2.50/lb (\$5.50/kg)
Pasta (paid by consumers)	<ul style="list-style-type: none"> • € 7.48/lb (€ 16.50/kg) 	<ul style="list-style-type: none"> • \$9.00/lb (\$19.80/kg)
Beer (paid by consumers)	<ul style="list-style-type: none"> • Not applicable 	<ul style="list-style-type: none"> • \$10.00/L–\$15.00/L
Whiskey (paid by consumers)	<ul style="list-style-type: none"> • Not applicable 	<ul style="list-style-type: none"> • \$83.00/L–\$99.00/L

* As of September 2022, the euro-dollar currency exchange was 1:1. **VAT: Value added tax.

to the establishment of a strong and trusting partnership, the preference shifted towards an informal price-finding arrangement, reflecting the mutual trust and understanding that governs the current collaboration.

Molino Merano is the center of Regiokorn’s handling of logistics and includes grain cleaning, milling, and quality testing, as well as marketing. In the network structure of Regiokorn, the privately owned and commercially managed mill mediates the interactions between farmers and processors, resulting in a possible imbalance of decision-making power in the management of the AGN. On the other hand, the mill ensures the success of the project due to the meticulous management of details, from harvesting to sale to quality assurance

and report drafting. Nevertheless, Regiokorn’s mill-centered network structure results in a high dependence of the other actors on the mill.

Product flows and prices at different stages of the network. The baker members of Regiokorn benefit not only from the local, quality-certified cereals but also from being part of an established and regulated collaborative structure that provides a value-added ingredient. The wholesale price of flour is established yearly by the mill, while the retail prices of Regiokorn products may vary at the discretion of each individual business. The profitability aspect of using local flours is not a driving factor for the bakers to be part of Regiokorn, as the profit margins are not high:

The grain we receive from Molino Merano is clean, high quality and guaranteed, something that we as bakers have no possibility of certifying. Regiokorn allows me to specialize and stand out from the competition; the profit is not an aspect that pushed me to join because the margins are low. (Baker)

In South Tyrolean grocery stores, Regiokorn rye bread is sold for about one-third more than the conventional version. However, production and distribution costs are also considerably higher than those in the conventional bread chain. Regiokorn pasta, made from rye and spelt, can be viewed as a specialty product with a price up to eight times higher than commercial durum wheat pasta. Its production and distribution costs are also significantly higher. Moreover, according to the interviewees the scarcity of the flour, due to the small growing area, destabilizes the continuous production of Regiokorn-branded bakery products:

The quantities of Regiokorn grains are minimal; this is the biggest problem in my opinion. We receive the Regiokorn grain in October, and in January it is already finished. Regiokorn will remain a niche, very interesting, but production must continue, and it is not possible to base a business on this with such small quantities. (Baker)

Consumer knowledge and motivation in participating in AGN experiences. For the consumers interviewed, the most important motive for buying Regiokorn products is their perceived particular taste and traditional production (Table 5). Moreover, especially in rural areas, consumers appreciate supporting local farmers, small businesses, and the community with their purchases:

It is important for me to buy bread here because I know who produces it and I have been going to this place for years and it also employs people I know. (Consumer)

Labels and logos are seen as unnecessary to communicate product message; personal explanations by sales assistants are preferred, which help to build relationships and trust. The interviewees know that as there are few grain fields in South Tyrol, Regiokorn consumers are willing to spend more money (about 10–20% more) to buy bread made with local grains in support of their community:

If I know that the flour is regional, then I would spend a little more because I am happy to support my community. (Consumer)

The limited availability of Regiokorn products also shows the lack in South Tyrol of consumer

Table 5. Consumer (N = 19) Perceptions of the Two Alternative Grain Network (AGN) Case Studies

	Alternative Grain Network	
	Regiokorn (N = 9)	Colorado Grain Chain (CGC) (N = 10)
Consumer willingness to pay	10–20% higher for Regiokorn-branded bread	20–100% higher for CGC bread
Local origin of grain or flour	Important but awareness that supply of local grain is limited	Very important for a subset of consumers
Project awareness in the general population according to interviewed consumers	There is little to no Regiokorn awareness	There is limited CGC awareness
Product attributes appreciated by consumers	Product taste and traditional production (local grain)	Bread taste and other sensory characteristics (texture, smell, etc.), nutrition, authenticity
Purchase motivations	Small business and community support, habitual purchases	Small business and community support, personal relationships, search for a different product

awareness of the Regiokorn AGN leading to low demand and the limited use of local grains and flours in bakery products.

