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Abstract	<p>Over the past century, a number of mega catastrophes have revealed mitigation, risk reduction, and disaster recovery as processes which primarily revolve around social, not physical, infrastructure. Residents with deeper reservoirs of social capital display more resilience than individuals who have fewer social ties, so that areas in which horizontal associations are more active are more likely to regain population lost to disaster. Further, in the absence of a strong government, informal and formal institutions including neighborhood associations and organized criminal groups (such as the yakuza in Japan) may serve as providers of key resources when standard sources of information, assistance, food, and aid are closed. Decision makers and scholars alike must recognize that, given the unavoidable nature of risks and the increasing frequency and severity of disaster, social capital and social networks will be core engines for mitigation and recovery in the future.</p>
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Chapter 8 1

The Emergence of Civil Society: Networks 2

in Disasters, Mitigation, and Recovery 3

Daniel P. Aldrich 4

8.1 Introduction 5

On 11 March 2011, a tremendous earthquake occurred off Japan's northeastern shore, registering 8.9 on the Richter scale and causing office buildings in Tokyo – more than 200 miles away – to sway like trees in a wind. The quake itself did little damage in terms of casualties – fewer than 5 % of the 19,000 or so victims died from collapsed homes, buildings, or structures. Instead, the earthquake triggered a towering tsunami which, within 40 min, had decimated villages in the coastal prefectures of Iwate, Miyagi, and Fukushima. The quake and the 40-ft tall tsunami disrupted the backup cooling systems of the Fukushima Dai-ichi nuclear reactors operated by the Tokyo Electric Power Company (TEPCO). While the seismic activity automatically triggered a shutdown of the three operating plants (out of the six on site), residual heat within them spiked upwards of 2,000° F despite attempts to keep them cool. The zircalloy fuel rods holding the nuclear fuel (uranium oxide pellets) melted, dropping the fuel onto the floor of the pressure chambers; engineers believe that there were complete meltdowns in the three reactors and these may have created cracks in thick steel plate floors. 6-20

Despite initial hesitation about the proper course of action, TEPCO and the government (along with members of the US military) worked to pump salt water into the complex to reduce the temperature (in a procedure labeled by engineers as a 'feed and bleed' process), vented the reactors to the atmosphere to reduce the pressure, and sought to evacuate residents who were at risk of exposure to radiation. At one point, more than a quarter of a million people evacuated from their homes, either due to the destruction of the tsunami (which traveled as far inland as 2 miles) 21-27

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28 or due to concerns about radiation exposure. More than 85,000 people living in and
29 around Fukushima prefecture may not be able to return to their homes for years, if ever.

30 Japan's 3/11 catastrophe typifies what experts call a 'compound disaster' – an
31 event which interacts with technological, political, social, and geographic condi-
32 tions and magnifies the overall negative externalities. Several other recent high pro-
33 file disasters also qualified as compound disasters; Hurricane Katrina, where the
34 bulk of the damage to the city of New Orleans came not from the storm itself, but
35 from the structural failure of the levees built by the Army Corps of Engineers, is
36 another. Due to high engineering standards and mitigation plans, the Tōhoku quake
37 itself caused little damage to either people or facilities across Japan, but in combina-
38 tion with the lax regulation on coastal construction, the placement of generators and
39 batteries at sea level, shortage of alternative transportation infrastructure, and the
40 location of nuclear power plants in highly vulnerable areas within meters of the
41 ocean, the earthquake triggered a crisis which is still ongoing. The destruction of
42 thousands of homes and lives along the Tōhoku area coast has raised questions
43 about Japan's long term plans for coastal development, accelerated demographic
44 changes in the nation's periphery, and raised questions about the economic viability
45 of many fishing communities. The ongoing nuclear crisis has resulted in the
46 banning of a number of agricultural products from the area (including beef, tea, and
47 rice), anxiety among parents and residents about radiation exposure, and an under-
48 mining of confidence in Japan's nuclear energy program.

49 The disaster has had an impact far beyond Japan's shores, prompting other
50 advanced industrial democracies such as Germany, Italy, and Switzerland to move
51 away from atomic energy despite large scale investments in the industry. In Japan,
52 that nation's long term energy plans are shifting away from a focus on nuclear
53 power to one involving safer alternative and renewable sources, including solar and
54 geothermal power. Much of the critical discussion about Japan's response to the
55 quake and ongoing nuclear risk has focused on the work of the central government,
56 large scale nongovernmental organizations (NGOs) such as the Red Cross, and
57 private firms, such as TEPCO and the other regional power monopolies. The
58 central government, for example, works as a unitary, not federal government,
59 holding the purse strings for local governments, which cannot carry out much of the
60 recovery work without Tokyo's support. Critics have singled out these actors for
61 tremendous criticism, ranging from the fact that it took the Red Cross almost
62 4 months to start distributing 169 billion yen in donations to victims, to the slowness
63 and inflexibility of the central government's handling requests from local communities
64 for aid and logistics.

