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Building Social Capital in Low-Income Communities for Resilience

Anais Roque, Barbara Quimby, Alexandra Brewis, and
Amber Wutich

Contents

1	Introduction	2
2	Social Capital: Some Basics	3
3	Social Capital: Contributing Factors	6
4	Community Climate Resilience	7
4.1	Vulnerability and Adaptive Capacity: Facets of Resilience	8
4.2	Social-Ecological System Perspectives in Resilience	9
5	Social Capital and Community Resilience	9
5.1	The Perspective from Disaster Studies	9
5.2	Environmental Governance	11
5.3	Climate Change Adaptation	12
6	Lessons Learned to Support Social Capital for Community Resilience	12
7	Conclusion	15
	References	16

Abstract

The risks and vulnerabilities generated by climate change are disproportionately distributed among low-income communities, indigenous peoples, and communities of color worldwide. However, some communities have proven to be more resilient to the challenges of an unpredictable environment, adapting to change, bouncing back from disasters, and working to anticipate and plan for future threats. To understand these disparities in community resilience, social-environmental researchers have turned to the concept of social capital to understand how local communities impacted by climate change connect to advance

A. Roque (✉) · A. Brewis · A. Wutich

School of Human Evolution and Social Change, Arizona State University, Tempe, AZ, USA
e-mail: adroque@asu.edu; alex.brewis@asu.edu; amber.wutich@asu.edu

B. Quimby

School of Human Evolution and Social Change, Arizona State University, Tempe, AZ, USA

Kyl Center for Water Policy, Morrison Institute, Arizona State University, Phoenix, AZ, USA

e-mail: bquimby@asu.edu; barbara.quimby@asu.edu

community preparedness, response, and adaptability. Social capital is a process of networking beneficial relationships in and across communities that can be explored through bonding, bridging, and linking social capital. Social capital processes are not inherently durable, with opportunities to both reduce and improve community resilience. This chapter summarizes and explains key literature on social capital and community resilience. At the same time, how different types of social capital development interact and contribute to collective community action in the context of climate change. The chapter provides examples of how social capital connects to frameworks of social-ecological systems, disaster studies, and environmental governance, with a summary of lessons from these contexts. Additionally, the chapter provides activities, practices, and lessons learned from different society sectors that can support social capital for climate change-affected communities. This chapter demonstrates that developing social capital can provide critical support to climate change-affected communities for their long-term resilience and some of the challenges to achieve this.

Keywords

Social capital · Low-income communities · Climate change adaptation · Climate resilience · Community resilience

1 Introduction

The Intergovernmental Panel on Climate Change (IPCC), through its climatological scenarios, states climate-related hazards will continue to increase as a consequence of human activity (IPCC 2014; Trenberth 2012; Fletcher et al. 2020). The combination of global climate change and rapid urbanization has forced decision-makers, cities, and local communities to rethink how they can plan for future devastating impacts from weather-related events. Climate change effects impact all essential areas for the quality of life such as health, energy, food, water, and the economy (e.g., jobs) (Hoerner and Robinson 2008). The impacts of climate change are particularly high in social systems with pre-existing vulnerabilities (e.g., weak physical infrastructure, high poverty rates) resulting from colonization, globalization, neoliberalism, and poor governance, among others; these disproportionately impact people of color and low-income communities (Chakrabarty 2012; Parr 2015; Broto 2017; Mahony and Endfield 2018). For example, poor households that live near hazardous areas are at higher risk. This set of inequities is sure to persist and even widen as climate change impacts grow. For example, people without financial resources – including access to informational resources or underinsurance – have more difficulty adapting to climate events (Karl et al. 2009; Shonkoff et al. 2009; Liverman and Merideth 2002). Communities lacking adequate adaptation – “. . . a process, action or outcome” that enables a “system to better cope with, manage or adjust to some changing condition, stress, hazard, risk or opportunity” (Smit and Wandel 2006, p. 281) – do not just suffer from events as they happen now. Those struggles then

mean their capacity is further eroded, so they are then faced with compounded vulnerabilities to future climatological events (Smit and Wandel 2006; Feltcher et al. 2020).

While there have been significant efforts to address climate change from a physical infrastructure standpoint, social science research is revealing the importance of social systems and developing resilience at the community level (Aldrich and Meyer 2015; Aldrich et al. 2016). Community resilience refers here to how effectively community members can develop and engage resources in environments that are highly uncertain or unpredictable (Maggis 2010, p. 401). Such resilience is essential not only for preparedness but also to support and improve community well-being (Chandra et al. 2011).