The Colorado Grain Chain (CGC)

The Colorado Grain Chain is a membership-based nonprofit organization, inclusive of diverse farming practices, comprised of locally owned and operated businesses and consumers who produce and support grain and grain products from heritage, ancient, and locally adapted grain, also referred to as specialty grains. The founding members were farmers, millers, bakers, brewers, distillers, and chefs. The CGC is devoted to promoting member businesses and raising awareness and demand for their products throughout Colorado (Colorado Grain Chain, n.d.-a). The organization began in 2019 in Colorado. The organization grew out of the University of Colorado Colorado Springs (UCCS) Grain School and the Cooperative Development Center of the Rocky Mountain Farmers Union (RMFU), leveraging the platform of two 2019 Grain School workshops to form a value proposition for the organization, build consensus, and develop a steering committee according to cooperative formation practices. Several federal grants have supported the CGC launch and expansion. Initially, the CGC was set up as a 501c(5) Labor and Agricultural Organization, with beneficiaries being stakeholders in the grain value chain. Within a year of its formation the CGC began to explore converting to a 501c(3) Educational and Charitable Organization, due largely to inability to sell memberships to meet budget expectations. While a 501c(5) is also considered a type of nonprofit organization, it is ineligible for grants and donations. In 2022 the CGC became a 501c(3) organization with the mission to grow and connect a vibrant community-centered grain economy in Colorado (Colorado Grain Chain, n.d.-a). For network structure and features see Tables 2 and 3.

Network functioning and organization from the producer/processor viewpoint. As of 2022, it is estimated that CGC farmers cultivate about 1,853 acres (750 ha), growing modern and ancient varieties of drought-hardy grains, an important trait in Colorado's semi-arid climate. The average culti-

vated area of grains for each farm is approximately 168 acres (68 ha). As a nonprofit member organization, the CGC meets its budget through membership dues (\$130/year for business members and \$40/year for consumer members), federal and private grants, public fundraisers, and donations. The CGC Board of Directors acts on a volunteer basis according to CGC written bylaws and is elected by the members. As a network, the CGC collaborates directly with UCCS, the University of Colorado Boulder and RMFU, relying on their institutional partners for funding, marketing expertise, education/grain literacy, outreach to farmers, and legal and cooperative values advice.

While Colorado is one of the major commodity wheat producing states, the CGC is very small. As of September 2022, the CGC structure comprised 11 farmers, one mill, 15 bakers, which included home bakers operating under Cottage Food laws, (Department of Public Health & Environment, n.d.), three brewers/distillers and five others (Table 2). To qualify to join the organization, members must operate small to medium-size family businesses that follow CGC guidelines of regenerative and certified and non-certified organic production and processing practices. There is no written contract or binding agreement required for business members to join. After joining, business members obtain access to the CGC business network, which adds visibility, a marketplace for selling and purchasing Colorado-grown grains, and access to the co-brand logo. Informal interactions occur among individual business members, which are conducted at a local and state level, depending on the actors' proximity.

The CGC's co-brand logo "Colorado Grown Grains" (Table 3) was created with the aim of promoting products made with at least 20% Colorado-grown grains (non-enforced, but inclusion of Colorado-grown grains is recommended) and advocating for locally sourced, nutritious, high quality whole grains. The purpose of the co-brand is to increase awareness among consumers and assist businesses in product recognition, networking opportunities, and access to technical assistance, promotion, and collaboration within the CGC. Use of the co-brand is free and CGC membership is not required to use it (Colorado Grain

Chain, n.d.-b); however, users must sign a use agreement and meet the co-brand use criteria. The co-brand launched concurrently with the interview process for this study. Thus, while we discuss the co-brand in the CGC case study, we have no further data to share.

The co-brand logo integrates Colorado's four major watersheds (Arkansas River, Colorado River, Rio Grande River, South Platte River) to provide greater awareness of regionality and the links between water and production by the producer/processor using the co-brand. The organization hopes to offer transparency of grain sourcing while highlighting the producer's or product's watershed. While joining the organization offers networking benefits and other services, such as a member directory and marketplace, the co-brand is not exclusively for members and CGC membership does not require business members to carry the co-brand. For example, a spelt grower using regenerative farming practices in Pueblo, Colorado, may use the co-brand with the Arkansas River Watershed, with a signed co-brand use agreement, but may choose not to become a CGC member. Likewise, a producer member may choose not to carry the co-brand but include a short description of business practices and the location. From the consumer side, the co-brand aims to help assure product origin, including watershed, although producers and processors (for a value-added product) must also declare company location on the product label, as required by the state of Colorado.