65 However, the ham-handed responses from the government and the slow release
66 of data and crucial radiation information from TEPCO have brought about a silver
67 lining: the visible emergence of the effectiveness of civil society in post-disaster
68 settings. The critical role of citizens and residents – and not formal state or private
69 sector institutions – can be seen in disasters around the world, ranging from their
70 role as first responders to their long term involvement in city planning. Furthermore,
71 disasters may serve as catalysts for less active social networks, pushing them to
72 become more active in situations where the government and other providers have

failed to perform well. In Japan, for example, the government's slow and incomplete response to the Tōhoku disaster has brought about new forms of transparent 'citizen science' along with a more informed and active citizenry which is willing to directly confront the government. This chapter will underscore the role played by networks of residents, volunteers, and even the mafia in disaster response along with post-crisis recovery and mitigation.

8.2 Social Resources in Disaster

A number of recent academic works have underscored the role of norms, trustworthiness, group solidarity, and mobilization after crises and disasters in different time periods and cultures. Rieko Kage began her 2010 book *Civic engagement in post-war Japan* by showing that levels of recovery after World War II varied tremendously among the 47 prefectures in Japan. Using quantitative data on the number of jobs, hospitals, elementary schools, and library books in each prefecture, she demonstrated how connections among citizens – measured through proxies such as the volume of mail per capita – interacted with other variables to help drive the process of rebuilding. State assistance by itself would not have been able to effectively guide recovery, but by interacting with local citizens, voluntary groups, and other horizontal associations, planners were better able to accelerate the growth process. Local civil society was able to better guide state resources where they were most necessary and avoid duplication and unnecessary investments. Kage's book also used case studies of the Japanese YMCA and judo clubs to show how civic engagement and volunteerism flourished in Japan's new democratic environment and further contributed to its post-war growth. In precisely the environment where we might expect social capital to fail – a society where most urban centers had been reduced to rubble, where millions of citizens had been stationed abroad as soldiers or colonists, and where the government had suppressed democratic thought and activity – it provided a core component of Japan's postwar 'economic miracle.'

Emily Chamlee-Wright's 2010 book *The cultural and political economy of recovery: Social learning in a post-disaster environment* emphasized local narratives, norms, and expectations in New Orleans following the 2005 Hurricane Katrina. Through approximately 300 or so interviews with survivors in locations such as the Village de L'est, the Lower Ninth Ward and Lakeview, Chamlee-Wright found that different neighborhoods had very different stories of their own evacuation, survival, and renewal. Residents in these communities drew on different cultural toolkits for handling the trauma of destruction. Some neighbors had strong self-help ethics which drew neighbors and even strangers together into collaborative efforts to tear down moldy dry wall, work collectively to restart electricity and other utilities, and push local institutions to restart. Other areas of New Orleans seemed to be waiting for aid from the authorities, and displayed less cooperative behavior and a slower pace of regrowth over time. Her focus on "the structure of socially embedded resources" illuminates how, more than aid from the government or damage

114 from the disaster, local norms and social resources strongly determined the trajec-
115 tory of recovery in the Big Easy (Chamlee-Wright 2010, p. 16).

116 Rick Weil and his research team have interviewed more than 7,000 residents
117 across New Orleans and gathered data about civic engagement, community work,
118 participation, crime, and recovery, among other factors. His research, like that of
119 Chamlee-Wright, demonstrated the deep connections between positive recovery
120 outcomes and a whole battery of factors related to volunteerism, mobilization, and
121 other collective resources. At the census tract, the indicators of associational
122 involvement, civic engagement, service performance, holding social trust, and
123 attendance at public meetings positively correlated with higher levels of repopula-
124 tion (Weil 2011). Areas whose citizens did not vote, get engaged in group activities,
125 or work for a common cause are those where blight, crime, and slow recovery
126 remain most evident after the storm. His research hammers home the message:
127 recovery is not primarily a function of government aid, or damage, or wealth before
128 disasters. Rather, social relationships are the drivers of recovery.