Social capital is one phenomenon that social scientists have identified as crucial to community adaptive capacities for resilience to climate change (Aldrich et al. 2016; Adger 2001, 2003). Social capital is defined by the density of networks of trusting and beneficial relationships (Brisson and Usher 2005, p. 644). These relationships generate and produce assets that can advance shared objectives (Lin 2002). For example, in collective action research, social capital is valuable for understanding resource exchanges, institutional function, and aspects of trustworthiness (Ostrom and Ahn 2009, p. 5). Moreover, international organizations such as the Ford Foundation, United Nations, and World Bank promote social capital in the context of development and poverty-related challenges (Brisson and Usher 2005). However, in spite of its recognized (potential) importance for resilience, social capital is a complex process that needs more attention to understand its relationships to adaptive capacity and community resilience (Paul et al. 2016; Pelling and High 2005; Wolf et al. 2010).

The goals of this chapter are multifold. First, the chapter provides a synopsis of the social capital literature. This will be followed by the literature on community resilience to understand its critical role in climate change contexts. Then disaster research is presented, alongside research on environmental governance and climate change adaptation. Bridging these highlights how social capital underpins community resilience. The chapter concludes with a summary of practices and “lessons learned” from social capital research that can support community resilience for low-income communities.

2 Social Capital: Some Basics

The concept of social capital can be traced back to the 1840s and de Tocqueville’s observations on American civil society (Ferragina 2010). But the notion of social capital more explicitly emerged in the world of sociologists like Bourdieu, Lin, and Coleman in the 1980s and political scientists like Putman’s research on civic participation in the 1990s (Ferragina 2010; Lin 2002). In defining social capital, three basic pillars of the concept are trust, networks, and reciprocity. At the individual or personal level, social capital is conceptualized as embedded in social structures that can be accessed and mobilized purposefully (Lin 2002). Viewed at the

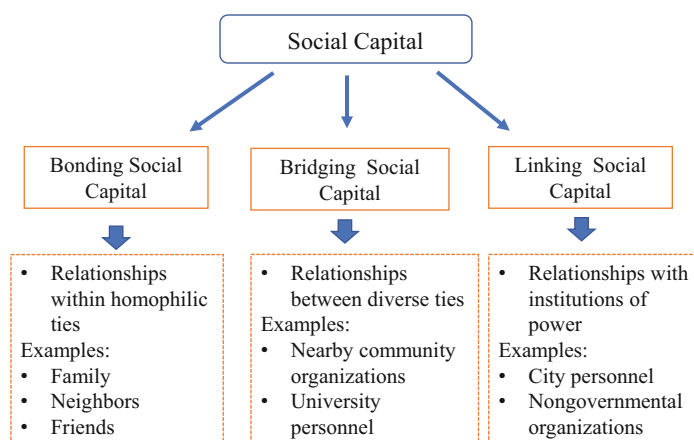
collective or community level, social capital is defined by the connections among individuals, such as their networks of reciprocity norms of trustworthiness (Putnam 2000, p. 19). As a social system, interaction among actors will support collective work engagement (Lin 2002; Ostrom and Ahn 2009). Being grounded in shared values and sentiments toward a specific goal will be more likely to advance collectivity toward a particular objective and organize to maintain resources and gain more (Lin 2002).

In social capital theory, drawing from Marxism and expectations of return from the marketplace, labor allows commodities to emerge through social activity; simultaneously, it requires an engagement in social relations to produce revenue in the market (Lin 2002). The market in this discussion is the system and actors that, through networks, can mobilize resources to expect community well-being in disrupted environments. These resources could be material or symbolic: for example, power, land, education, and association in clubs (Lin 2002; Putnam 1993). From this perspective, social capital brings clear benefits. For example, information mobilized through social connections can influence decision-makers toward releasing a particular resource (Lin 2002; Aldrich and Meyer 2015). However, to incite change or increase the value of a resource, influence would need to be guided by the mobilized actors that share an interest in this value (Lin 2002).

Social capital, or the lack of it, has important implications for low-income communities. Class inequality, racism, elites, and local power structures all undermine social capital in poor communities (Warren et al. 2001). Lopez and Stack (2001), for instance, illustrate how local power brokers sabotaged (e.g., refusing funding) the efforts of a group of African American women who moved back to their hometown, developed a volunteer organization, and worked to build social support. In cases like this, to better understand different social relationships that support collectivity, scholars use the analytical categorizations of bonding, bridging, and linking social capital.

