



Networks of Inclusive Exclusion: Social Capital and Resilient Rural Livelihoods in the Southern Great Plains (SGP)

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Abstract

Assessments of resilience and sustainability are increasingly important for mitigating the effects of climate change, especially in rural areas such as the Southern Great Plains (SGP) in the United States. While ecological and economic research on rural sustainability is necessary, we argue that a social approach is essential to understanding how to promote resilient futures. Social capital facilitates access to, and transference of resources individuals need to achieve individual and collective ends. Over the past three decades, research on social capital has advanced across multiple disciplines to address a variety of social phenomena, issues, and outcomes. Building on previous research in the SGP, we focus on community-level social capital through a qualitative content analysis of 65 key informant interviews across the three counties in Oklahoma, New Mexico, and Colorado. Findings suggest that while in-group social capital is strong, resistance to outsiders and government distrust create significant barriers to promoting more resilient communities. Our study contributes to a prolific body of literature on rural sustainability and disaster mitigation. It also develops important insights into the dynamic, contingent, and interdependent nature of social capital. We conclude with recommendations on how to promote community agency while cultivating collaborative relationships between rural communities and government institutions in the interest of rural resilience.

Keywords Rural resilience · Rural sustainability · Social capital · Disaster resilience · Climate change resilience · Southern great plains · United States

Introduction

Research on hazards and disasters has long stated that disasters are produced by human socio-economic and political conditions (Mileti, 1999; Blaikie et al., 2014). Disasters influence communities financially, environmentally, socially, and culturally (Kroll-Smith & Couch, 1991). In places facing chronic disasters like the Southern Great Plains (SGP), disaster impacts rural identities and local land use and livelihoods (Vadjunec & Sheehan, 2010), creating lasting legacies of poverty, debt, and turmoil, but also healthy skepticism, and determination from those who survive, including their offspring (Vadjunec et al., 2021). Disasters are also romanticized, to the point that “the worst hard times” of the 1930s Dust Bowl are practically mythologized into the best hard times, the stuff of legends (Egan, 2006). Acute events, coupled with other chronic events, such as reoccurring cyclical drought, have long-term impacts on individual and collective identities, as well as one’s accompanying environmental imaginaries (Jackson & Warren,

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2005). According to Sheehan and Vadjunec (2012: 927), shared experiences such as “common misery and common success” can be the glue that holds communities together, creating insider and outsider mentalities.

Further, disasters serve as “focusing events” (Birkland, 2009), which often produce inevitable change via government intervention with mixed results, including vacillating environmental perceptions and conflict along the way (Ritchie et al., 2012; Robbins, 2004). Following the Dust Bowl in the 1930s, rural communities across the Great Plains first decried government intervention programs—such as developing more sustainable agricultural practices and cattle buyback/culling initiatives (Wilcox et al., 1974). Extant research finds that government interventions designed to conserve natural resources but limit individual economic opportunities by restricting land use are highly contested in rural areas, especially for those in the agriculture industry (Freudenburg & McGinn, 1991; Straub, 2022). Following the Dust Bowl, rather than limiting community agency, education, and conservation programs instituted by the US government ultimately empowered local communities and led to better sustainability outcomes. Over time, these initiatives were looked on favorably by most rural Dust Bowl communities (Worster, 2004). We position social capital as a critical linchpin to cultivating rural resilience to issues of water scarcity and chronic disaster like drought (Ritchie and Gill, 2018; Tierney, 2014).

We argue that understanding and enriching social capital is key to promoting resilient rural livelihoods, especially in the SGP, where individuals and communities face increasing vulnerability due to the compounding risks of reoccurring cyclical drought and aquifer drawdown. Drought and water scarcity are particularly important in the context of a warming world. Climate change is projected to most negatively affect areas in the Midwest, like the SGP (Hsiang et al., 2017). Specifically, findings estimate, that at current levels of water use, rural livelihoods can only be maintained for ~35 years (Scanlon et al., 2012; Wenger et al., 2017). Whether it be chronic routine challenges or extreme events, facilitating sustainable rural livelihoods and cultivating disaster resilience will be crucial to the future of rural communities in the SGP. We argue that these goals need to be rooted in a more nuanced and local cultural context and that perceptions of trust and reciprocity are essential for the formation, maintenance, and enhancement of social capital. First, we define and conceptualize social capital as “linking,” “bridging,” and “bonding,” typologies. Second, we provide background on our SGP study area, followed by an explanation of our methods and qualitative analysis. Third, we provide the results of our emergent coding analysis using our conceptual framework for understanding rural resilience via social capital. Lastly, we discuss the implications and

importance of social capital in the context of fostering rural sustainability.

Literature Review

Social Capital

Generally, social capital operates as the relational pathways through which individuals and groups engage in social interaction and gain access to ideas, materials, and other resources they need to operate within society. In other words, unlike resources that individuals or groups possess (i.e., land, labor, and other forms of physical assets), social capital facilitates access to, and transference of, resources people need to achieve their individual and collective ends (Woolcock, 2001). Research focusing on social capital has developed substantially over the past three decades (Straub et al., 2020). The use of the term also extends across disciplinary lines to address a variety of social phenomena, issues, and outcomes. The concept of social capital moves beyond reductionist cultural and ideological explanations for social outcomes to situate understanding in an inherently structural and relational context (Woolcock, 2001). Social capital has gained significant attention in research on economic development (Coleman, 1988), disaster vulnerability and resilience (Meyer, 2018; Ritchie & Gill, 2018; Straub et al., 2020), economic inequality and poverty (Narayan, 1999; Paxton, 1999), rural resilience and sustainability (Flora & Flora, 2008), polity (Szreter, 2002), and racial and class inequalities (Waldinger, 1995). The dynamic nature of social capital as an applicable boundary concept employed in many disciplines simultaneously (Meyer, 2018) makes it especially integrative and useful for connecting diverse areas of scholarship to practical outcomes.

Conceptualizing Social Capital

Social capital emerged from the concept of human capital (Schultz, 1961; Becker, 2009)—loosely defined as the health, physical competency, training, education, and leadership skills that individuals contribute to the modernization and development of society. It quickly became apparent that human capital, without social connections or networks to transfer, communicate, and coordinate individual skills, means little in an interdependent social world: “In essence, where human capital resides in individuals, social capital resides in relationships” (Woolcock, 2001: 69). Ultimately, it is the structural relations or networks between social actors (Portes, 1998). Bourdieu (1985) popularized the term in the mid-1980s offering his more comprehensive and structured definition:

Social capital is the aggregate of the actual or potential resources which are linked to possession on a durable network of more or less institutionalized relationships of mutual acquaintance and recognition—or in other words, to membership in a group—which provides each of its members with backing of the collectively-owned capital, a credential which entitles them to credit (pp. 248–249).

This definition offers two main analytic lines through which social capital exists and operates. First, the social relations between individuals to larger social organizations or institutions through membership. Membership is dual faceted in that it requires an individual to be affiliated with a larger group, network, or institution and (importantly) must be recognized as a member of that network.

Second, that the quality and quantity of resources available to individuals through these networks is contingent upon the “credit” individuals have within the collective network (Portes, 1998). Social credit is achieved not only through membership but also through engagement in the processes of reliably transferring materials, services, or other resources to other affiliated members or as a general “store” for other members of the social association to draw upon. Bourdieu (1977) makes explicit the analytic distinction between social capital and more formalized obligatory social relationships. Expectations of trust and reciprocity are flexible and normative. Rather than strictly dictated and obligatory, social exchanges via social capital occur within contextually produced expectations of a constituent’s participation in a network of social exchange. Contributions from individuals are also culturally and contextually defined. Violating those normative expectations can result in lost trust. Loss of trust weakens individual stores of social capital and diminishes the overall reach and network of social capital within that social unit (Bourdieu, 1977; Portes, 1998). This is particularly true in tightly coupled kinship networks where perceptions of trust are relatively higher when compared to other, more loosely affiliated social associations (Paxton, 1999).

It is well understood that the initial form of social capital is bonding social capital (Portes, 1998; Putnam, 2000). These networks are forged through frequent social contact and interaction among groups that share many social, ethnic, cultural, and economic qualities. Individuals and groups connected by bonding social capital are largely homogeneous, such as in agricultural communities. Close family ties, kinship networks, and tight-knit communities—often living and working together over generations—are the most typical examples of these network configurations (Woolcock, 2001). Trust and reciprocity are extremely high in bonding social capital. Strong bonds developed through sustained

and consistent reinforcement of particular social values, cultural attitudes, and lack of variation in these factors provide frequent opportunities for social sanction and reward, distilling a very narrow yet highly accountable set of expectations for social exchange (Bourdieu, 1977).

Stack (1997) explains how isolated and tightly coupled poor, ethnic enclaves in urban neighborhoods rely intensely on bonding social capital through kinship networks and a shared sense of cultural identity to navigate social challenges rooted in race and poverty. In part, this is in response to a lack of institutional support. This is also true in distal rural communities (Straub, 2022; Straub et al., 2020). Rural communities tend to initially oppose government interventions at any institutional level (Tremblay & Dunlap, 1978), especially regarding what they see as infringements on their property rights, specifically land and water use (Freudenburg & McGinn, 1991). Bonding social capital tends to be the dominant form in small communities with a lack of social, economic, cultural, ethnic, and racial diversity. A lack of shared values with “outsiders” and intense bonds of trust among members can be detrimental to expanding those networks. The same strong ties that bind community members also serve to “bar others from access” (Portes, 1998:15). As a result, the homogeneity of individuals and communities within networks of bonding social capital means that their resources are similarly limited. The absence or weakness of formal institutions (such as banks, insurance agencies, courts, and governmental agencies) is often compensated for by the creation of informal organizations to solve routine problems (Burt, 1992; Narayan, 1999).