129 8.3 Three Categories of Social Capital

130 These and other scholars have sought to categorize the role played by the ties, con-
131 nections and networks that bind us together – resources known by social science as
132 social capital – in the process of disaster recovery and mitigation. Initially named by
133 L.J. Hanifan in the early twentieth century, expanded upon by Pierre Bourdieu
134 (1986) and James Coleman (1988), the field of social capital exploded after Robert
135 Putnam popularized it in his study of the civic roots of Italian economic develop-
136 ment (1993) and his follow up research on declining levels of engagement in the
137 United States (2000). Researchers have categorized social capital into three types,
138 depending on the types of connections in the relationship.

139 The first and most common form of network is bonding social capital. Sociologists
140 have long argued that we connect most regularly and easily with individuals who
141 are similar to us; this condition is called homophily (c.f. Rueff et al. 2003), and
142 predicts, for example, that middle age Japanese housewives are likely to have class
143 friends of similar age and gender. Bonding social capital connects these kinds of
144 kin, family, and friends and can be seen as a “horizontal” connection between indi-
145 viduals of the same power levels. It is strongest in homogeneous communities and
146 often results in closed networks which are relatively stable over time because they
147 are composed of like-minded, similar-value holding residents. Residents in the
148 primarily African-American neighborhood of the Lower 9th Ward in New Orleans,
149 for example, are more likely than counterparts in the Lakeview neighborhood to
150 know their neighbors’ names, engage in regular communal group activities, and
151 have higher levels of trust in nearby residents (Elliott et al. 2010). Granovetter’s
152 work envisioned these types of connections as ‘strong ties,’ in contrast to weak ones
153 (1973); in such networks, daily or weekly direct contact is the norm. Studies have
154 demonstrated that bonding social capital does not necessarily generate strong

economic growth or motivate entrepreneurial behavior (Gittel and Vidal 1998). Instead, bonding social capital has helped poorer communities 'get by,' but not necessarily 'get ahead' (Narayan 1999; Woolcock 2000). Bonding social ties reinforce tendencies toward homophily but provide few resources beyond often geographically circumscribed boundaries.

The second type of social capital is labeled bridging social capital, and it connects between often isolated or enclosed groups. Parent Teacher Association (PTA) meetings, which bring together individuals who may normally not have encounters in their regular social circles, can foster this type of connection. Other formal institutions and associations such as hobby and sport clubs, employment groups, unions, and schools may create bridging social networks. Bridging social capital has the capacity to cross cultural, religious, and racial lines and reduce conflict among ethnic groups.

Ashutosh Varshney has argued that communities with more bridging organizations experienced fewer (often deadly) Hindu-Muslim riots over the late twentieth century (2002). Through direct contact on a regular basis through cross-cultural voluntary associations, both Hindus and Muslims could reduce ethnic tension, smooth over differences, and solve potentially explosive conflicts before they reach the streets. Granovetter (1973) has argued that 'weak ties' between people who may have little or no direct regular contact, but instead provide extra local, extra-network resources, are most critical in processes such as job searches. That is, many people find jobs not through their personal friends, but rather through friends of friends and colleagues. As a result of research on bridging social capital, institutions such as the Concord Project have sought to "bring together people with fundamentally opposing views or identities for the purpose of promoting civil society while recognizing group differences" (Nelson et al. 2003, p. 1). The Concord Project was founded on the belief that bridging social capital acted as a resource which would create a more harmonious society.

The third and final type of social capital comes when individuals and nodes are connected not through standard horizontal ties – when the connections stretch between people of similar status and power – but rather through vertical ties (Szreter and Woolcock 2004). Scholars have titled this connection as linking social capital. Residents of the Village de L'est neighborhood in northwestern New Orleans rarely interacted with city government officials, NGO leaders, or decision makers before Hurricane Katrina's advent in 2005. Once the storm decimated the city and flooded their neighborhood, though, they quickly worked to find allies and politicians within the power structure who could assist them in their drive to re-establish their community. Their search for power brokers in the administration contrasted with members of the Lakeview community, many of whom already had direct personal ties with city government officials well before the storm.

Similarly, local residents in poverty-stricken villages in the Indian state of Tamil Nadu rarely met their local 'collector,' that is, the government representative who travels throughout sub-regions to connect citizens with government services. The government has published public lists with email and phone contact information for these officials (see <http://www.tn.gov.in/telephone/collectors.html>) to better

200 connect residents with assistance. Linking social capital provides access to translocal
201 resources, information, and services that are often embedded with decision makers
202 who operate above the day-to-day lives of most residents. Given these different
203 types of social networks, how do social resources focus after crisis?