Bonding social capital is described as the intracommunity ties or connections among those who share a social identity, ethnicity, socio-demographics, geographical space, and others (Putnam 1993, 2000; Aldrich and Meyer 2015; Szreter and Woolcock 2004). Family, neighbors, and close friends' relationships represent bonding social capital (Aldrich 2017; Putnam 1993, 2000; Partelow 2021; Nakagawa and Shaw 2004). For example, Mitchell and LaGory (2002) explored the importance of social capital for health and well-being in an urban neighborhood with high poverty and racial segregation. Their research showed that bonding social capital increased participants levels of mental distress.

Bridging social capital refers to relationships or connections with individuals with different backgrounds (Putnam 1993, 2000; Aldrich and Meyer 2015). Due to these relationships' diversity, they allow better access to information and resources to address any particular need (Aldrich and Meyer 2015; Maggis 2010; Saegert and Winkel 1998). For example, in disaster management, bridging social capital has shown to greatly increase the tangible support survivors receive from local social services, religious, health, business, and other groups with access to needed resources (Pfefferbaum et al. 2017).



Sources: Putnam, 1993, 2000, Nakagawa & Shaw, 2004; Aldrich, 2012

Fig. 1 Social capital types with examples

Linking social capital refers to the relationships or networks communities have with institutions of power or authority that can bring resources to support their goals or needs (Aldrich 2012; Maggis 2010). Linking social capital is especially important in contexts of climate change adaptation (Adger 2003; Aldrich et al. 2016). One of the values of linking social capital comes from the possibility to leverage resources and facilitate relationships that have clearly unequal power distributions (Saegert and Winkel 1998). Examples are international development agencies working with impoverished communities (Szreter 2002) or relationships with government agencies in disaster recovery (Roque et al. 2020) (Fig. 1).

Social ties potentially increase access to assets for individuals and communities, but there can be some downsides for both individuals and communities. Low-income and marginalized communities can have with fewer social ties to begin with (Woolcock and Narayan 2000; Warner 2001). Here the distinction between bonding and bridging forms of social capital is crucial. As we detail more below, bonding capital refers to ties to others in the community; bridging capital by contrast is ties to people outside the community – often those with more power and greater control of resources. Low-income communities, for example, often have strong bonding social capital but have relatively weak bridging social capital. This matters when what is needed is controlled externally (Narayan 1999; Woolcock and Narayan 2000).

Bridging social capital can create other problems in marginalized or otherwise isolated communities seeking to address climate risks. For example, bridging connections to drug cartels could provide access to resources, but at other costs (Woolcock and Narayan 2000; Portes 1998). Social capital coming from specific communities (e.g., the Catholic Church) can bring significant assistance in areas of development, but challenges to address issues such as birth control or LGBTQ+ healthcare (Warren et al. 2001). Acting through social capital can create challenges,

obligations, and commitments to others that may themselves cause serious stress or other negative outcomes sooner or later (Woolcock and Narayan 2000, p. 231).

Not all social capital is positive, and it needs to be tailored to particular needs. Substantial social bonding and bridging social capital does not always translate into having access to power for collective action. Furthermore, high community social capital might help access resources, but cannot overcome macro-political systems such as colonialism, political exclusion, and corruption that create and reinforce marginalization itself (White and Smucker 1998).

3 Social Capital: Contributing Factors

What elements or characteristics do social scientists identify as important for social capital at the individual and community levels? This is a key question; it provides the means to identify effective support for collective community action to advance climate change adaptation.

In analyzing social capital at the individual level, there is often a focus on the different resources (from material to symbolic) that individuals can access via their social network and investment in it (Van der Gaag and Snijders 2004). For instance, Flap (2002) evaluates social capital by three main components. First, the quantity of “alters” (i.e., a social network term meaning other people) in this person’s social network. Second, the types of resources the person has access to in these alters. Third, the willingness of the alter to give such resource (Flap 2002). Similarly, Van der Gaag and Webber (2008) examine “volume,” meaning the totality of social resources one can potentially access. This volume can include access to alters’ personal assets like political capital (power), financial (money), and human (education and skills and cultural (symbolic knowledge) (p. 35). The idea of volume benefits is based in a recognition that more access will make a positive difference. Another characteristic is diversity, meaning the *different* ways that alters can access resources or relationships via their networks; these should then improve access to more resources and make it easier to advance a particular objective (Flap 1991; Granovetter 1973; Lin 2001; van der Gaag and Weber 2008). Key factors that seem to predict this advantageous diversity include education level, gender, and occupational prestige (van der Gaag and Weber 2008).