Vertical integration can be implemented to leverage a farm's internal economic potential by manufacturing value-added products in-house with a higher profit margin, due to the inevitable large distances among businesses in the state and the difficulty of competing in grain commodity markets as small growers. It follows that being part of the CGC helps farmers located in remote areas develop relationships with other nearby businesses, gain infrastructure access for grain handling, or obtain technical assistance:

... the organization is really becoming a platform for people finding each other and for people that may be new [to the grain world].
(Farmer)

At the time of this work, there were 50 CGC consumer members, interested in locally grown grains. Consumer members have access to the educational and informational activities of the CGC. As the organization is continually evolving under nonprofit conditions, new membership categories are being created.

Product flows and prices at different stages of the network. The wholesale prices of grains are set by individual farmers (Table 4) and depend on the grain species and/or organic/regenerative farming certification, with conventionally grown modern varieties on the lower end of the price range and specialty grains, such as certified organic, ancient, or landrace varieties, on the higher end. Business relations are built across individual grain chains from farmer to miller and baker, involving general price expectations of individual buyers (e.g., bakers) and learning from other AGNs across neighboring regions about less known grain varieties (e.g., flour corn). However, farmers are pressured by low commodity prices and depend on millers and bakers to purchase their crops at a higher price:

It's just hard to find the people that are willing to pay. Because you're competing with commercial guys. (Farmer)

As of 2022, there was only one CGC mill located in the San Luis Valley (Rio Grande River watershed), a remote region in Southern Colorado along the northern border of New Mexico. The predominantly agricultural landscape and presence of several independent farms ensure the constant supply of grains. At the same time, most of the adjacent land is cultivated as corporate contract farming, which feeds into the commodity market and cannot be a source for the mill. The stone mill, which also contains a grain handling facility, processes certified organic grain into flour and supplies processors in the valley and regionally at a competitive price due to proximity and shared interests in organic varieties of grain (Table 4). There are currently no other CGC grain handling and milling facilities that work with multiple small and medium-scale growers, bakers, and other

processors, although there is momentum regionally, especially originating from the beverage industry. Because of only one independent mill that processes regional grains and acts as an intermediary and flour supplier in a vast territory, most CGC bakers have had to invest in in-house mills, working individually on sourcing local grains and/or stocking up on flour from other sources and/or out-of-state milling operations. Popular suppliers are in Utah and Kansas. There is a shortage of small to medium-size scale regional cleaning and milling facilities in Colorado that produce a consistent high-quality product, especially for bakers:

My main concern was that we had bread that was consistent and usually getting a grain that's milled from a small mill it meant that it wasn't tested enough. (Baker)

CGC bakers, distillers, and brewers share the desire to create a system that could support them and that shares the same values regarding the use of local grains, the meaning of local food, and sense of community. They would also appear to benefit from creating a network of grain professionals, as it may facilitate access to local cereals as well as flour:

I think there's a need to fix the gap regarding mills and quality of flour, especially for people like me who don't mill in-house. A plus is going to be the connection that is created with this project. (Baker)

The retail prices of bakers are set in sales units and/or by weight, depending on the business and location. In general, rural locations have less expensive options than urban areas, with the lowest bread price of bread found in the San Luis Valley to be an "Affordable Loaf" baked for a local food bank, thus mitigating food insecurity in the region through bread. The baker states that one of her regular loaves has an affordable retail price because due to proximity the miller maintains a consistently less expensive price point:

Our Mountain Mama is always \$5 and that is because the price of that flour is the same and

has not changed. So why would we raise our price if our ingredient price hasn't? (Baker)

Comparable prices in Colorado can be summarized as follows: a loaf of conventional fresh white bread is 20%–50% lower in price than CGC bread; domestic conventional beer is 60%–90% lower in price than CGC beers; commercial brand whiskey is 15%–30% lower in price than CGC whiskey. Moreover, most of the pasta sold in Colorado grocery stores is imported from Italy with a retail price of around \$1.80/lb. (\$4.00/kg), 130% lower in price than CGC pasta.

The greatest difficulties that bakers face include logistics, a sense of isolation due to geographic distance, lack of adequate CGC online support for connecting with each other and other markets, and lack of quality control; for example, the lack of needed infrastructure for quality handling and sourcing of grains:

... a lot of bakers want the grain, but there needs to be a step between the farmer and the baker. (Baker)

Consumer knowledge and motivation in participating in AGN experiences. We found a general agreement among Colorado consumers that taste, whole grain content, and healthy nutrition are the most important aspects when buying goods such as bread. Consumers are looking for originality and artisanship and are willing to spend 20–100% more, and even travel further, to make the purchase (Table 5):

[Buying bakery products made with regional/local flours] is very important and I'm willing to come here to get it, and I drive at least five miles, maybe more, and I have to get on the highway to come here. (Consumer)

Flour origin is an essential trait for most consumers. Knowing that the product is made with Colorado-grown grains is perceived as an added value of the product, but this is not the case for everyone:

[It is important at a certain extent, I support this bakery because it is a very cool business

and I like the community around it, but I'm not very into the local food stuff though.]