Bridging social capital is the second type of social capital and exists between heterogeneous groups. Diverse social and cultural backgrounds provide access to a broader and more diverse array of resources of greater quality and quantity (Granovetter, 1973). Unlike bonding social capital, investment in networks of bridging social capital are viewed by constituent members mainly as opportunities for potential access to resources themselves rather than a vested interest in the well-being of others in that network: “Their proximate reason for interaction is to engage together in a collective activity, which each value and benefits from, which they cannot achieve alone, and which is not available through the bonded networks they have” (Szreter, 2002: 576). Paradoxically, because these groups are highly diverse, diffuse, and expansive, these networks require greater maintenance of trust and reciprocity. Infrequent interaction, less commonality with other members, and a more flexible set of expectations obliges individuals and groups to reaffirm their membership on a more consistent basis. Bridging social capital is common in places with high population density and economic centers where social collaboration and exchange are not only necessary but common. Another

key distinction between bonding and bridging social capitals is that bridging social capital tends to benefit groups and individuals external to those networks while the benefits of bonding social capital tend to be more exclusive and limited (Portes, 1998; Putnam, 2000).

Bonding and bridging social capital help to explain the formation and maintenance of social networks across highly similar as well as diverse networks of individuals and communities while accounting for elements of scale. Additionally, both help to explain the difference in perceptions of trust and expectations of reciprocity among similar and dissimilar groups. However, these types are not exhaustive. The inclusion of a third type, linking social capital, “... allows us to analyze the power and influence of the patterns of social relationships in a polity” (Szreter, 2002). Linking social capital allows for the consideration of relationships characterized by power differences among network members. In this way, linking social capital can analytically capture social networks situated in social and governmental institutions (Woolcock & Narayan, 2000). The problem here is how to account for aspects of trust and reciprocity. While government institutions acquire little from specific individuals to which they provide resources to, they do require broad social trust to maintain their status (Freudenburg, 1993). In other words, to rationalize and legitimize their existence as a necessary institution, they need to hedge against perceptions and accusations of malfeasance.

Historical Context of Water and Land-Use in the Southern Great Plains (SGP)

The focal point of our study is a tri-county/tri-state area in the Southern Great Plains (SGP): Cimarron County, OK; Union County, NM; and Las Animas County, CO (Fig. 1). Our research is part of a long-term community engaged and participatory project (15+ years) on adaptation to drought and environmental perceptions of slow onset disasters (Vadjunec et al., 2022). The three counties are biophysically, economically, and demographically similar, with shared socioecological histories tied to recurrent, persistent drought, an agricultural economy, and access to “commons” resources, such as public lands and surface and groundwater. Past research in the region at the producer and household levels illustrates that the three counties have distinct but overlapping historical livelihood and land-use/land-cover trajectories (Carrasco et al., 2024), changes in land-holdings via corporatization (Vadjunec et al., 2021), and a patchwork of local, state, and federal policies that has led to differences in land and water use practices, land cover dynamics, drought response, and livelihood practices (Fagin et al., 2016; Wenger et al., 2017; Vadjunec et al., 2022).

The SGP is an agricultural epicenter for the region and the nation, the U.S. Breadbasket (Scharping, 2021). Much of the area falls within the High Plains Aquifer (HPA) and is a transition zone from the High Plains to the Southwestern Tablelands ecoregions (US EPA, 2013). The area is also susceptible to recurrent, persistent drought, most infamously

Fig. 1 The tri-county/tri-state study area in relationship to the High Plains Aquifer. Source: The Authors

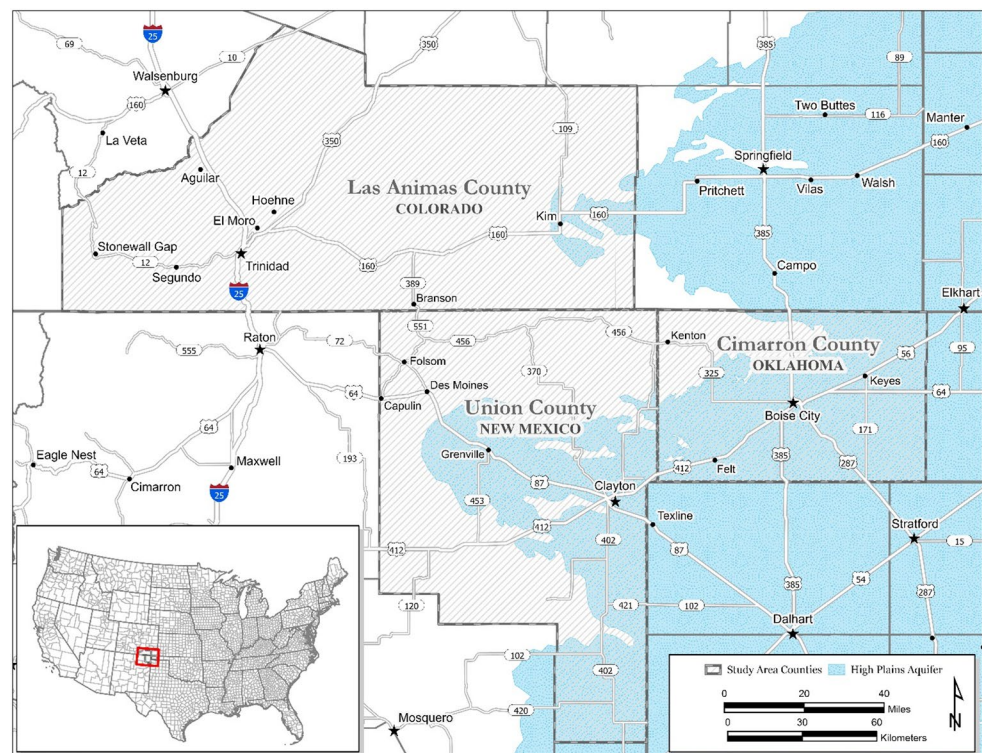


Fig. 2 Percentages of study area counties under different official drought categories, 2000 to 2022 (where D0 is abnormally dry and D4 is exceptional). Data source: Made by the authors using U.S. Drought Monitor data

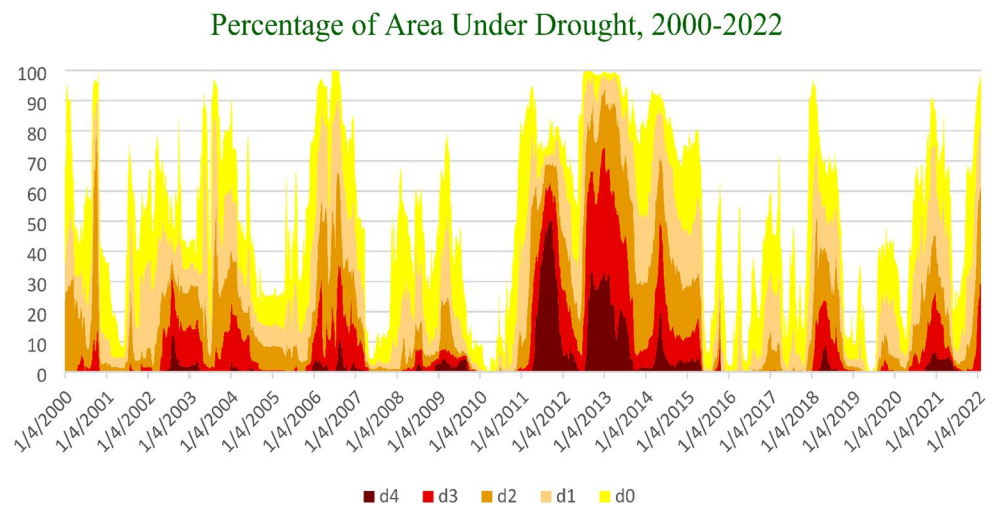


Table 1 Comparison of Tri-county/Tri-State demographic characteristics, groundwater policy, State School Land policy, and major government subsidies. Sources: U.S. Census, 2020, OWRB (2023); CSU (2023), NM OSE (2023), CLO (2023), NM State Land Office (2023), Colorado State Land Board (2023), and Environmental Working Group (2023)

	Cimarron, OK	Las Animas, CO	Union, NM
Population (2022)	2,252	14,327	3,980
Population density (individuals/km ²)	0.47	1.16	0.40
Median age	45.9	46.8	39.4
Hispanic or other minority percent	29.1%	46.1%	48.2%
Groundwater policy	Private Property/ Prior Appropriation	Public Resource/ Prior Appropriation	Public Resource/ Beneficial Use
State school land policy	Open Bidding	Variable	Linked to Deeded Property/ Closed Bidding
USDA crop insurance subsidies (1995–2021)	\$127 Million	\$11 Million	\$25 Million
USDA disaster subsidies (1995–2021)	\$66 Million	\$35 Million	\$40 Million
USDA commodity subsidies (1995–2021)	\$169 Million	\$8 Million	\$18 Million
USDA conservation subsidies (1950–2021)	\$115 Million	\$48 Million	\$21 Million

the Dust Bowl of the 1930s, but with drier conditions occurring in the 1950s (Nace & Pluhowski, 1965) and again in 2000s (Basara et al., 2013; Fig. 2). Fueled by government subsidies and other incentives (Table 1), the region has grown dependent on groundwater resources from the HPA and access to public lands to sustain and expand agricultural

practices, even during these drier than normal periods. However, the policies that govern and incentivize access to these resources are not uniform across the three counties/states, ultimately leading to differential vulnerability. Commons resources usage is also shaped by informal arrangements. Resource users often respond to these formal and informal governance structures based not only on their own awareness and comprehension of the rules but also on perceptions of resource availability within the regulatory environment (Wenger et al., 2017).

This is perhaps most evident when looking at water rights issues and public land policy. For instance, groundwater policy is typically set at the state level, though it may also be governed at the regional and local levels. In Colorado, both surface and groundwater are regarded as public resources, but constitutionally allocated by a prior appropriation system that governs who can use water, how much they may use, the purposes for which it can be used, and when it can be used (CSU, 2023). As a result, all new wells in Colorado must be permitted.

Oklahoma also allocates surface and groundwater resources based on prior appropriations. Stream water in Oklahoma is mandated as public water subject to appropriations (OWRB, 2023). Conversely, Oklahoma regards groundwater as private property, the ownership of which is based on surface ownership atop the groundwater. However, new drilling permits must be advertised locally, with an open period for public contestation, but Oklahoma well permitting is considered by many to be “wide open” (Wenger et al., 2017). This is particularly pertinent because a large portion of Cimarron County, OK, is underlain by the HPA. In Union County, NM, the HPA underlays about half of the county, and only a fraction of Las Animas County, CO (Fig. 1).