At the community level, following Putnam (1993, 1995), some of the contributing factors of social capital involve aspects of trust, norms, and reciprocity, as well as membership in associations (Harpham 2008). The community in this sense can refer to a geographical area (e.g., neighborhood) or non-spatial (e.g., religious) groups than together use aggregated responses from individuals to represent social capital (Harpham 2008). Another component is degree of civic participation, which represents the involvement of community members in activities like petitioning, protesting, attending council meetings, or contacting local politicians (Harpham 2008). Trust is also key, meaning relational confidence in other community members. Similarly, reciprocity is evaluated as the inclination to support others and expectation of return if needed (Harpham 2008). Following the premise of social capital as an

asset for collective action, the (quantification or qualitative) evaluation of these factors is often able to help estimate the extent groups can mobilize for disruptive environments – such as in the face of climate change unpredictability or adverse events like disasters.

4 Community Climate Resilience

Another relevant set of literature for understanding community adaptation to climate change is around resilience, an interdisciplinary approach at the intersection of health, social change, engineering, environment, and sustainability research. While there are diverse and sometimes competing definitions of resilience, most reflect an interest in the capacity of a system to resist or bounce back from a shock and maintain or recover its functions and relationships (Berkes et al. 1998; Folke 2006; Holling 1973, 2001). The focus here is on how people and the natural environment adapt to environmental disturbances, such as extreme weather events, and the disasters following hurricanes, tsunamis, coastal flooding, or wildfires. Resilience is also relevant for preparing and mitigating the effects of slow-onset disasters like coral reef bleaching, sea level rise, drought, extreme heat, and other environmental changes that displace human and natural communities (Aldrich 2012; Levin and Lubchenco 2008; Cinner et al. 2009; Lauer et al. 2013).

Resilience research explores the interrelationships between social and environmental processes across scales; this is informed by recognition of social-ecological systems and common-pool resource approaches to human-environment relationships (Berkes et al. 1998; Holling and Gunderson 2002). Community resilience from a systems approach (Maggis 2010) is conceptualized as the capacity of people in a particular geographic area (place-based community) to self-organize and respond to social-environmental shocks (Aldrich and Meyer 2015). Resilience is understood to be simultaneously a property of a community, dynamic process, and possible outcome (Pfefferbaum et al. 2017). Community resilience is formed through complex social relations (Fazey et al. 2018). The interaction of key community characteristics (e.g., social networks, values, and beliefs, leadership, engaged governance) informs agency and self-organization, central components in the production of community resilience (Berkes and Ross 2013). These interactions, in turn, produce capacity building and social learning as they encounter stresses over time – to a point (Berkes and Ross 2013; Olsson et al. 2004). A disturbance event can both catalyze and diminish future resilience, as communities expend resources in their recovery and also develop new relationships to prepare for future events (Berkes and Ross 2013).

The turn toward community-based approaches in development and natural resource management activities globally has informed social research on climate change resilience (Buggy and McNamara 2016; McLeod et al. 2009). Like these management-based approaches, community resilience remains critically tied to higher scales of social and political processes; by connecting with national governments and international agencies' financial and political power, it can address

multiscale crises like climate change (Cash et al. 2006; Cudney-Bueno and Basurto 2009). The global scale of climate change can overshadow strategies for climate resilience formed and practiced at the community scale (Wilbanks and Kates 2010). Simultaneously, poverty cycles in low-income and marginalized settings can also be considered “resilient” but don’t provide outcomes for community well-being (Berkes and Ross 2013). Therefore, the focus on community resilience’s local-scale processes allows for greater attention to adaptation, place-based processes, and social justice outcomes (See ► [“Resilience Is Not a One-Step Process: The Importance to Focus on the Post-recovery Phases at the Global South”](#)).

4.1 Vulnerability and Adaptive Capacity: Facets of Resilience

Vulnerability is another key concept, referring to a community’s likelihood of experiencing harm and reduced well-being, particularly following a natural hazard event (Blaikie 1994). Disconnection from centers of power – indicated by poverty, marginality, lack of physical and institutional infrastructure, and so forth – is also seen as indicator of vulnerability (Cutter 2003; Wilson 2012). Vulnerability, as a concept, however, recognizes the need to center equity and social justice issues in risk and disaster research (Eakin and Luers 2006). It shifts the focus from the environmental hazard to those human factors that magnify a community’s likelihood of experiencing disaster or crisis. Some scholars warn, though, that this terminology encourages a view of these groups as victims without agency, suggests the inevitability of “natural” disasters, and conceals the broader and deeper social and political processes that create increased risk to some populations (racism, gender inequity, and poverty) (Mikulewicz 2020).