Furthermore, supporting small businesses and being part of a community around the bakery has substantial meaning for consumers, some of whom stated that they “established a personal relationship” with the baker.

Interviews also included consumers in general; when asked about their awareness of the CGC as an AGN, only of ten consumer interviewees reported being aware of the network.

Discussion

The AGNs Regiokorn and CGC have similar goals yet operate quite differently. While distinct in geographic location, scale, and organizational arrangement, they share comparable values about purpose and impact. More fundamentally, and considering success and failure risks of AFNs, both Regiokorn and CGC can learn from each other regarding long-term viability, community engagement, and leveraging environmental, sociocultural, and socioeconomic diversity.

Geographical Proximity

Both AGNs cover regional territories. Using the term “regio” by Regiokorn together with the name of the province (“Südtirol”), and including the state (“Colorado”) by the CGC, and using them in their logos provide a reference linked to a specific region. However, their spatial areas and densities differ significantly. While the CGC is a young organization and still expanding, it extends over a territory more than 35 times larger than that of Regiokorn (Table 3). In relative terms, with about 70 members, Regiokorn has one member per 100 km². In contrast, with 85 CGC members, there is roughly one member per 3,100 km² of the AGN territory. Network density matters in terms of transaction costs and social cohesion (De Bernardi et al., 2020).

Despite modern communication tools, physical proximity is essential for coordinating activities, creating synergies, achieving a critical collaboration mass, and leveraging business success. Regiokorn's relative commercial success so far may be attributed, at least in part, to the close physical proximi-

ties of its members and customers. Business meetings can be arranged more often due to lower travel costs, and can be attended by more members more regularly. Meeting business partners in person helps to build and maintain trust. As physical distances become too large for meeting in-person on a regular basis, it may be advisable to create organizational subgroups or regional hubs that operate autonomously to achieve social cohesion and contribute to business success. The CGC network is physically much more widespread and decentralized in both urban and rural regions. Due to the infrastructure needed to successfully move grain from the field to various businesses, regional infrastructure for grain handling and milling is essential. A good example is the San Luis Valley, with its small-scale commercial mill. The miller works closely with farmers and bakers in the valley. However, due to the shortage of other regional processing and milling facilities in Colorado and the extra capacity of the miller, the miller has accounts with other bakers outside of this regional network. Thus, Regiokorn's geographically concentrated network structure may be a useful comparison, as multiple regional mills could contract with regional farmers and bakers also in Colorado. One drawback of additional regional mills and processing facilities, in the case of Colorado, is increased competition within a small-scale AGN. Nevertheless, if consumer demand is increasing, including from institutional markets, a major barrier is not having enough supply. An expansion based on Regiokorn's model and cooperative values would be warranted in Colorado.

Cultural Homogeneity

Network success is also a function of intuitive mutual understanding and minimizing internal friction. Cultural diversity within a network has many advantages in the long term, such as building on a broader view and a larger experience base to identify solutions for problems. Nevertheless, cultural diversity may also create conflicts and tensions in the short term, due to socially innate differences in problem solving approaches and solution implementation styles (Vangen & Winchester, 2014). Regiokorn has the advantage that its members are predominantly from the

German-speaking community of South Tyrol, which assures a common language and building on a shared cultural identity. For example, this is reflected in the selection of AGN grains cultivated and processed: rye is more commonly used in German and Austrian culture, and most Regiokorn grain products, such as rye bread and strudel pastry products, are part of the local German/Austrian culinary tradition. By creating a culturally narrowly defined AGN, Regiokorn may have strengthened its resilience and assured its relative business success. However, Regiokorn products are not much different from many similar products which are available locally but made from imported grains and flours. Thus, buying Regiokorn is not a boycott or protest towards the national Italian culture and eating habits but rather seem to be a social status indicator based on the financial possibility to buy premium local products.