In stark contrast, New Mexico regards all surface and groundwater as public property and restricts appropriations

for beneficial use. Any use of these public waters must be permitted by the State Engineer, who must determine water availability, whether an allocation will impair existing rights, that uses align with state water conservation efforts, and that intended uses are not detrimental to the public (NM OSE, 2023). As a result of this patchwork of regulations at both the state and sub-state level, differential water management practices and concurrent land use practices exist even for individuals accessing the same resource (e.g. groundwater from the HPA).

Similarly, public land policy differs among the three states (Table 1). All three counties of our study area are a mosaic of public (local, state, and federal) and private lands. Public lands, such as U.S. Forest Service lands (including the National Grasslands) and state school lands are designated mixed-use and may be leased by private entities for a variety of purposes, such as livestock ranching, farming, and oil and gas exploration (Fagin & Wikle, 2012). While federal land policies should be uniform throughout, state land policies can differ significantly (Vadjunec & Sheehan, 2010). For example, each of the three counties maintain so-called State School Lands (aka State Trust Lands) that are leased to support and maintain common schools and higher education (CLO, 2023).

Due to historical legacy and the unique history of the state, over 20% (96,815 ha) of land in Cimarron County, OK is State School Lands. For generations, families have leased these public lands, treating them as extensions of their own property. However, in 1982, the Oklahoma State Supreme Court ruled that the leasing policy was unconstitutional, removing preferential bidding and maximum lease caps. This led to an open-bidding process, driving lease prices beyond some agriculturalists' affordability and resulting in the loss of land that families had leased for generations (Vadjunec & Sheehan, 2010). By contrast, in New Mexico lease rights are attached to deeded lands (Culp et al., 2005), after which the lessor has access to that leased land in perpetuity unless they sell the rights to the land or break the 5-year lease. Union County, NM, has a similar percentage of State School Lands as Cimarron County, OK (18% cover 179,414 ha), so these policy differences are not insignificant (Fagin et al., 2016). Colorado, on the other hand, has more variable State School Lands leasing policies. For instance, while Colorado maintains lease renewal options (with certain stipulations), a lease is not tied to deeded lands. Additionally, the Colorado State Land Board recently approved an open bidding process on a long-term lease of State School Lands in a county adjacent to Las Animas County, CO. Moreover, Colorado requires strong land management and stewardship practices on its leased lands. Nonetheless, Las Animas County, CO, shares the smallest portion of State

School Lands, which covers ~5% (67,200 ha) of the county's land area.

Research has shown that different lease policies can directly impact land stewardship practices, especially during periods of drought (e.g., Vadjunec & Sheehan, 2010; Fagin et al., 2016; Vadjunec et al., 2022). For instance, ranchers in Oklahoma have concluded that open-bidding disincentivizes good land stewardship practices during periods of climate stress. Whereas the promise of lease renewal may encourage land managers to consider long-term interests (Vadjunec & Sheehan, 2010), the lack of guarantee of lease renewal can inadvertently lead to overgrazing as producers consider short-term gains at the expense of long-term sustainability. This is further illustrated in the work of Fagin et al. (2016), who showed that rates of woody plant encroachment were higher on State School Lands in Cimarron County, OK, than School Lands in neighboring Union County, NM, and private and public lands throughout both counties.

Other policy differences have also had differential impacts on land and water usage in the three counties. In 2012, for instance, voters in Colorado approved Amendment 64 legalizing recreational marijuana (New Mexico legalized recreational marijuana in 2021 and Oklahoma legalized medical marijuana in 2018; however, our interviews focus on 2019). Not only did this legalization lead directly to a proliferation of both legal and illegal grow operations (Mitchell, 2019), it has pitted longtime agriculturalists against budding entrepreneurs, fighting over limited resources and, even, cultural identity. Additionally, towns such as Trinidad, CO, situated close to the Oklahoma, Texas, New Mexico, and Kansas borders, witnessed a surge in so-called "marijuana (and related) tourism" and a concurrent proliferation of dispensaries. Overall, there is estimated to be one dispensary for every ~350 residents in Las Animas County, the highest density of dispensaries per capita in the US, earning it the name "Weed Town, USA" (Gentile, 2018).

According to past work in the communities, Trinidad, with a population of 8,335 (USCB, ND) has a long history of being a perceived outlier to the farming and ranching community in the surrounding area. Historically, Trinidad was a robust mining community that attracted Italians and other diverse European migrants starting in the 1860s (Colorado Encyclopedia, ND). Trinidad has also been named the "Sex change capital of the world" for the pioneering work of Stanley Biber, who performed over 5,000 sex change operations in the unassuming hospital there (Brady, 2006). Lastly, it is also the historic site of the internationally famous "Drop City" artists' commune established in the 1960s (Coraghesan, 2003). For the agricultural community in Las Animas, the town exists despite the agricultural community, rather than in tandem with the surrounding community.

Following recreational marijuana legalization, Trinidad saw a large infusion of outside capital for other revitalization projects and accompanying increases in tax revenues to support vital services (Blevins & Porter, 2024). However, these changes have also fueled a surge in a transient population and corresponded with increases in panhandling and homelessness not previously experienced in the county (Albers, 2021). These tensions are further compounded by dwindling agricultural lands throughout the state and within Las Animas County. Specifically, Colorado lost an estimated 2.89 million acres of ranches and cropland between 1992 and 2006 (ECROC, 2006), a trend that continues today, as outside money moves into the region buying up acreage for recreational “ranchettes.”

For instance, in 1983 with the creation of the US Army’s Pinon Canyon Maneuver site, ~500 square miles of ranchland were taken from agriculturalists, the majority by eminent domain. The displaced agriculturalists moved out to the local regions scattered throughout our study area. Years later, a 2004 governmental report was publicly leaked that suggested that the Pinon Canyon Maneuver site would be developed into a 7 million-acre maneuver site (The Land Report, 2008). This caused an explosive backlash in the surrounding counties that spilled across borders and led to the eventual death of a national scenic byway proposal as nearby communities rallied against it for fear of even more governmental land grabbing (Sheehan & Vadjunec, 2012). Overall, land grabbing fears remain high via complex processes of gentrification, corporatization, and militarization. This has led to further tensions between local residents claiming family legacy and sense of belonging in the region and a more recent generation of powerful, wealthy, and potentially threatening “outsiders” (Blevins & Porter, 2024).

Despite these differences, these agricultural counties remain intertwined geographically, economically, and demographically. They share a rich agricultural history tied to western expansion and federal government policy, which has led to a relative homogeneity in agricultural practices (Carrasco et al., 2024). Most recently, federal livestock (e.g., Livestock Forage Program), crop (e.g., corn subsidies for ethanol), and conservation subsidies (e.g., Environmental Quality Incentives Program (EQIP) and Conservation Reserve Program (CRP) have played a role in furthering this homogenization (Table 1). Demographically, the counties have similar population densities, especially in the rural areas (even though the Trinidad “pot boom” in Las Animas County, CO slightly skews this, the rest of the county is similar). Additionally, the shared history of recurrent drought, particularly the legacy of the Dust Bowl, unites the three counties through shared hardship, loss, and resilience. This legacy was again put to the test recently, as the region experienced another severe, prolonged drought and related

agricultural disasters (see Fig. 2, and Disaster and Crop Loss subsidies, Table 1).

Methods

Data Collection

While much of our past research focused on household level changes over time and space (Fagin et al., 2016; Wenger et al., 2017; Colston et al., 2018; Vadjunec et al., 2021; Carrasco et al., 2024), we have become increasingly interested in broader aspects of community identity, conflict, and resilience. Consequently, to understand broader narratives of community resilience, over three months in the summer of 2019, we interviewed a minimum 20 key informants in each county, to the point of perceived saturation¹. This resulted in interviews with 70 total individuals, where a few were interviewed jointly, resulting in 65 total interview transcripts. Key informants were selected as community “experts” for their ability to take the long view and/or larger perspective within each community, as well as the broader region. They included a wide variety of officials, NGOs, and other traditional and nontraditional local leaders such as city, county, and state officials, extension agents, superintendents, clergy, conservation and agricultural agencies, tourism, and business incubator officials, as well as people involved in county-wide agricultural related industries (i.e., sale barns, cattlemen’s associations, feed, equipment, and supply stores, water irrigation businesses, local co-ops, etc.). Care was made to stratify interviews geographically across the counties. Interviews lasted 1–1.5 h and used a semi-structured format (IRB AS–18–24). Given the sensitive nature of the topics, our knowledge of regional antagonisms, and our extensive experience in the area, we opted for an “anonymous notes” only approach, which allowed us to speak more freely while protecting human subjects. This process generally consisted of an interviewer (who took notes) and, when possible, an additional dedicated notetaker. Digital notes were compiled while in the field, directly following the interviews, and the team triangulated them. This ensured efficacy in the capture of sentiments, gestures, and, especially in particular, direct quotes, producing over 420 pages of notes that were coded and analyzed using NVIVO software.

¹ Studies that seek to understand how many interviews are necessary to be methodologically reliable and valid focus on “saturation” (Mason, 2010; Roy et al., 2015). Saturation is a concept whereby collecting more data does not result in any new meaningful contributions to data analysis. For instance, Guest and colleagues (2006), using a sample size of 60 interviews to conduct an experiment on saturation, found that saturation was achieved after only 12 interviews.

Coding and Analysis

Conventionally, quantitative methods have dominated social science research (Black, 2006; Rod, 2009; Alise & Teddlie, 2010; Lopez-Fernandez & Molina-Azorin, 2011; Kapoulas & Mitic, 2012; Yang, 2013). However, these quantitative measurements have largely focused on the outcomes of social capital rather than the quality, strength, and perceptions of the networks themselves (Putnam, 2001). Refinement of survey instruments, questionnaires, and quantitative measures have led to an increased understanding of how social capital facilitates resource access and acquisition in a socio-economic context, but still focuses on indirect measures (Ievdokymova et al., 2020). In disaster research focused on vulnerability and resilience, quantification of social capital overwhelmingly consists of indices designed to measure volunteerism and community engagement, civic participation, organizational affiliations as behavioral indications of social capital (Cutter et al., 2010). Still others focus on trust in neighbors, communities, organizations, institutions, and government as indicators of cognitive and attitudinal aspects of social capital (Aldrich & Meyer, 2015).