Vulnerability is thus different from simply being an inverse of adaptive capacity, where the latter is the ability to rebound from a disaster event, or further to create improvements in well-being following the event (Adger 2001; Cohen et al. 2016; Folke et al. 2010). To reduce the vulnerability of communities to the shocks and hazards associated with climate change, however, there has been a focus on increasing their adaptive capacity (Ferro-Azcona et al. 2019; Plummer and Armitage 2010; Adger 2001). The notion of adaptive capacity usefully includes the ability to learn, reorganize, innovate, and respond to social and environmental changes across scales (Armitage et al. 2009; Folke 2006; Brown 2013; Quimby and Levine 2021). Governance arrangements foster adaptive capacity, and integration of local values and norms, as actors negotiate contested interests and work toward collective action (Engle and Lemos 2010; Armitage 2005; Pahl-Wostl et al. 2009). Social networks and learning communities also play important roles in adaptive capacities (Goldstein 2012). While research on adaptive capacity to manage environmental change has focused significantly on institutional factors and governance arrangements (Gupta et al. 2010; Thompson et al. 2006), the functional factors of resource access and use, social connectivity, social capital, integration with existing traditional social organization, and memory and experience have also been highlighted as important factors

(Armitage 2005; Kuruppu and Liverman 2011; Quimby and Levine 2021; Warrick et al. 2017).

4.2 Social-Ecological System Perspectives in Resilience

In social-ecological systems (SES) research, resilience frameworks are drawn from ecological approaches to understanding how systems retain similar structures and functions or change to a new (renewed) state after a disturbance (Walker et al. 2006; Wilson 2012). Principles of resilience are reflected in adaptive management approaches applied to social-ecological systems, such as self-organizing, learning, and knowledge-sharing, and flexible and responsive governance (Olsson et al. 2004). Similarly, resilience frameworks also can help to connect social-ecological systems theory with applied management decisions (See ► [“Ecological Resilience and the Built Environment”](#)).

Theorization of “social” in SES has been criticized for its lack of attention to social complexity and heterogeneity (Fabinyi et al. 2014; Cote and Nightingale 2011; Ravera et al. 2016). Responding to this, SES approaches are increasingly combined with social and psychological approaches to individual coping with social and economic stressors and vulnerability (Gallopín 2006; Manyena 2006; Berkes and Ross 2013). For example, Berkes and Ross (2013) explore the integration of social-ecological systems, psychology of development, and individual mental health to inform the way they assess community resilience. This approach is designed explicitly to provide analytic flexibility and wider applicability, such as for cases not defined by resource dependence or environmental disruption. Other recent research on resilience focuses on the opportunities for innovation, reorganization, and recreation in response to stress and trauma (Folke et al. 2021; Haugen et al. 2021). This view of resilience is a process toward transformation into a desirable state; it purposefully incorporates actors’ flexibility and agency in self-organizing, anticipating, planning, and responding to unprecedented threats from climate change (Berkes and Ross 2013; Folke et al. 2021). It also allows for more nuanced attention to the active agency of communities and contestation and power asymmetries, which critics have noted were absent from many resilience examinations (Cote and Nightingale 2011; Lauer 2016; Cutter 2016).

5 Social Capital and Community Resilience

5.1 The Perspective from Disaster Studies

Climate change is driving an increased risk for natural hazards. The intensity and frequency of hurricanes and typhoons, storm surge and coastal flooding, wildfires, and other events are expected to increase, and we are already seeing the effects (IPCC 2014). Environmental processes drive these natural hazards; however, social and political scientists have long argued that the primary cause of disasters is in

social, economic, and political processes that create unsafe conditions, stoke environmental change, and fail to prepare for or mitigate risk (Blaikie 1994; Cutter 1996). For instance, small island developing states (SIDS) in the Pacific and Caribbean have gained particular prominence in the climate change resilience research, as they are already experiencing higher occurrences of climate change-induced natural hazards and are perceived to be at greater relative social, economic, and physical risk (Hardy et al. 2016; Robinson 2017; Kelman and West 2009). For example, ocean warming is occurring at a faster rate in the Pacific than other parts of the globe. Combined with reduced precipitation, low physical infrastructure, and small national size, SIDS' vulnerability is estimated to be high (Robinson 2019). Still, some argue such island states' resilience also benefits from incredibly strong bridging social capital. Petzold and Ratter (2015) identify their dense and integrated social networks, providing high levels of social capital in the forms of collective action, reciprocity, and trust. Similarly, Gaillard (2007) points to the Indigenous social organization of many Pacific SIDS as one reason bonding and linking social capital are particularly strong in that region – and so undergird a bonding-based community resilience.