204 **8.4 Social Capital Mechanisms**

205 My work in disaster recoveries in India, Japan, and the United States has demon-
206 strated that social networks provide assistance before, during, and after disaster
207 through at least three overlapping mechanisms: exit vs. voice, the provision of informal
208 insurance and mutual assistance, and the overcoming of barriers to collective
209 action (Aldrich 2012a). The first decision each survivor must make is to either
210 return to a damaged home or to uproot stakes and relocate to a new community. Of
211 course, in some cases the government will not allow survivors back in; this has been
212 the situation for Japanese survivors of the tsunami whose homes were within 20 km
213 of the Fukushima Dai-ichi nuclear power plants. For those citizens, while they can
214 break the police cordon around the area and return illegally, the radiation levels in
215 these 'hot spots' have created an environment unsafe for long term habitation.

216 But for the vast majority of disaster survivors, they must select either 'exit' or
217 'voice.' These terms are borrowed from the work of Albert Hirschman (1970); he
218 discussed the decision making heuristics of disappointed clients and customers who
219 can either stop patronizing a business (exit) or complain to improve levels of service
220 (voice). Exit in a post-disaster setting means relocating to a new community, possi-
221 bly quite far from one's initial home. Internally displaced people from New
222 Orleans settled as far away as Arkansas and Massachusetts in the diaspora after
223 Hurricane Katrina; many others settled in Houston, Texas. Many of these displaced
224 New Orleanians remain in their new communities some 6 years after the storm.

225 The decision to stay and rebuild whatever the costs, or to start over in a new loca-
226 tion, is heavily influenced by social networks. For individuals who are only loosely
227 connected to a location, or for those who have fewer friends, family, and kin in the
228 area, relocating may be less painful and hence more likely. If one's job has been
229 lost, and one has few friends in the area, restarting life a new location may be a
230 refreshing start. On the other hand, for residents who feel tightly bound to a sense
231 of belonging to local networks, or have friends or family who are staying in the
232 damaged area, relocation may not be an option even if the rebuilding will be an
233 expensive and slow process. Their love for their neighborhood and their connec-
234 tions to their neighbors have them eschew exit and use their voice; they will join
235 with other concerned local citizens to have their needs met by the government.
236 Research on Tokyo residents after the 1923 earthquake which leveled roughly
237 half of the capital city has shown that neighborhoods in which people worked
238 together on common causes – through political demonstrations, riots, and voting,
239 for example – were the ones which regrew population levels most effectively
240 (Aldrich 2012b).

The next mechanism by which social capital works following a crisis is through the provision of informal insurance or mutual assistance. Many people around the world receive services, such as information, medical assistance, child care, food, and water from a combination of public and private organizations. Government welfare offices, free or private medical clinics, and public or private childcare providers are in high demand around the world. Following a severe crisis, these institutions may not be open or able to provide such services to their constituents. After hurricane Katrina in New Orleans, for example, there were almost no grocery stores, hospitals, gas stations, or kindergartens in the city itself. However, members of social networks can serve as substitute – even if temporary – providers of these services when standard providers cannot.

When local stores are shut down and residents need power tools to remove moldy dry wall, they ask neighbors if they can borrow them. If a day care is shut down, local mothers may form a round-robin daycare group until a more permanent solution can be found. Importantly, disaster survivors in need of information about logistics such as restarting utilities, registering a home as damaged, or signing up children in a new school system, will seek out this information from their networks. Similarly, survivors who need damaged homes repaired by contractors will ask their friends and neighbors for the names of those who can be trusted. Those survivors with fewer contacts – that is, lower levels of bonding, bridging, and linking social capital – are at risk of being outside critical information loops and missing the boat (or deadlines, as the case may be) in important areas.

The third mechanism by which social capital alters the recovery trajectory is through lowering the barriers to collective action. During and after disasters communities may have a number of commonly held goals and targets – deterring looting, removing debris, and pressuring local and national authorities to dedicate more resources to their area. Successful accomplishment of these goals requires more than just individual action and will, however. In order to deter looting, local citizens must systematically work to keep out potential thieves and coordinate their watches over the area. The creation of a clean, debris-free neighborhood requires all local homeowners and renters to move their garbage out of the area and keep others from dumping in their neighborhood.

[AU1] Mancur Olson (1965) and other social scientists established decades ago that there are high barriers to collective action – individuals would often prefer to free ride on the accomplishments of others. Given that highly motivated residents may act independently and take on broader responsibilities, the motivation to shirk for less outgoing individuals is quite high. Why would I use up valuable time and resources to join a community watch patrol if I believe that my eager-to-serve neighbor will fill in for my absence? Why bother walking my garbage an additional hundred yards to a special dumpster if I can toss it over into a ravine or onto the street? These problems require collective obligation, an expectation of surveillance, and a long term perspective.