While these advancements are important, a paradigm centered on rationality—widely adopted in socio-economic research—proves to be insufficient at capturing emotively driven decision-making processes. The highly sensitive nature of cultural norms and place-based identity makes the study of perceptions of social networks and willingness to engage in those networks uniquely suited to a qualitative approach to understanding economic and ecological sustainability in a rural context (Flora, 2018). Similarly, qualitative approaches in disaster contexts allow interviewees to articulate the details and nuance necessary to understand localized configurations of social capital types (Tierney, 2014; Ritchie & Gill, 2007, 2018).

Qualitative interviews were coded in two sequential phases and all interviews were coded by the first author with weekly input from the second author, including an initial comparison of a subgroup ($n=10$) in which the first and second authors coded the same interviews to establish a protocol to ensure the validity and consistency of the open coding. This was followed by continued weekly meetings with discussions and adjustments to the protocol as needed. The first phase used a deductive approach. Data were coded and organized according to the larger analytic categories closely aligning with the priorities of the larger project. These coded categories include communication networks; drought and climate change; identity, perceptions, and community; land-tenure policy; land use—land management; marijuana and hemp; tourism; and water issues and irrigation.

Specifically for this paper, we next employed inductive coding to allow the data to drive theorizing and explanation

Table 2 Emergent code frequency and percentage for Southern Great plains Study Site ($N=65$)

Emergent codes	Cimarron, OK	Las Animas, CO	Union, NM	Total
Economics	191 (22.68)	151 (20.21)	151 (20.49)	493 (21.32)
Local identity/ideology	135 (16.03)	127 (17.00)	109 (15.08)	371 (16.05)
Government relationships	122 (14.49)	119 (15.93)	109 (15.08)	350 (15.14)
Social solidarity—boundary making	108 (12.83)	75 (10.04)	92 (12.75)	275 (11.89)
Community engagement	87 (10.33)	52 (6.96)	61 (8.60)	265 (11.46)
Environmental conservation	81 (9.62)	97 (12.99)	87 (12.03)	200 (8.65)
Technology	84 (9.98)	65 (8.70)	44 (6.02)	193 (8.35)
Place attachment	14 (1.66)	40 (5.35)	41 (5.87)	95 (4.11)
Corporatization	20 (2.38)	21 (2.81)	29 (3.87)	70 (3.03)
Total emergent codes	842 (100)	747 (100)	723 (100)	2312 (100)

*Data is presented as frequency (*percentage*). Number of interviews: Cimarron ($n=22$), Las Animas ($n=21$), and Union ($n=22$) Counties

about social capital rather than an a priori assumption of community dynamics, perceptions, social behaviors, or relationships (Cope, 2010). All interviews were read first to identify potential themes that emerged from the data. Emergent themes were strategically constructed in such a way that positive, neutral, and negative valences were all captured to allow data analysis to confirm or critique extant scholarship, i.e., conceptual or theoretical explanations established in other work should not be assumed to be operate in the exact same way in this case study. Creating codes with open valences allows for expressions that confirm existing explanations while creating space for divergent explanations based on these specific data (Hesse-Biber, 2010; Tracy, 2010).

For example, interview data coded as “government relationships” could contain interviewee perceptions that favored, disdained, or were indifferent toward government agencies, officials, policies, or interventions. After identifying these themes, line by line coding was conducted to comprehensively analyze interview data (Schreier, 2012). Emergent themes relevant to this study resulted in analysis of five distinct codes: community engagement; economics; government relationships; local identity/ideology; and social solidarity—boundary making (Table 2). All five codes demonstrate close affinity with social capital typologies and illustrate the unique configurations of social capital within and across each of the three study sites. In general, local ideology and identity help shape in group-out group

dynamics that suggest how bonding social capital networks are constructed and maintained. Community engagement and social solidarity–boundary making align well with bonding social capital, with implications for understanding bridging social capital. Government relationships clearly allude to dimensions of linking social capital.

Lastly, since economic dimensions influence decision-making regarding assessing risk, disaster resilience, and promoting rural livelihoods, “economics” provides an indirect measure to understand the boundaries and overlap between all three types of social capital (Beck, 1992; Woolcock, 2001; Tierney, 2014; Straub et al., 2020). Moreover, a summary of descriptive statistics (Table 2) shows that four out of five of these are the most salient and frequent codes across these data, reinforcing the importance of social capital in understanding land-use and water scarcity issues in the SGP. These results are similar between counties, with little variation and few exceptions, the relative frequency of each code is consistent across all three study sites.

We synthesized themes into community narratives to analyze the configuration(s) of social capital in the SGP (below). First, in each subsection of the findings, we highlight similarities across study sites before parsing their differences. Direct quotes are exemplary in nature and best capture community sentiment regarding dynamics of social capital in each of the three counties. Additionally, field notes are inserted into quotes, where appropriate, to provide additional context about respondents during the interview.

Findings

Linking Social Capital – Rural Neglect and Mistrust of Government/Perceptions of Government Relationships

Understanding the relationships between government agencies and local constituencies is essential to developing sustainable rural livelihoods. Governments can assist local communities by enacting policies that encourage economic development while promoting sustainable livelihoods (Flora, 2018). They can allocate subsidies and incentives to stimulate economic growth while preserving important ecological resources (Mol et al., 2013). However, in practice, the overall efficacy of national and state policy was derided among local stakeholders in the SGP. Most respondents were also strongly resistant to new government regulation or interventions—well established feelings of distrust intensify as respondents perceive new programs and policies made by “outsiders” (at any institutional level) as further restrictions or constraints on land and water use. Most respondents view government policy as limiting economic

growth in their community while actively extracting revenue from local communities. Moreover, a widely held perception of a lack of government interest in local issues and appreciation for rural expertise was a source of frustration among participants. Broadly, local trust in governmental bodies and agencies is low among interview respondents, precipitating a lack of linking social capital.

Foundationally, respondent interviews overwhelmingly demonstrate a lack of trust in the ability and will of state and federal governments to represent and serve local interests. These perceptions are predicated on three main factors: geographic distance, population size, and political-economic influence. Animosity and distrust toward federal and state government is most pronounced in Cimarron County, where they rank last in Oklahoma and 3,034th of 3,143 for population by county across the United States (US Census, 2020):

A lot of the times we’re left in the cold here [by the Oklahoma government], because of the population numbers, and the distance we have to the Capital. It’s logical that Tulsa and Oklahoma City areas have more representation (Cimarron County, OK).

While logical, local antagonism also feels deeply personal to interviewees. Many respondents described how their communities have been “forgotten by the state” and are seen as an unwanted or neglected “stepchild” relative to other counties in Oklahoma. This sentiment is not exclusive to Oklahoma. A respondent in Las Animas County, CO describes state negligence toward their local community:

One of the challenges for this community [which, made her tone of voice and expression more emotional] is the lack of political will to bring resources for those who need them the most. (Las Animas County, CO).

Ultimately, distrust toward government officials is rooted in a perceived lack of understanding (or interest) about local needs. Interviewees consistently talk about how “one-size fits all” approaches to land management and water use ignore local needs and context:

There are no problems with the other states, but the Oklahoma government wants to regulate farming and ranching here from Oklahoma City, and instead of doing regulations based on what works here, they ignore the local needs. No state officials come and see how things are done here. They cannot make rules for everyone and force them to fit everywhere (Cimarron County, OK).

For respondents, a nuanced approach to considering local conditions is absent from government decision-making causing many residents to feel unheard, excluded, and disempowered by government representatives who are supposed to act on their behalf. Lack of control over resource (land/water) use was a substantial concern among interview participants and property owners.

[Interviewee commented that there's a lot of ignorance in Oklahoma City and in Washington, D.C. about what happens here] We need our farming and ranching to survive, and all the discussions about the new farm bill are crazy debates that exclude our reality here (Cimarron County, OK).

Frustrations that arise from the decision-makers excluding local voices was compounded by perceived political indifference to community feedback about how ineffective policy is once enacted. For example, even when political and legal measures are taken to confront out of touch policies, interviewees still feel their perspective is disregarded or ignored:

We didn't get a lot of help from our senators, as they are extremely liberals (sic.), and don't understand our land use. Our representatives don't listen to us, and they just see pictures of animals, ignoring the needs we have here, and taking our acres...No action was tak[en] after those opposition efforts... (Union County, NM).

This interviewee also alluded to wildlife and habitat protections for endangered species, offering documents of opposition and lawsuits by Union County from 2013, 2014, and 2015. This local office (along with other counties) filed the resolution from 2013. Many local landowners opposed these measures as liberal agenda setting out of touch with local needs, values, and traditions as it pertains to land use.

None of these issues are new but are a product of historical relations between rural communities and the governments which serve them. A history of state land seizures and management across all three states has embedded a general distrust of state government into the local culture. Cimarron County, OK, for example, has a long history of state land ownership qualified as "school lands." A relationship that, according to Cimarron County residents, benefits the state at the expense of the local economy and rural livelihoods:

Money from the state school land goes to a general fund of the state [emphasis in the original]. The rent for our land is not money that comes back to the county, we don't get anything good of that deal. The

biggest concern we have right now for taxes is that we have two thousand people in the county, and a lot of vacant land, no people living here and paying taxes to benefit schools and roads (Cimarron County, OK).

Water rights were significant points of contention for local landowners in Colorado. While land rights in New Mexico and Oklahoma guarantee rights to groundwater, Colorado's water (which is primarily drawn from surface water in lakes, rivers, and streams) is owned and managed by the State.

When someone buys land, sometimes they assume that they can do whatever they want, so one of the concerns (sic.) is making sure that people understand that the water is owned and managed by federal, state, and municipal governments. No public citizen owns water (Las Animas County, CO).

A government monopoly over the distribution of water causes community friction, not only between communities and government agents, but also within communities. Water appropriations follow a historical precedence model that prioritizes duration of tenure and size of acreage making increases in water appropriations for newer or smaller landowners difficult to obtain. Moreover, soil and crop diversity in Colorado make a one-size-fits-all approach to water appropriations impractical. According to respondents, because larger landowners have disproportionate power and influence with state decision-makers, public calls to reform water appropriations policy ring hollow.