In contrast, the CGC deals with greater heterogeneity regarding many factors, such as farm type and scale, regional on-farm grain diversification opportunities according to altitude, precipitation and irrigation, and urban versus rural location. While Colorado is predominantly White (86.5%), there is significant cultural diversity in both urban and rural regions (U.S. Census, 2021), with highly variable density of non-White racial groups, especially Hispanic and Latino. In addition, Colorado has always attracted many people not born in Colorado but who migrated there to live and work (Bilek, 2019). This is especially true for urban centers such as the Front Range Urban Corridor (including cities like Boulder, Denver, and Colorado Springs) and mountain towns. Rural regions, both eastern and western/southwestern, particularly where agriculture has been a significant form of income and livelihood, are mostly home to Colorado-born residents. While there is currently no clear understanding as to how the network may take advantage of diversity among its members and within the state, there have been initial communications. Agreeing on a decentralized model and specialization in grain production, handling, and processing may help increase diversification and reduce the AGN's internal competition, increase interdependence, promote cooperation, and strengthen the regional food system. Alternative grain

networks can also consider the grains suited to the regional food culture, besides making environmentally or economically based decisions in grain production. For example, much of southern and southwestern Colorado is inhabited by Hispanic, Latino, and Native American populations, whose cultural diets align with corn, amaranth, quinoa, and soft white wheats like Sonora. Other ethnically diverse populations in Colorado's urban corridor may be more interested in finding local millets, such as teff or sorghum. Finally, Colorado's active urban and mountain communities, most of whose residents have migrated from elsewhere, may be open to an expanded offering in grain diversity, including heritage or ancient varieties of wheats, culinary barleys, and rye, and their diverse product applications.

Commercial Viability

The central node of a network is crucial for effective and successful member coordination (Nassimbeni, 1998). Regiokorn's core coordinator is a successful commercial enterprise, the mill Molino Merano. With the mill's competencies focused on commercial processing and marketing activities, the underlying AGN may benefit in terms of commercial viability and business success. For AGNs whose activities are coordinated by nonprofit partners, a lack of business and financial experience may reduce long-term commercial viability and resilience (Poças Ribeiro et al., 2021). The CGC recently transitioned its organizational character from a trade to a nonprofit organization, shifting its focus while pivoting the economic goals of its business members to (re)organizing independently of the CGC with greater focus on infrastructure building, while also leveraging the Colorado Grown Grains co-brand as a central marketing tool in partnership with CGC. A decentralized grain hub structure, led regionally by competent business-oriented professionals, may solidify long-term success for the Colorado AGN.

Regarding economic growth potential, purchasing power in the two locations differs. South Tyrol is one of the wealthiest provinces in Italy, with a median household income of €/\$39,000, compared to the national average of €/\$31,000 (ASTAT, 2019; ISTAT, 2019), resulting in high

purchasing power and a privileged economic status. In Colorado, the median household income is \$81,841 (U.S. Census, 2021), but with a wide disparity among counties, ranging from \$92,466 in Boulder to \$35,000 in Costilla County. The CGC, as a statewide organization with members in both urban and rural regions, can adjust to this economic landscape based on regional purchasing power. In addition, while production occurs in more rural areas, there is great opportunity for farmers and processors to take advantage of markets in urban centers, such as the most densely populated region, the Front Range Urban Corridor.

While our qualitative-based data does not allow us to unequivocally validate our interpretation, it appears that within the Regiokorn AGN the farmers benefit most from the network's financial success. This is mostly because the network was created for and with farmers to assure a fairer remuneration for them, while extending the range of regional products to meet the demand of local consumers. In the case of the CGC, it seems that the involved bakers, brewers, and distillers, working independently with producers and grain handling/milling facilities, are remunerated based on negotiated prices that work for everybody, including the farmer. It has been shown to be easier to start a brewery or bakery than to expand grain production (Forrest & Wiek, 2021). Before the inception of the CGC, farmers and bakers in Colorado had already begun to work together, with bakers emphasizing Colorado-grown grains. The Colorado Grain Chain grew out of these early relationships as consumer awareness grew and interest in local grains expanded. Given the short history of the CGC and its current nonprofit status, it is impossible to determine from our data who ultimately benefits, if not everyone involved in the grain chain, including consumer members. As noted previously, in the long run sufficient income streams need to be generated for all network participants who depend on revenue to ensure AGN success and resilience. In particular, financial stability of farmers involved is crucial since the rest of the downstream chain depends on the raw material the farmers provide. As long as the prices are fair and stable among producers and processors, end products can also be marketed to consumers in a

fair and stable way. The CGC has been drawing on trust along the grain value chain, and has built its network from shared values, including those of community involvement.