However, closer examination demonstrates the potential contradictions and limitations of social capital for supporting resilience across different social groups, kinship networks, and villages in such majority-Indigenous societies. Schuermann and Lauer (2016) investigated the role of traditional Melanesian systems of reciprocal exchange and mutual benefit (*wantok*) following a 2007 tsunami event in the Solomon Islands. For the 7,000 residents of Ghizo Island, *wantok* was important for the rapid distribution of international aid. However, it also biased distribution toward more connected individuals and groups. Comparing the recovery process in two villages with nearly identical tsunami impacts but different ethnic and linguistic identities, they found significant differences in the distribution of goods and services (like new fishing equipment and housing materials). In other words, the bonding social capital of *wantok* that supports sharing of food, labor, and resources among households was limited to the village scale, while bridging and linking forms of social capital embedded in *wontok* across scales, connecting people to international aid from NGOs and government agencies, was extremely uneven.

In another case study, Eadie and Su (2018) examine social capital and traditional social systems in the Philippines following Super Typhoon Yolanda (Haiyan). The typhoon affected approximately 16 million people, including poor urban residents of Tacloban City. Here, *bayanihan*, or a principle of mutual effort and reciprocity, provides the notion of cooperation relevant to bonding social capital that emphasizes the expectation of a return on investment and reciprocal aid. They note that government agencies asked for cooperation and *bayanihan*, turning it into a form of linking social capital to bring diverse people together in the relief effort. However, their interviews also suggested that any benefits of linking social capital created in the relief efforts was short-lived, as the uneven distribution of relief exacerbated existing inequalities and created new ones, which undermined trust. In all, the authors find that claims of *bayanihan* and bonding social capital were overstated: many households rather turned quickly to self-reliance. Such examples demonstrate how local

social capital systems can reinforce and reduce community resilience following a disaster, as rapid decisions and changes inform the dynamics of social capital processes.

5.2 Environmental Governance

From an environmental governance perspective, social capital is seen as critical to community resilience to climate change, based on its role in elevating adaptive capacity, catalyzing collective action for managing resources, and enforcing regulations at the local scale (Brondizio et al. 2009; Plummer and Armitage 2010; Pretty and Ward 2001; Olsson et al. 2004). Institutional approaches emphasize the importance of social capital for supporting the trust and legitimacy of governance institutions. In the 1990s, community-based resource management approaches for environmental governance, including co-management (a community-based, cross scale approach where the community, state agencies, and non-governmental organizations share management responsibility and authority), emerged as a preferred choice (Armitage et al. 2009). Co-management can support both ecological and social sustainability (Jentoft 2000). This approach has demonstrated greater flexibility and adaptability than top-down approaches, aiding in resilience against climate change. However, co-management can also compromise resilience when existing social and political institutions are not well integrated (Gelcich et al. 2006). Integrating institutions may better engage the bonding and bridging capital needed for good governance of complex natural resources (Marin et al. 2012; Sekhar 2007).

Research on the governance of small-scale fisheries has particularly highlighted the role of social capital for community resilience and sustainable management. A study of small-scale fisheries co-management by Gutierrez et al. (2011) found social capital to be critical for supporting community cohesion and communication when addressing governance challenges. Leadership, compliance with rules, and conflict resolution were all improved by social capital. Social capital can also create governance challenges for fisheries, however, such as high bonding social capital lowering fishers' willingness to report rule breaking (Bodin and Crona 2008). Fishers create and draw on social capital in their networks by sharing their catch, sharing environmental knowledge, providing access to markets, and other practices (Mueller et al. 2008; Poe et al. 2015), which can reduce vulnerability (Barnett and Eakin 2015) and supports community resilience to social, environmental, and economic shocks. Traditional tenure and indigenous governance systems have also often been incorporated into community-based management, providing and creating social capital (Aswani and Ruddle 2013). However, the ongoing effects of capitalism and colonialism, such as reliance on external aid and top-down bureaucratic governance organization, can undermine traditional systems and reduce resilience benefits (Bordner et al. 2020; Quimby and Levine 2021).