Rural water issues are compounded by urbanization. The growth of cities like Denver and Oklahoma City requires more water to sustain growing populations. Large urban municipalities with political and economic influence are increasingly pressuring state-level appropriations officials to allocate more water to meet this demand. Increased demand for permanent residents collides with the tourism industry, which relies heavily on wilderness imagery of pristine lakes and picturesque snow-covered mountains to attract tourism:

Something that I hate about... Colorado is this image of a lot of water, you always see touristic attractions like skiing, lakes, beautiful green scenic pictures. Colorado doesn't have water! Yes, we have rivers, but we don't own water. Colorado should be advertising in a more realistic way, with biking and hiking attractions where you also appreciate drier areas. Colorado Springs is buying water, Denver is buying water, everybody wants everybody's water, that's not realistic (Las Animas County, CO).

While local antagonism for government, politicians, and one-size-fits-all programs is prevalent in the discourse, one bright spot does emerge. Respondents did comment on the positive relationships they have with Extension Agents in their communities:

The OSU extension office is doing a great job here, we're glad to have their research...The amount of agriculture we have here is enormous compared to the number of people, we need the extension office and science in general to focus more on educating (Cimarron County, OK).

Extension Agents work with land-grant institutions to provide knowledge about emergent technologies, assess agricultural impacts from events like droughts and floods, and educate locals on best practices to help them improve their ranching and farming operations. Often, these agents have long-standing relationships with communities and help build them by organizing local agricultural cooperatives.

Whether it be government management of surface water resources and non-contextual appropriations in Colorado, state land ownership of 20% of county lands in Oklahoma funding surplus discretionary budgets in Oklahoma City, or ground-metered regulation and interstate pressures influencing policy in New Mexico, rural communities share common frustrations with how the government agencies constrain and limit land use and water management across the study region. Interviewees articulate a long historical legacy characterized by a lack of rural interests represented in the political apparatuses at the federal, state, and local levels. An ever-increasing demand for water from growing populations in cities, coupled with the increasing frequency and severity of drought brought on by climate change, further strain these resources. Ultimately, all these factors combine to further marginalize the rural communities struggling to preserve their way of life in the SGP.

Bridging Social Capital – Demographic Change and Lack of Economic Diversity

Extensive networks of social exchange characterized by educational, cultural, and financial diversity are essential for rural sustainability (Flora, 2018). Varied types of expertise - such as local knowledge, formal education, and technical proficiency - create robust opportunities that communities can draw upon in order to solve routine problems, increase the efficacy and efficiency of social processes, and mitigate the adverse effects of crises (Tierney, 2014). Cultural diversity allows for a polyvalent approach to understanding complex issues while encouraging the development of innovative solutions supported by a broader assortment of

community members (Swidler, 1986; Woolcock, 2001). Cultural competency (or at least tolerance) can also foster diverse and integrated communities, increase social interactions and exchange, and attract newcomers (Tuttle, 2020). Lastly, economic diversity promotes resilience and attenuates vulnerabilities that typify single-sector economies. This is particularly true in a rural context. Heavily investing (and sometimes exclusively) in extractive industries can result in boom-and-bust cycles—a temporary economic boom that results in economic collapse once the resource is exhausted or other economic factors incentivize businesses to leave (Erikson, 1976; Cutter et al., 2003; Flora, 2018). Additionally, investing in a single-sector economy over an extended period has been shown to constrain alternative development opportunities, deepening community reliance on dominant industries and, therefore, increasing community vulnerability (Gramling & Freudenburg, 1996).

Robust networks of bridging social capital encourage educational, cultural, and financial diversity by giving members of that network greater access to resources, knowledge, and skills of increased quality and quantity. According to analysis, bridging social capital in the SGP is deficient and diminishing. Interviewees described a declining population characterized by outmigration of young people. Coupled with demographic change and economic vulnerability is a diminished interest in public participation in local organizations.

In general, interviewees from Las Animas County have mixed feelings toward the future of their communities. They observe an overall increase in their population and diversity in their communities while at the same time suggesting that younger generations that grew up in their communities, and others in rural Colorado, are not returning after college. This they attribute to two burgeoning industries: tourism and hemp. A recent policy change has introduced new opportunities for economic diversification and growth. The picturesque landscape is seen as a primary economic driver of the local economy, attracting a variety of different tourists interested in hiking, camping, and dude ranching experiences:

During fall of 2017, the city along with Parks and Recreation, Public Lands, Forest Service, Parks and Wildlife of Colorado purchased in a collaborative way the Fisher's Peak Mountain. The idea behind this investment is to have a public recreational area. We own that property, but we've never been able to access to it. Most of legislators have a conservation approach, and they do not want to make any developments there, but keep the land for biking and hiking trails, hunting, and many other possibilities... (Las Animas County, CO).

In 2020, Fishers Peak State Park was created through that innovative partnership. Consequently, an influx of tourists has had a cascading effect. Growth in tourism has incentivized infrastructure development and attracted investment from businesses in the service industry, providing jobs and elevating tax revenue and public services in places like Trinidad, CO. Similarly, recent changes in state law have introduced hemp and marijuana as cash crops to Colorado. These industries have been a boon to the local economy:

Before the recreational marijuana, the community was very depressed, so it brought more money and revitalization for the town; a lot of places have been rented to bring new businesses and population; earlier you used to go to Walmart and know everybody, now there are many new faces (Las Animas County, CO).

Despite economic growth, respondents expressed concerns about the potential vulnerabilities specific to marijuana and hemp. First, the rapidly increasing population has left a great need for educational reform and expansion. “[W]ith eighty kids in one class...” many parents are electing to homeschool their children, limiting their social interaction with others and insulating them within their small communities. According to one participant, the increase in tax revenue attributable to marijuana and hemp has not been allocated to the school system that is trying to accommodate an influx of new students. Additionally, as American culture begins to largely accept (or at least tolerate) marijuana legalization and other states around the country witness the dramatic uptick in revenue generated from taxes, Colorado faces increasing economic competition that could leave them vulnerable to a boom-and-bust cycle. This threat looms large given recent changes to marijuana legislation in neighboring Oklahoma in 2018 and New Mexico in 2021. Many locals are keenly aware of this given the boom-and-bust industries of the past in this area. One respondent commented that when she was a little girl, she witnessed a particular progression in boom-and-bust cycles in her community. Coal and natural gas came and went. In her mind, marijuana is just the next in a long line of temporary economic booms.

Overwhelmingly, respondents in Cimarron County, OK, and Union County, NM, have a different perspective on the future of their communities than interviewees in Las Animas County, CO. Respondents discuss population decline as a key area of concern for their communities. Here, a variety of commonalities exist across interviewee narratives, best exemplified by a resident in Boise City, OK: “[We are a] farming and ranching community, there are not so many opportunities for young people to come or stay here, and there are not opportunities for incomers.” A lack of job

opportunities (particularly those that pay well) makes it difficult to attract educated, highly skilled individuals to their communities. Combined with a lack of local higher education institutions, younger generations who leave to pursue a college degree do not return. This poses a significant vulnerability in communities that are reliant on labor-intensive industries with a high rate of injury, like agriculture and ranching. Moreover, as these folks age, they increasingly require care from others. Something these communities can scarcely provide as this resident of Clayton, NM, attests:

Right now, the population of Clayton is like 2000 people. Our transportation records show that we transported about 1500 people during 2018. Before providing this service, they did a survey at the grocery store, people expressed their unfulfilled needs, and transportation to health care provider appeared at the top of the list. Another need in town is child day care, which they haven’t been able to provide yet (Union County, NM).

Clearly, communities near Clayton, NM are receptive and attentive to changing community needs – particularly those associated with a rapidly aging population. However, this attention is limited in its consistency and focus. According to respondents, across the region, there are decreasing rates of engagement in community organizations. Associations like the Rotary Club, 4 H Club, Future Farmers of America (FFA), Women’s groups, and church groups were mentioned regularly by participants as key to community health and wellbeing. They serve as places to engage with a variety of different community members, address community problems, and foster stronger community relationships. However, while these clubs have been historically important, community participation has been in decline: “Chamber of Commerce exists, but I wouldn’t call it active, and there’s no Main Street association in town” (Cimarron County, OK). Most often, respondents discussed how church organizations and others (most notably the Rotary Club) are tremendous assets in times of crisis such as blizzards, fires, and floods—providing labor, food, shelter, and community support. While important sources of community disaster resilience, the lack of consistent engagement from members of the community in these organizations during normal times inhibits the development of bridging social capital.

By far the most significant organizations to sustain consistent community engagement are those oriented around children. FFA, 4 H Club, and church organizations provide places for families to interact and build lasting relationships. However, given the outmigration of younger populations, the intergenerational sustainability of these organizations is

questionable. By moving away, children break the intergenerational cycle of investment and reinvestment in intracommunity social exchange. Compounding this issue is the lack of in-migration to replace those that leave.

Challenges arising from a lack of economic diversity precipitate and contribute to demographic and population changes, exacerbating vulnerability. Few businesses limit opportunities to gather in public spaces. Less frequent interaction leads to little community investment. One indicator is declining community participation in community organizations. These dynamics make it difficult for local rural communities to build and maintain sustainable livelihoods. Culturally and practically, this means the decline of traditional family farms creates vacancies and opportunities for another growing area of community concern: the encroachment of “outsiders.”

Bonding Social Capital – The Perceived Problem of “Outsiders” and Community Insulation

Despite population decline and an overall lack of economic opportunities, interviews across the three counties emphasized the tight knit bonds among local families and community members. Many of these networks consist of families who have lived in these communities for years, if not generations. However, this social intimacy seems to make them resistant to welcoming incomers they are not familiar with or do not share common values or lifestyles. The specific term “outsiders” was used frequently across all three study sites. Typically referred to in a pejorative sense or tone, “outsiders” are broadly described as adhering to a different set of values, being opportunistic, and contributing little (socially, economically, or environmentally) to the community.

Participants in Las Animas County focus significantly on concerns related to the “type of people” attracted by the emerging industries of tourism and marijuana. According to respondents, making Fishers Peak a public space has attracted a large vagrant population, leading to perceptions of a rise in crime and deviants in the community. Likewise, participants worry about the transient populations travelling to the area to purchase marijuana:

Some of the negative effects of marijuana is that we have more vandalism, we see it here at the lake with the graffiti. Theft has increased in town, and the crime and violence rates are going up, as well as the homeless and traveler population; there are gossips about homeless organized groups stealing cars outside of Walmart, but I cannot confirm that (Las Animas County, CO).