Community Involvement

Regiokorn and CGC networks also differ in the degree to which they interact with local stakeholders. At the time of this study, the CGC had about 50 fee-paying consumer members while Regiokorn had none (Table 3). AFN sales depend crucially on active consumer involvement and customer loyalty leading to value co-creation (De Bernardi et al., 2020). If customers are also network members, higher product involvement and purchase commitment can be achieved, and support fatigue may be reduced. Moreover, having consumer members within an AGN may generate spill-over effects on the wider community and expand awareness of the AGN (Navin, 2015). In this regard, Regiokorn may learn from the CGC. The CGC is in part supported by consumer membership fees, but the amount is a fraction of what an organization requires for viability. Stronger approaches to community involvement may consist of access to discounted co-branded products, courses or educational materials, and other structures such as consumer ownership. With the CGC as a nonprofit organization, however, cooperative approaches independent of CGC may well become more feasible regionally for grain production, handling, and processing. Nevertheless, the CGC's early success story is, in part, due to the relational values found in the community, including consumer member involvement even when CGC was still a 501c(5) trade organization. As has been previously shown with transformational system change—and which may apply as well to food systems—experience with nature, as in agriculture or gardening, increase relational values, through sensory contact, emotions, meaning, beauty, and compassion (Richardson, 2020). Trust in alternative production and in the specific farmer is another important relational value for consumers actively participating in a network (Carfora & Catellani, 2023). The CGC, with UCCS Grain School as part of its origin, stimulated interest in Colorado-grown grains along the grain chain, from farmer and grain handler to artisan miller, baker,

maltster, brewer, and distiller. Outreach and inclusion were cultivated early as UCCS Grain School invited consumers to participate in their annual public forums.

AFNs have been shown to be instrumental in strengthening community social processes (Corsi et al., 2018). In addition to building social capital (De Bernardi et al., 2020), both Regiokorn and CGC create cultural value beyond mere food supply and income generation by preserving and promoting resilient crop production, offering traditional products, and providing alternative distribution and consumption processes. Community life is supported, and cultural capital enhanced. Some rural regions have also engaged in bread value chains through supporting food security causes, which seems to address not only cultural and community needs but also rural economic development (Lurie et al., 2019).

Finally, it is well known that limited availability also reduces awareness and knowledge of local products (Carfora & Catellani, 2023) which seems to be a severe problem for both networks, although in different ways. To increase consumer awareness of the networks, there is a need for expansion, especially of production. More consumers are becoming interested in traditional bread products and appreciate flavor, nutrition, and authenticity. There is a great potential for increased awareness and consumption if availability of grain, flour, and end products can increase.

Conclusions

In a world with a globally growing population and increasing interconnectedness, as witnessed by high levels of multi-country business collaborations, intercultural exchanges, international trade and cross-continental travel and migration, a significant number of people worldwide feel the need to support alternative food provision channels. Consequently, AFNs seem to be increasing, with a large variety of products including grains. With the likely ongoing demand for diversified food supply channels, generating knowledge on how to successfully establish and operate these value-based food chains is important.

Building on a comparative case study approach, our qualitative assessment of two AGNs

has provided insights into their structures, operations, and evidence of their multiple impacts in their local regions. While neither case may be taken as *the* role model or design template for further initiatives, both offer valuable lessons about potential pitfalls and effective practices. While there is no universal recipe on how to start, grow, or maintain an AFN and successfully collaborate or coexist with others, our case studies show that similar objectives can be achieved in different geographical and cultural contexts. This may also be the biggest lesson from our assessment: there is no “one size fits all” approach.

The northern Italian, close-to-Austria Regiokorn AGN was initiated to fulfill the local population’s preferences for preserving traditional bakery products made from grains of their native mountain territory. Regiokorn is characterized by members with close geographic proximity and a high degree of cultural homogeneity. It achieved commercial viability by targeting a rather price-insensitive and tradition-valuing customer base, involving the community, and gaining approval and support from public subsidies. At this time this regionally established producer and processor network does not include consumer members. In contrast, the CGC has so far operated successfully in a geographically dispersed territory with a culturally diverse membership that includes consumers. The CGC has achieved some commercial viability through its internal and external community activities, governmental support, and sponsored events, but it is young and still relatively unstable. Different approaches lead to similar goals and outcomes, and our results may suggest a compass for other AGNs to find their own paths.

Future research can build on our results and add more case study evidence to broaden the knowledge base for further AGN initiatives. While no new AGN will be able to replicate success by simply copying existing experiences, being able to learn from previous examples should help to increase the likelihood of AGN success and resilience, and thus expand the impact of AGN benefits for producers, consumers, communities, and natural ecosystems.