5.3 Climate Change Adaptation

Social capital is considered especially important for mitigation strategies and public policy interventions (Adger 2003; Dietz et al. 2007) that require peoples' acceptance and participation in reorganizing, removing, or relocating the community that may involve significant social costs (Jones and Clark 2013). Climate change adaptation is inherently multiscale, bringing together actors, organizations, and governments across traditional spatial or political boundaries. These complex intergroup relationships require and create social capital to build trust. Hamilton and Lubell (2019) provide insights into the positive and negative effects of social capital on climate change adaptation in East Africa's Lake Victoria region. Policy networks connect different decision-making forums across three nations and multiple administrative, economic, and ethnic/linguistic boundaries. They see these policy networks as a form of social capital, and surveyed forum members on their access to information, procedural fairness, cooperation, and satisfaction with the process, and hypothesize that the performance of the forums is informed by the potentially opposing effects of different forms of social capital (p. 321). There was an observable positive effect of popularity of the forums on information access – an indication of bridging capital. They concluded that the benefits of bonding and bridging social capital differed and are not always complimentary and that the specific agenda of the forum was an important factor in the benefits of social capital. However, they also suggest that in polycentric systems, there is a need to manage the trade-offs between all three forms of social capital due to the complex dynamics of multiscale climate change adaptation. It should be noted that their study applied pre-determined variables to identify characteristics of social capital and does not explore direct outcomes for adaptation or resilience. As a limited-time study, it did not capture fluctuations in social capital or resilience. But the value and complexity of social capital's role in resilience are evident. In all, bonding social capital can support immediate support and aid for disaster recovery, but its interactions and co-dependence with linking and bridging social capital produce varied outcomes.

6 Lessons Learned to Support Social Capital for Community Resilience

As it has been explained, social capital research has value for environmental governance, community resilience, and climate change adaptation (Aldrich et al. 2016; Adger 2003; Petzold 2016). Aldrich and colleagues (2016) identify the role of bridging social capital as allowing access to innovation and managing extra-local resources to respond to climate change. Linking social capital represents connections between regional or national decision-makers that can improve adaptation resources and actions (Aldrich et al. 2016). This is of particular importance for protecting at-risk physical infrastructures (e.g., sea defenses) when there needs to be an institutional willingness for investment. Social capital may be able to support

through network processes (e.g., risk communication at the local level) and funding acquisition to restore important physical infrastructure (Petzold 2016).

Building from this premise, social capital should be purposefully and intentionally addressed. This section provides examples from government actions, community-external partnership activities, and lessons learned that can guide efforts to build social capital. Although not designed for targeted communities' (e.g., low-income communities) response to climate change, they can be transferred to such needs. The Australian Government Productivity Commission in 2003 conducted extensive research on social capital benefits, challenges, measurements, implications to policy, health, and equality. The commissions' role was to provide advice on microeconomic policy and regulation and to research social and economic challenges to the well-being of Australia's citizenry (Productivity Commission 2003). To support social capital from a policy perspective, the commission collated suggestions based in then-current literature. For example, for community engagement and participation, they advised policy to support the creation of "citizens juries" and "deliberative polls" to support trust in government. At the same time, government policies could support social capital creation even though it might not be their primary objective. For instance, providing funding for festivals or sports events (e.g., Sydney Olympics) considers that such activities will attract tourism, support the local economy, and broadly civic participation (Productivity Commission 2003, p. 61). Other examples highlighted by the commission included support to Landcare groups and volunteer bushfire brigades. The development and support of initiatives like these seemed to support network development, trust, and a sense of community (p. 61)

Elders' experiences in Ofunato, Japan, after the Great East Japan Earthquake of 2011 provide another example. With a large elderly population, many seniors wanted to support the recovery efforts. With the assistance of the NGO Ibasho, they developed the "Ibasho Café," a gathering space where the community could connect and where elders take leadership positions to foster social capital and support community resilience (Kiyota et al. 2015, 2020). By empowering elders and viewing them as significant resources in the community, this project initially focused on boosting social capital by providing a space where the community itself could deepen connections. In this way, Ibasho Café provided physical and social infrastructure to create stronger bonds, extend networks, community participation, trust, and maintenance of the space. One of the lessons learned was that before any such implementation, there needs to be an assessment of the community's needs, resources, group commitment, and consensus that can support sense of belonging (Kiyota et al. 2015). This includes limiting outside experts' roles to facilitate community participation (Kiyota et al. 2015). Moreover, involving the local government and bridging to other communities will also allow for new connections, resource achievement, and related needs for resilience. Ofunato Ibasho's success over 5 years has boosted social capital and strength and has received over 40,000 people for approximately 12,000 events which have been under the organization and leadership of local elders. The success of this partnership has pushed the replication

of this model in other countries such as the Philippines and Nepal (Kiyota et al. 2020).

Lastly, Barbara Nelson et al. (2003) provide another suggested model of building social capital. Their handbook aims to outline best practices for bridging social capital in organizations divided by historical conflict (e.g., religion, ethnicity, race, values). This international action project follows the models of existing concord organizations in the United States, South Africa, Israel, Northern Ireland, and Palestine (Nelson et al. 2003). Concord organizations are designed to develop an environment that reduces political and social conflict while promoting economic and community development as institutions that purposefully build bridging social capital (Nelson et al. 2003). As there are challenges from the lack of organizations that provide a space to continue learning on cross community work, they identified more successful practices to build bridging social capital including dialogue groups, small-scale witness activities, education and training activities, conflict management and mediation, community service, and economic development (Nelson et al. 2003, p. 8).