Even when incomers do not carry differentiating markers in terms of appearance, culture, or lifestyle, it can be difficult for them to integrate into the broader agricultural community. Some respondents, who are relatively new to the area, discussed the difficulty in being considered part of the community and escaping the label of “outsider,” as this resident suggests when describing their community:

Friendly, depends on the lifestyle of the incomers, people can be laid back. Everybody knows everybody, but it takes time to do things here. It took some time... to stop feeling like an outsider. (Cimarron County, OK).

Hesitation towards outsiders extends to leadership positions in the community as well: “She brought that office back to life, now there’s a lot of hesitation about bringing someone to that office. People don’t want someone from another place, they want a local in that position.” Across the region, respondents also lament about how a shrinking local economy consisting primarily of agriculture and ranching operations is being eroded by an additional factor: absentee land ownership and increasing corporatization. Here, land—as the most crucial resource culturally and economically—is being systematically acquired by wealthy “outsiders” who contribute little to the local economy, capitalize on vulnerable farms on the edge of collapse, leveraging political influence to capture vital resources like water rights (in Colorado specifically), and utilizing their large businesses to avoid paying taxes. These dynamics are best summarized by this resident in Union County, NM:

Right now, we have a lot of absentee Texas landowners, and many run summer yearling [cattle] operations, that means that the tax revenue is only for [25%] of the year. These are people that are not in the land 100% of the time, they hire workers, and the guys working the land don’t care about it as much as a landowner. Then you have [local] people living in their land, running their cattle, doing their operations all year, and paying more taxes. The land prices keep going up because absentee landowners are willing to pay for it and have other economic resources... Usually the big rancher or farmer buys land, but don’t bring their family or new people. The problem with their families not living here is that they usually don’t consume local, and so they don’t contribute to the economy and taxes. If the landowner brings family, usually the children are homeschooled and don’t participate in community. “You’d better like rural America if you live here”. There are some challenges and dilemmas when helping outsiders or absentee landowners. Big farmers

know how to work the system...Some of the legal tricks is to have their own accountants who help them to break down the land to apply several times to these [government] programs. Ten years ago, the maximum a farmer got was \$250,000, now that limit is elevated. These guys [referring to big ranchers and farmers] are changing agriculture so much because they have diverse operations, and don't mind about being cost effective, but [it's] about market domination... eventually the big guys will buy it all, we're going to work for them while they get richer.

The constant assault from “outsiders” makes these rural communities feel they lack control over their community, their land, and their way of life. Resistance to outsiders also extends to government programs to modernize farming practices in the interest of sustainability. However, the governmental approach is one of imposition rather than collaboration, something resented by local communities:

More involvement of the public is necessary, instead of having scientists telling you how do things and imposing, it's important to have the citizen understand why certain decisions are for their own good (Union County, NM).

Here, key informants feel “the government” and other experts patronize rural people and treat them with condescension.

Discussion and Conclusion

For state and national authorities, ecological problems and their solutions are often narrowly conceptualized through a biological and politico-economic lens (Tierney, 2014; Cutter, 2016; Flora, 2018; Ritchie & Gill, 2018; Rodriguez et al., 2018). Our study builds upon a legacy of social science research that argues for social relations as a critical focus for social and political attention in the context of promoting sustainable livelihoods and fostering disaster resilience. All three types of social capital are essential for community resilience and rural sustainability (Flora, 2018; Tierney, 2019). We focused on crucial social dimensions that directly affect (and are affected by) issues related to land use and development, economic development, government policy, and long-term sustainability in the SGP. Our findings contribute to a burgeoning literature on the importance of social capital as a linchpin in community disaster resilience (Aldrich and Meyer, 2015; Ritchie & Gill, 2018; Tierney, 2019) and rural sustainability (Flora et al., 2005; Flora & Flora, 2008; Flora, 2018). Both are key areas of concern for the region given their proclivity for drought, the precarity of the High Plains

Aquifer, and the land-intensive nature of rural life. Additionally, they affirm scholarship that indicated diminished social capital can precipitate loss spirals in other community resources such as financial capital (Ritchie, 2012). Further, we highlight the dynamic, iterative, contingent, and interactive nature of different forms of social capital—in that deficits in one or more expansive forms (linking and bridging) can trigger and incentivize investment and reliance on bonding social capital (Straub et al., 2020; Straub, 2022).

This study is limited in that it deals with cognitive and attitudinal dimensions of social capital. While culture and collective perceptions are crucial to understanding how social capital is viewed and utilized (or not) by participants, it lacks quantitative measurement of strength. As this study is cross-sectional, it is also limited in its ability to explain changes in perceptions over time. Further, while the questions and structure build from past understandings of complex land use and livelihood dynamics from our previous research at the household level, we recognize the importance of the broader community level understandings unearthed through broader qualitative analysis. Consequently, we focused on local and regional leaders and as such our findings are select and limited, but from an important key sample population. Future studies should incorporate both quantitative measures and longitudinal studies across households and communities to better understand aggregate and temporal indicators of social capital.

Practically, this study serves as a diagnostic tool to plan strategic actions or tactical interventions to improve working relationships within communities, across community or regional contexts, and between local communities and government agencies. Bolstering all these forms of social capital will provide the social context and local dispositions toward outsiders to encourage sustainability, improve the reception of government programs and interventions, and improve the overall social, financial, and political relationships for rural communities in the SGP.

Strong networks of linking social capital facilitate political engagement and collaboration between rural spaces that have the potential to positively impact rural livelihoods. They also open channels through which rural communities can gain access to government programs, funding, and incentives that stimulate economic growth and promote sustainability. Overall, relationships between rural communities and “government” entities are strained in the SGP, especially regarding public land and water issues (Tremblay & Dunlap, 1978; Freudenburg & McGinn, 1991). We note some tension in the use of the generic term “government” used by many of the key informants. While many of the interviewees were from or worked closely with government agencies themselves, “government” was often, but not always, conceptualized by respondents as “big [state and/or

federal] and/or intrusive government,” rather than “local” or “useful” government. Further, “big government” officials, such as an FSA representative or state level agricultural extensionist might be seen as an “insider” given their salience and status in the community, their origin from a similar farming community, their utility, and/or their length of time in the community. This fuzzy discourse illustrates the abstract nature of insider/outsider tensions that need to be addressed to create more robust community-government partnerships in the SGP. It also indicates access into these communities via shared interests, working towards a common good, and/or support for a rural agricultural lifestyle.

Perceptions of a lack of representation and interest in rural community needs in Oklahoma and New Mexico causes community resentment and suspicion of government institutions and agencies (Straub et al., 2020; Straub, 2022). Likewise in Colorado, state control over water rights (in particular) and the decisions made regarding access to this crucial resource made residents feel that state appropriations of water are out of touch with local context and privilege those with political influence (Tremblay & Dunlap, 1978; Freudenburg & McGinn, 1991). As urban areas continue to grow, allocations of water to these places (coupled with limitations imposed on rural spaces) made residents feel neglected, forgotten, and unheard, causing distrust and frustration toward federal and state politicians. Respondents indicated that they feel increasing pressures from external forces (in this case “government”) that run in direct opposition to rural livelihoods, represented as an encroachment on individual rights, leaving little opportunity for local input into decisions about how they manage their land (Freudenburg & McGinn, 1991).

Clearly, a more collaborative approach is valued by local leaders and landowners. In Colorado, state initiatives coupled with local decision-making led to the creation of a state park and a steady source of tourism revenue, while at the same time causing controversy for rural residents who disagree with local cannabis policies. For landowners, local state Extension Agents often fill this role, working collaboratively with local communities. Co-ops are crucial places for consistent social exchange, increasing both bridging and bonding social capitals among community stakeholders. Unfortunately, state funding for university extension programs has been in decline. In Oklahoma, for example, the number of extension agents was cut by 33% in 2018, reducing resources, revenue, and increasing workloads (Straub, 2022) so that extension agents now spend less time in communities, squandering one of the few positive relationships between rural spaces and the government and diminishing linking social capital in the three counties.

All study sites face challenges maintaining current networks of bridging social capital and significant barriers for

expanding them. Respondents are pessimistic about their future and consistently discuss the lack of job opportunities and a dwindling population as barriers for attracting newcomers with higher levels of education and those with special skills. Additionally, local youths rarely return after pursuing a post-secondary education outside their communities. This deprives these communities of highly skilled individuals who could potentially diversify and revitalize the local economy. Second, it reduces the overall population, due to outmigration and the mortality rate for older generations. Third, the community loses younger generations that would serve in community roles like emergency management, volunteering, leadership, and public service—forcing older residents to retain these positions out of loyalty to the community despite their decreasing ability to respond effectively to community crises. Last, it causes a dramatic shift in the demographic composition of the community. With little prospect of attracting newcomers, these combined social factors increase the social, economic, health, and disaster related vulnerabilities of these communities.

While participants from Oklahoma and New Mexico describe a trend of economic decline, those in Colorado are more optimistic due to developments in tourism and marijuana. However, as more states decriminalize, regulate, and legalize marijuana use, Colorado faces increasing economic competition that could leave it vulnerable to a boom-and-bust cycle. Informants drew on their own experiences with past boom-and-bust industries like coal and natural gas extraction to identify this single-sector economic vulnerability.

Paradoxically, some participants commented on the encroachment of outsiders—transient populations, corporations, and absentee landowners—who do not look like them, do not share their values, and are presumed to contribute little to the local economy or community. That said, the Rotary Club, 4 H, FFA, and church organizations continue to contribute to positive aspects of bridging social capital. These organizations provide opportunities for social interaction and exchange among community members; however, they seem to be utilized inconsistently during intermittent crises (natural hazard events), making maintenance of bridging social capital networks incredibly difficult.

In contrast to linking and bridging social capitals, bonding social capital is quite strong. Participants frequently reported families helping one another in times of need (especially during a crisis). However, bonding social capital has a “dark side” (Woolcock, 2001). While trust among local families is high, this implies that in-network members look at outside-network members with, at best, skepticism, and at worst, with distrust and suspicion. Effectively, strong bonding social capital insulates the community from newcomers (people who would move into these communities) and

outsiders (those who interact with these communities like federal and government officials, scientists, and tourists) who could broaden the array and quality of the resources and skills they would have access to. This is especially the case for absentee landowners. Implicit in this is how local farmers and ranchers view their relationship with the land. The subtext implies that corporations see it as a resource to exploit to make money while small farmers view themselves as stewards of the land that their families have tended for generations. The lack of engagement and participation on the part of absentee landowners confirms local perceptions. Respondents describe an adversarial relationship characterized by natural resource extraction, economic exploitation, lack of investment in the community, a lack of interest in or respect for the traditional rural livelihoods, and intentional leverage of political and financial power to systematically acquire the land from local communities.