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Appendix A. Alternative Grain Networks in the U.S. (Selection)

Initiative name	Year founded	Location	Involved actors	Size*	Aim	Website
Whole Grain Connection	2000	California	<ul style="list-style-type: none"> • Farmers • Bakers • Consumers 	Small	Enhancing the desirability and availability of whole grain breads and other whole grain products from organically, sustainably grown grains and thereby connecting farmers and bakers.	http://wholegrainconnection.org
Carolina Gold Rice Foundation	2004	South Carolina	<ul style="list-style-type: none"> • Breeders • Farmers • Millers • Chefs • Bakers • Educators 	Large	Rebuilding the fundamentals of local culinary heritage through scholarship, research, farming, exploration, pro bono rare seed distribution, and good wholesome food.	https://www.thecarolinagoldricefoundation.org
Maine Grain Alliance	2007	Maine	<ul style="list-style-type: none"> • Farmers • Millers • Malsters • Bakers • Brewers • Processors • Consumers 	Large	Inspiring and empowering people who are building local grain economies by connecting people and supporting the economic, environmental, and nutritional importance of establishing regional grain economies.	https://www.kneadingconference.com
GrowNYC Grains	2009	New York City, New Jersey	<ul style="list-style-type: none"> • Farmers • Processors • Bakers • Chefs 	Medium	With our partners, and through our farmers market retail program, we built the marketplace for grains grown and milled in the Northeast. We are educating and connecting growers, processors, bakers, and chefs—sparking a rise in demand for local grains while helping ensure that the crop supply and processing infrastructure are there to meet the demand.	https://www.grownyc.org/grains
WSU Breadlab	2010	Skagit Valley, Washington	<ul style="list-style-type: none"> • Breeders • Farmers • Bakers • Millers • Washington State University 	Medium	Bringing more affordable, great tasting bread to the world one loaf at a time. Or maybe faster than that.	https://www.breadlab.wsu.edu

Community Grains	2010	California	<ul style="list-style-type: none"> • Farmers • Millers • Bakers • Chefs 	Small	Restoring a vibrant local grain economy in California, improving the health of the community and the environment.	https://www.communitygrains.com
Tehachapi Grain Project	2014	Tehachapi, California	<ul style="list-style-type: none"> • Farmers • Chefs 	Small	To preserve and grow heritage organic grains that are naturally drought-tolerant and low in gluten.	https://www.tehachapigrainproject.org
Artisan Grain Collaborative	2016	Upper Midwest	<ul style="list-style-type: none"> • Farmers • Millers • Maltsters • Bakers • Chefs • Food manufacturers • Brewers • Distillers • Researchers 	Large	Facilitating a network to create and strengthen relationships along the grain supply chain throughout the Upper Midwest region by connecting farmers, processors, makers, and advocates, developing resources, and building awareness of regional grains.	https://www.graincollaborative.com
River Valley Community Grains	2016	River Valley area, New Jersey	<ul style="list-style-type: none"> • Farmers • Millers • Bakers 	Small	Encouraging farmers to use regenerative agricultural methods and helping meet the growing demand for nutrient-dense grains, local flour, “real bread,” and healthy cereals in the region.	https://www.rivervalleycommunitygrains.com
Common Grain Alliance	2018	Mid-Atlantic region	<ul style="list-style-type: none"> • Farmers • Millers • Bakers • Chefs 	Medium	Connects and supports farmers, millers, bakers, and grain artisans to build a vibrant, integrated, equitable and regenerative grain economy in the Mid-Atlantic.	https://www.commonrainalliance.org
Southwest Grain Collaborative	2018	New Mexico	<ul style="list-style-type: none"> • Farmers • Millers • Bakers • Chefs 	Small	The Southwest Grain Collaborative, in partnership with the NMSU Cropping Systems Research Program (SGC/CSRP), uses a participatory plant breeding approach to work with farmers across the region to propagate and increase seed stocks of traditional Southwest food crops such as ancient corn, bean, and small grain cultivars, scaling production for new market opportunities. SGC/CSRP provides practical guidance on agroecosystem management and crop rotation planning focused on soil health, water conservation, and farm business viability.	https://www.southwestgraincollaborative.org

Rio Grande Grain	2018	New Mexico	<ul style="list-style-type: none"> • Farmers • Millers • Bakers • Chefs 	Small	Our mission is to create interest in and demand for ancient and heritage grains in northern New Mexico.	https://www.riograndegrain.org
Colorado Grain Chain	2019	Colorado	<ul style="list-style-type: none"> • Farmers • Millers • Bakers • Distillers • Malsters • Brewers • Other makers • Educators • Consumers 	Medium	To grow and connect a vibrant community-centered grain economy in the state of Colorado.	https://www.coloradograinchain.com
Northeast Grainshed Alliance	2020	New England	<ul style="list-style-type: none"> • Farmers • Millers • Maltsters • Brewers • Bakers • Distillers • Restaurants • Educators and researchers 	Large	A diverse stakeholder-driven partnership, connecting grain-related businesses and organizations in the Northeast pledging to connect and strengthen regional farms, mills, and malthouses with craft food and beverages.	https://northeastgrainshed.com/