Applying the previous discussion to how social capital can support low-income community climate resiliency, there are opportunities for the three types of social capital to support this goal. Underprivileged communities can increase bonding social capital through community engagement activities. Strong leadership will support these initial conversations as the community members gain interest. Local government institutions can additionally support or initiate this by funding community centers, libraries, and other physical infrastructures that support community conversations. As social capital represents an investment in relationships that will bring resources for a particular goal, climate resilience would need to be set as a community goal. As these conversations or events occur, community members can branch out to diverse stakeholders or organizations that can support this (e.g., university faculty, community planners, non-profit organizations). The creation of new diverse relationships (i.e., bridging social capital) will need activities (e.g., dialogue groups or training activities) that can support trust among community members and these stakeholders. At the same time, these types of activities will allow for local knowledge to surface as well as barriers and opportunities to achieve the desired goal.

As climate resilience involves physical and social infrastructures, linking social capital will be essential to scale up efforts and bring financial and educational resources. Policy or activities to enhance social capital toward community resilience will also transition these individuals into agents of change while bringing awareness on alternatives for the betterment of their community. Governmental institutions can support social capital through the development of policies and activities as previously discussed. However, as stated (see Aldrich et al. 2016), there are challenges to achieve support at this level. For example, Warren et al. (2001) discussed that poor communities do not necessarily have low social capital but rather face challenges to access or develop these new ties due to racism, inequality, and other power dynamics. At the same time, these communities suffer from pre-existing ecological and physical vulnerabilities. In this sense, while social capital serves as a mechanism to

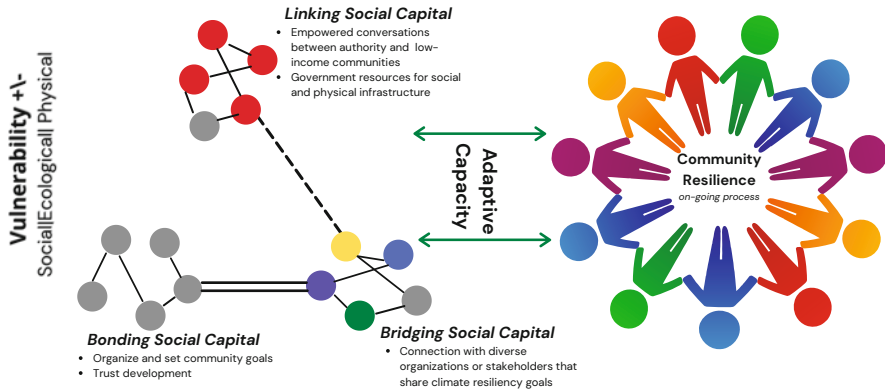


Fig. 2 Framework of social capital for low-income community to support resilience to climate change. (Adapted from Aldrich (2012))

increase adaptive capacity and subsequently community resilience, governmental institutions at all levels (local, regional, state) need to acknowledge the detrimental challenges that come from climate change and facilitate support through policy, activities, multi-sector collaboration, and direct funding. This is of particular importance for the context of climate change as these events impact large infrastructures that these communities have no control over. In these ways, through its three distinct categories (i.e., bonding, bridging, and linking), social capital is an asset to support adaptive capacity, strengthening the ongoing process of community resilience to climate change. The figure below provides a framework adapted from Aldrich's (2012) discussion of social capital and community resilience to present the possible role of social capital in low-income communities to support community resilience to climate change (Fig. 2).

7 Conclusion

This chapter has reviewed how social capital – bonding, bridging, and linking – can be leveraged to build climate-resilient societies. Bonding capital, which describes ties among people in a community who are socially close, helps communities work together. Bridging social capital, which describes ties among people in a community who are socially distant, can help gain broader skills, resources, and cooperation. Linking social capital, which describes ties to people beyond the community, can access resources and assistance from powerful institutions and actors. Social capital can help build resilience to climate change by building adaptive capacity in social-ecological systems and helping a system bounce back from shocks. Addressing lessons learned from global research, it discusses ways in which social capital can be built and nurtured. Yet our review of the literature on disaster, environmental management, and climate change also indicates the need for caution. Social capital can have unintended negative effects, such as restraining collective action (e.g., lack

of rule enforcement) or resulting in unequal resource distribution. In addition, social capital is not a cure-all, and cannot overcome large-scale inequalities and injustices stemming from colonialism, capitalism, or racism.

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