Based on these findings, we suggest that government efforts focus on addressing the cultural perceptions of government interventions in rural spaces. Specifically, we argue that general distrust of government and outsiders has informed bonding social capital and needs to be acknowledged and addressed to move forward in community-government partnerships. Much can be addressed by regular interactions, acknowledging past actions and inequities, living in, and/or engaging with the concerns of local communities to enhance their perception of their role in decision-making (as opposed to top-down imposition of policy) would likely help rebuild trust in institutions (Freudenburg & McGinn, 1991; Straub et al., 2020; Straub, 2022).

We also suggest that controversies regarding the perceived fairness of both public (state and federal) land and (surface and ground) water use governance across states and counties need to be addressed to avoid ‘tragedy of the commons’ situations (Hardin, 1968), and build trust for stronger community-government relationships (Vadjunec & Sheehan, 2010; Fagin et al., 2016; Wenger et al., 2017). Given the sparse populations of these communities, there are generally few opportunities in their down-states in which to garner true change through the initiation of legislation change via traditional ballot measures. As Ostrom (2015) illustrates, for successful commons management, communities need to have an active voice and control in the process. In lieu of official federal, state, and/or local level changes, mechanisms should be developed to better support informal governance, such as through adaptive co-management of resources (Vadjunec et al., 2022). By disrupting historical power dynamics, programs that support informal governance arrangements can help to increase bonding, bridging, and linking social capital in these communities (Straub et al., 2020).

Top-down governmental approaches are often reductive, lack nuance, and ignore local voices. A more direct way to remedy these weaknesses is to reinvest in extension programs. Overall, extension agents are viewed as valuable assets and resources to these communities. It seems curious that state governments have broadly reduced funding to these crucial liaisons among government, education, technology, and community building in these spaces, especially given the historical successes of on-the-ground programs designed to solve critical problems in the same area (i.e., the CRP program and post-Dust Bowl education programs). As opposed to the distant, disconnected, bureaucratic, east coast agency (i.e., United States Department of Agriculture (USDA), United States Food and Drug Administration (FDA), etc.), extension agents are the physical embodiment of government outreach, communication, and collaboration, embedding themselves in communities on a consistent basis. They also serve as crucial organizers of community cooperatives, facilitating regular community interaction, collective problem solving and support networks, and mediating local conflicts. Taken together, extension agents enhance both linking and bridging social capitals.

Given the precarity of rural livelihoods, particularly in the SGP, it is essential to focus not only on economic or conservancy efforts, but on improving social relationships. The strength and quality of these relationships are shaped by local culture and past experience (Straub et al., 2020; Straub, 2022). A culture of rural stoicism combined with a history of top-down, one-size-fits-all government interventions deprive local communities of participation in and control over decisions made about their lifestyles and the land they have tended, often for generations. By improving social relationships, addressing issues of trust, valuing local knowledge and context, and working collaboratively to solve rural challenges, government assistance will not only be more readily received but stand a better chance of producing better outcomes for rural communities in the SGP and beyond.

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Data Availability No datasets were generated or analysed during the current study.

Declarations

Competing Interests The authors declare no competing interests.

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References

- Albers, G. (2021). *Trinidad mayor shares ups, downs of legalized marijuana sales*. Las Vegas Optic. Oct. 5., 2021. https://www.lasvegasoptic.com/news/community/trinidad-mayor-shares-ups-downs-of-legalized-marijuana-sales/article_df3ff3ee-25fe-11ec-90b9-434f3913d2fc.html
- Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American Behavioral Scientist*, 59(2), 254–269.
- Alise, M. A., & Teddlie, C. (2010). A continuation of the paradigm wars? Prevalence rates of methodological approaches across the social/behavioral sciences. *Journal of Mixed Methods Research*, 4(2), 103–126.
- Basara, J.B., Maybourn, J.N., Peirano, C.M., Tate, J.E., Brown, P.J., Hoey, J.D., & Smith, B.R. (2013). Drought and associated impacts in the great plains of the United States—a review. *International Journal of Geosciences*, 4(6A2). <https://doi.org/10.4236/ijg.2013.46A2009>
- Beck, U. (1992). *Risk society: Towards a new modernity*. Sage.
- Becker, G. S. (2009). *Human capital: A theoretical and empirical analysis, with special reference to education*. University of Chicago Press.
- Birkland, T. A. (2009). Disasters, lessons learned, and fantasy documents. *Journal of Contingencies and Crisis Management*, 17(3), 146–156.
- Black, I. (2006). The presentation of interpretivist research. *Qualitative Market Research: An International Journal*, 9(4), 319–324.
- Blaikie, P., Cannon, T., Davis, I., & Wisner, B. (2014). *At risk: natural hazards, people's vulnerability and disasters*. Routledge.
- Blevins, J., & Porter, G. (2024). *More than \$150 M Has Been Invested in Trinidad. Has it Worked?* The Colorado Sun. Feb. 4, 2024. <https://coloradosun.com/2024/02/04/trinidad-investment-culture-business-stalls/>
- Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge.
- Bourdieu, P. (1985). Forms of capital. In: J. G. Richardson (Ed.), *Handbook of theory and research for sociology of education* (pp. 241–258). Greenwood.
- Brady, J. (2006). Sex-change pioneer, Dr. Stanley Biber. NPR 1/19/2006. <https://www.npr.org/templates/story/story.php?storyId=5163832> Accessed 3/12/24.
- Burt, R. S. (1992). *Structural holes*. Harvard University Press.
- Carrasco, B., Vadjunec, J. M., & Fagin, T. D. (2024). Lessons from the archives: Understanding Historical Agricultural Change in the Southern. *Great Plains Land*, 13(2), 196. <https://doi.org/10.3390/land13020196>
- Coraghessan, B.T. (2003). *Drop city*. Viking.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, 95–120.
- Colorado State University (CSU) (2023). Colorado Water Knowledge. <https://waterknowledge.colostate.edu/water-management-administration/water-rights/> Accessed 12/19/2023.
- Colorado State Land Board (2023). State Land Board Website. <https://slb.colorado.gov/>. Accessed 12/19/2023.
- Colston, N. M., Vadjunec, J. M., & Fagin, T. (2018). It is always dry here: Examining perceptions about drought and climate change in the southern high plains. *Environmental Communication*, 13(7), 958–974. <https://doi.org/10.1080/17524032.2018.1536071>
- Commissioners of the Land Office (CLO) State of Oklahoma. (2023). <https://clo.ok.gov/Accessed12/19/2023>
- Cope, M. (2010). Coding transcripts and diaries. In: N. Clifford, S. French, & G. Valentine (Eds.), *Key methods in geography* (pp. 440–452). Sage.
- Culp, P., Conradi, D. B., & Tuell, C. C. (2005). *Trust land in the American West: A legal overview and policy assessment*. Lincoln Institute of Land Policy.
- Cutter, S. L. (2016). Resilience to what? Resilience for whom? *The Geographical Journal*, 182(2), 110–113.
- Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003). Social vulnerability to environmental hazards. *Social Science Quarterly*, 84(2), 242–261.
- Cutter, S. L., Burton, C. G., & Emrich, C. T. (2010). Disaster resilience indicators for benchmarking baseline conditions. *Journal of Homeland Security and Emergency Management*, 7(1).
- Egan, T. (2006). *The worst hard time: The untold story of those who survived the great American Dust Bowl*. Houghton Mifflin Harcourt.
- Environment Colorado Research and Policy Center (ECROC) (2006). *Losing Ground: Colorado's Vanishing Agricultural Landscape*. https://publicinterestnetwork.org/wp-content/uploads/2012/02/Losing_Ground.pdf
- Environmental Working Group (EWG) (2023). Farm Subsidies Database. <https://farm.ewg.org/Accessed12/19/2023>
- Erikson, K. (1976). *Everything in its path*. Simon & Schuster.
- Fagin, T. D., & Wikle, T. A. (2012). Lands of meat and oil: Conservation, Resource Management, and America's National grasslands. *FOCUS on Geography*, 55(2), 41–47.
- Fagin, T. D., Vadjunec, J. M., Colston, N. M., Wenger, K., & Graham, A. (2016). Land tenure and landscape change: a comparison of public-private lands in the Southern High Plains. *Ecological Processes*. 5: 12. <https://doi.org/10.1186/s13717-016-0056-2>
- Flora, C. B. (2018). *Rural communities: Legacy + change*. Routledge.
- Flora, C. B., & Flora, J. (2008). *Rural Communities: Legacy + Change 4th edition*. Westview Press.
- Flora, C. B., Emery, M., Fey, S., & Bregendahl, C. (2005). *Community capitals: A tool for evaluating strategic interventions and projects*. Ames, IA: North Central Regional Center for Rural Development. Retrieved on February 27, 2007.
- Freudenburg, W. R. (1993). Risk and recreancy: Weber, the division of labor, and the rationality of risk perceptions. *Social Forces*, 71(4), 909–932.