* Small < 20 members; medium 20–50; large > 50; This list is not an exhaustive list of U.S.-based alternative grain networks, and U.S. mills, such as Hayden Flour Mills in Arizona and Anson Mills in South Carolina, are not listed. Nevertheless, mills play a central role in alternative grain chains, as shown in this paper.

Appendix B. Alternative Grain Networks in Italy (Selection)

Initiative name	Year founded	Location	Involved actors	Size*	Aim	Website
Spiga & Madia	2006	Brianza (Lombardy)	<ul style="list-style-type: none"> • Farmers • Critical consumers • Agricultural cooperative • Miller • Baker • Solidarity purchasing groups (GAS) 	Large	Rebuild an organic bread supply chain.	https://www.spigaemadia.it
Filiera corta bio dei cereali antichi	2007	Veneto region	<ul style="list-style-type: none"> • Farmers • Mills • Bakeries • Social cooperatives • Fair trade • Restaurants 	Small	Recovering ancient grain varieties, recognising their genetic heritage as a source for safeguarding health and the environment.	https://www.crescent.bio
Filiera del Pane DES Altro Tirreno	2008	Pisa Province (Tuscany)	<ul style="list-style-type: none"> • Farmer • Millers • Solidarity Purchasing Groups (GAS) 	Small	Respect fields and protect their fertility, for the benefit of territory and consumers towards environmental conservation.	https://www.desaltrotirreno.org
Filiera del Grano DESR PASM	2008	Parco agricolo sud Milano (Lombardy)	<ul style="list-style-type: none"> • Farmers • Bakers • Social cooperatives • Processors • Solidarity Purchasing Groups (GAS) 	Large	Producing healthy goods and sustainable bread with gluten-free flours, with sourdough and long leavening, distributed at an affordable price.	https://www.desrparcosud.it/la-filiera-del-grano-del-parco-sud-milano/
Gran Prato	2011	Prato province (Tuscany)	<ul style="list-style-type: none"> • Farmers • Bakers • Millers • University of Florence 	Medium	Support local agriculture and enhance one of the pillars of Prato's culinary and gastronomic tradition, which is based on flour and its products.	https://www.granprato.wordpress.com
Regiokorn	2011	South Tyrol	<ul style="list-style-type: none"> • Farmers • Miller • Bakers 	Large	Revitalizing cereal cultivation by creating a close cooperation network between farmers, millers, and bakers.	https://www.meranermuehle.it/business/it/prodotti/regiograno

Il Biricoccolo	2012	Valsamoggia (Emilia-Romagna)	<ul style="list-style-type: none"> • Farmers • Critical consumers 	Small	Spreading the concept of 'Ethical Agriculture': a model of agriculture that pursues the common good according to solidarity economy principles.	https://www.ilbiricoccolo.it
Cum-Panatico Sud	2013	Campania region	<ul style="list-style-type: none"> • Farmers • Regional association • Processors • Critical consumers 	Large	Rebuilding a self-managed short supply chain of grains from organic 'local varieties' entirely managed in the region.	https://www.cumpanatico-sud-20172018.jimdosite.com
Pane Virgo	2013	Emilia Romagna region	<ul style="list-style-type: none"> • Farmers • Millers • Bakers • University of Bologna • Critical consumers 	Medium	Recover ancient wheat varieties and study their properties, with the aim of making the resulting products available to the community through creation of a short supply chain.	https://www.nelnomedelpane.it/progetto-virgo
Consorzio Terra di San Marino	2014	Republic of San Marino	<ul style="list-style-type: none"> • Farmers • Critical consumers 	Small	Protecting and enhancing the flavors and authenticity of local production.	https://www.terradisanmarino.com
Associazione Grani Antichi di Montespertoli	2014	Montespertoli (Tuscany)	<ul style="list-style-type: none"> • Farmers • Municipality • Miller • Baker • Agrarian technician • Critical consumers 	Large	Creation of a virtuous local supply chain, involving and engaging farmers, processors, and also embedding critical consumers.	https://www.graniantichitoscani.com

* Small < 20 members; medium 20 – 50; large > 50.