- Freudenburg, W., & McGinn, B. (1991). Rural-urban difference in environmental concern: A closer look. *Sociological Inquiry*, 61(2), 167–198.
- Gentile, J. (2018). Weed Town, USA: How Marijuana Rescued the Town of Trinidad, Colorado. *High Times* 6/2/2018. Accessed 12/26/23 <https://hightimes.com/culture/weed-town-usa-how-marijuana-rescued-town-trinidad-colorado/>
- Gramling, R., & Freudenburg, W. (1996). Crude, coppertone, and the coast: Developmental channelization and constraint of alternative development opportunities. *Society & Natural Resources*, 9(5), 483–506.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360–1380.
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18(1), 59–82.
- Hardin, G. (1968). The tragedy of the commons. The population problem has no technical solution; it requires a fundamental extension in morality. *Science*, 162(3859), 1243–1248.
- Hesse-Biber, S. (2010). Qualitative approaches to mixed methods practice. *Qualitative Inquiry*, 16(6), 455–468.
- Hsiang, S., Kopp, R., Jina, A., et al. (2017). Estimating economic damage from climate change in the United States. *Science*, 356, 1362–1369. <https://doi.org/10.1126/science.aal4369>
- Ievdokymova, V., Lehenchuka, S., Zakharova, D., Andrusivb, U., Usatenkoc, O., & Kovalenkod, L. (2020). Social capital measurement based on the value explorer method. *Management Science Letters*, 10, 1161–1168.
- Jackson, J. E., & Warren, K. B. (2005). Indigenous movements in Latin America, 1992–2004: Controversies, ironies, new directions. *Annual Review of Anthropology*, 34(1), 549–573.
- Kapoulas, A., & Mitic, M. (2012). Understanding challenges of qualitative research: Rhetorical issues and reality traps. *Qualitative Market Research: An International Journal*, 15(4), 354–368.
- Kroll-Smith, J. S., & Couch, S. R. (1991). What is a disaster? An ecological-symbolic approach to resolving the definitional debate. *International Journal of Mass Emergencies and Disasters*, 9(3), 355–366.
- Lopez-Fernandez, O., & Molina-Azorin, J. F. (2011). The use of mixed methods research in the field of behavioural sciences. *Quality & Quantity*, 45(6), 1459–1472.
- Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Research*, 11(3), 1–20.
- Meyer, M. A. (2018). Social capital in disaster research. In H. Rodriguez, et al. (Eds.), *Handbook of disaster research* (pp. 263–286). Springer International Publishing.
- Mileti, D. (1999). *Disasters by design*. Joseph Henry.
- Mitchell, K. (2019). Nearly \$5.8 Million in Marijuana Destroyed After Authorities Raid 40 Illegal Grows in Southern Colorado. *The Denver Post*. Sep. 16, 2019.
- Mol, A. P., Spaargaren, G., & Sonnenfeld, D. A. (2013). Ecological modernization theory: Taking stock, moving forward. In S. Lockie, D. R. Fisher, & D.A. Sonnenfeld (Eds.), *Routledge international handbook of social and environmental change* (pp. 15–30). Routledge.
- Nace, R. L., & Pluhowski, E. J. (1965). *Drought of the 1950's with Special Reference to the Midcontinent*. Geological Survey Water-Supply Paper 1804. United States Government Printing Office.
- Narayan, D. (1999). Bonds and bridges: Social capital and poverty. *Policy Research Working Paper No. 2167*. The World Bank.
- New Mexico State Land Office (2023). Land Office Website. <https://www.nmstatelands.org/Accessed12/19/2023>
- New Mexico Office of the State Engineer (NM OSE) (2023). Water Rights Reporting System. <https://www.ose.state.nm.us/WRAB/Accessed12/19/2023>
- Oklahoma Water Resources Board (OWRB) (2023). Water Law and Management in Oklahoma. https://www.owrb.ok.gov/supply/ocwp/pdf_ocwp/WaterPlanUpdate/joint_committee/WATER%20LAW_MANAGEMENT%20IN%20OKLAHOMA.pdf Accessed 12/19/2023.
- Ostrom, E. (2015). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.
- Paxton, P. (1999). Is social capital declining in the United States? A multiple indicator assessment. *American Journal of Sociology*, 105(1), 88–127.
- Portes, A. (1998). Social Capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24, 1–24.
- Putnam, R. D. (2000). *Bowling alone: America's declining social capital*. Palgrave MacMillan.
- Putnam, R. (2001). Social capital: Measurement and consequences. *Canadian Journal of Policy Research*, 2(1), 41–51.
- Ritchie, L. A. (2012). Individual stress, collective trauma, and social capital in the wake of the Exxon Valdez oil spill. *Sociological Inquiry*, 82(2), 187–211.
- Ritchie, L. A., & Gill, D. A. (2007). Social capital theory as an integrative theoretical framework in technological disaster research. *Sociological Spectrum*, 27(1), 103–129.
- Ritchie, L. A., & Gill, D. A. (2018). The role of social capital in community disaster resilience. In J. Bohland, J. Harrauld, & D. Brosnan (Eds.), *The disaster resiliency challenge: Transforming theory to action* (pp. 112–139). Charles C. Thomas Publisher, Ltd.
- Ritchie, L. A., Gill, D. A., & Farnham, C. N. (2012). Recreancy revisited: Beliefs about institutional failure following the Exxon Valdez Oil spill. *Society and Natural Resources*, 0, 1–17.
- Robbins, P. (2004). Cultural ecology. In *A companion to cultural geography* (pp. 180–193).
- Rod, M. (2009). Marketing: Philosophy of science and ‘epistobabble warfare’. *Qualitative Market Research: An International Journal*, 12(2), 120–129.
- Rodriguez, H., Donner, W., & Trainor, J. E. (2018). *Handbook of disaster research* (2nd ed). Springer.
- Roy, K., Zvonkovic, A., Goldberg, A., Sharp, E., & LaRossa, R. (2015). Sampling richness and qualitative integrity: Challenges for research with families. *Journal of Marriage and Family*, 77(1), 243–260.
- Scanlon, B. R., FAunt, C. C., Longuevergne, L., Reedy, R. C., Alley, W. M., McGuire, V. L., & McMahon, P. B. (2012). Groundwater depletion and sustainability of irrigation in the US High Plains and Central Valley. *Proceedings of the National Academy of Sciences of the United States of America*, 109(24), 9320–9325.
- Scharping, N. (2021). As the Climate Warms, Could the U.S. Face Another Dust Bowl? *Yale Environment 360*. <http://e360.yale.edu/features/as-the-climate-warms-could-the-u.s.-face-another-dust-bowl>. Accessed 12/19/2023.
- Schreier, M. (2012). *Qualitative content analysis in practice*. Sage.
- Schultz, T. W. (1961). Investment in human capital. *The American Economic Review*, 51(1), 1–17.
- Sheehan, R., & Vadjunec, J. M. (2012). Placing community through actor-network theory in Oklahoma’s ‘No man’s land’. *Social & Cultural Geography*, 13(8), 915–936. <https://doi.org/10.1080/14649365.2012.728616>
- Stack, C. B. (1997). *All our kin: Strategies for survival in a black community*. Basic Books.
- Straub, A. M. (2022). *Rural Oklahoma and the Nexus of Disaster Vulnerability, Risk, and Resilience*. Dissertation. Oklahoma State University ProQuest.
- Straub, A. M., Gray, B. J., Ritchie, L. A., & Gill, D. A. (2020). Cultivating disaster resilience in rural Oklahoma: Community disenfranchisement and relational aspects of social capital. *Journal of Rural Studies*, 73, 105–113.

- Swidler, A. (1986). Culture in action: Symbols and strategies. *American Sociological Review*, 51(2), 273–286.
- Szreter, S. (2002). The state of social capital: Bringing back in power, politics, and history. *Theory and Society*, 31, 573–621.
- The Land Report (2008). Pinon Canyon: One Colossal Land Grab Accessed on 3/11/2024. <https://landreport.com/pinon-canyon-on-e-colossal-land-grab>
- Tierney, K. (2014). *The social roots of risk*. Stanford Business Books.
- Tierney, K. (2019). *Disasters: A sociological approach*. Polity.
- Tracy, S. J. (2010). Qualitative quality: Eight ‘Big-Tent’ Criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10), 837–851.
- Tremblay, K. R., & Dunlap, R. E. (1978). Rural-urban residence and concern with environmental quality: A replication and extension. *Rural Sociology*, 43(3), 474.
- Tuttle, S. (2020). Producing diverse and segregated spaces: Local businesses and commercial gentrification in two Chicago neighborhoods. *City & Community*, 19(4), 845–869.
- U.S. Census. (2020). Decennial Census P.L. 94–171 Redistricting Data. <https://data.census.gov>. Accessed 3/11/2024.
- U.S. Drought Monitor (2023). U.S. Drought Monitor Website. <https://droughtmonitor.unl.edu/Accessed12/19/2023>
- U.S. Environmental Protection Agency (US EPA) (2013). Level III and IV ecoregions of the continental United States. <https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states> Accessed 12/19/2023.
- Vadjunec, J. M., & Sheehan, R. (2010). Ranching and State School Land in Cimarron County, Oklahoma. *Great Plains Research*, 20(2), 163–177.
- Vadjunec, J. M., Boardman, A. L., Fagin, T. D., Larson, M. P., Kedron, P., & Birchler, B. (2021). Footprints from the dust bowl: Using historical geographic information systems to explore land and resource access, use, and survivability in “No Man’s Land,” Cimarron County, Oklahoma. *Annals of the American Association of Geographers*, 111(7), 1906–1930. <https://doi.org/10.1080/24694452.2020.1867497>
- Vadjunec, J. M., Colston, N. M., Fagin, T. D., & Boardman, A. (2022). Fostering resilience and adaptation to Drought in the Southern High Plains: Using participatory methods for more robust Citizen Science. *Sustainability*, 14(3), 1813. <https://doi.org/10.3390/su14031813>
- Waldinger, R. (1995). The ‘other side’ of embeddedness: A case-study of the interplay of economy and ethnicity. *Ethnicity and Racial Studies*, 18(3), 555–580.
- Wenger, K., Vadjunec, J. M., & Fagin, T. (2017). Groundwater governance and the growth of center pivot irrigation in Cimarron County, OK and Union County, NM: Implications for community vulnerability to drought. *Water*, 9(1), 39.
- Wilcox, W. W., Cochrane, W. W., & Herdt, R. W. (1974). *Economics of American agriculture* (3rd ed.). Prentice-Hall.
- Woolcock, M. (2001). The Place of Social Capital in understanding Social and Economic outcomes. *Canadian Journal of Policy Research*, 2(1), 65–88.
- Woolcock, M., & Narayan, D. (2000). Social capital: Implications for development theory, research, and policy. *World Bank Research Observations*, 15(2), 225–249.
- Worster, D. (2004). *Dust Bowl: The Southern Plains in the 1930s*. New York: Oxford University Press.
- Yang, S. (2013). Surviving as a qualitative researcher in a quantitative world: A personal reflection. *International Journal of Social Research Methodology*, 16(1), 81–85.

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