Neighborhoods with higher levels of bonding social capital are ones where successful collective action is most likely. The aforementioned of Village de L'est in New Orleans returned to their damaged homes far earlier than other communities

286 and found themselves without power and other utilities. They contacted the local
287 utility in New Orleans, Entergy, and were told that they must submit a petition with
288 several hundred names in order to show that they had sufficient numbers to justify
289 these actions. They easily collected several hundred signatures within days of the
290 request. In areas where trust is lower and neighbors have less contact, collective
291 action becomes almost impossible. Following the 1995 Kobe earthquake, the local
292 government offered condominium owners free debris removal if they could provide
293 signatures of all owners within a set period of time. Unfortunately, very few condos
294 took advantage of this offer because they did not have the information about the
295 location of their neighbors.

296 **8.5 Filling the Gap: Weak and Failed States**

297 Some may imagine that social networks and social capital serve as important parts of
298 recovery and mitigation only in advanced industrial democracies, such as Japan,
299 Germany, or the United States. Observers may argue that social networks cannot play
300 such strong roles in weak or failed states. But the crucial role of communities, mutual
301 assistance, and norms of trustworthiness has emerged even in disaster responses in
302 developing nations with weak governance structures, such as Haiti. On 12 January
303 2010 a 7.0 earthquake struck some 20 miles away from Haiti's capital Port-au-Prince,
304 collapsing buildings, homes, and roads. Estimates of casualties go as high as 300,000,
305 with more than a million residents made homeless by the event (Reuters News, 12
306 January 2011). Immediately following the quake, neighbors, friends, and family
307 began to dig in the rubble to try to free those trapped underneath. As we have seen in
308 past disasters, the first responders were not professional fire fighters, police officers,
309 or uniformed military personnel, but instead those who knew where to find the
310 bodies. People who were able to use shovels, hands, and other improvised imple-
311 ments tried to save those survivors buried in the ruins. Beyond the emergence of
312 members of civil society as first responders, post-earthquake Haiti provides another
313 example of the power held by communities and norms after crisis.

314 A number of Haitian residents whose homes survived the quake opened them to
315 internally displaced people, providing shelter and food despite the lack of a mandate
316 from the state or supplies from the private sector. People set up pots of food to share
317 with passersby, and sought to provide what creature comforts that they could. In this
318 environment of communal sharing, individuals seen as violating collectively held
319 norms of cooperation and mutual aid were punished severely. Several reporters cap-
320 tured the gruesome scene as a crowd distributed their form of justice to a suspected
321 thief, who was beaten to death and then dragged through the streets (17 January
322 2010, *The Guardian*). This unfortunate outcome arose out of the recognition by
323 locals of the need to work together and protect each other from outsiders who might
324 upset the delicate balance of demand and supply.

325 Civil society and social networks will often move to fill in a vacuum left by a
326 weak, absent, or poorly performing state. These networks may not be the 'good'

social capital that many citizens hope to see active in their backyards. Instead, well organized criminal groups, especially highly disciplined and well-resourced mafia associations, regularly emerge after disaster to provide supplies, deter looting, and assist victims. The motivation for these groups to undertake philanthropic activities is unclear. After Japan's triple-disaster in March 2011, when asked why gangsters worked so hard to deliver supplies to the area, a Japanese mafia boss was quoted as saying "It takes too long for the arm of the government to reach out here so it's important to do it now" (Reuters, 25 March 2011). His words implied that these organizations acted out of a desire to improve the public good. Critics – especially in law enforcement agencies – say that these are attempts to rehabilitate tarnished public images; one observer argued that the yakuza simply enjoy publicity (National Post, 23 July 2003). Whatever the reason, the involvement of these non-governmental, 'uncivil' civil society organizations in disaster recovery is well documented.

In Japan, the mafia group known as the yakuza is well organized and operates visibly, especially in cities such as Kobe and Osaka. In these urban metropolises, local yakuza groups may even hang out their 'shingle' for all to see. On the 17 January 1995, at around 5:45 am, an earthquake registering 6.8 on the Richter scale struck near the densely populated city of Kobe. Close to 6,500 people lost their lives as buildings, homes, and roads across the area collapsed. Fires broke out, and while volunteer fire brigades organized to combat the blazes, many trucks could not reach victims or their homes in time due to narrow streets which were blocked with rubble. The government moved slowly to call out the Japanese Self Defense Forces (SDF) for assistance. In the meantime, as citizens dug with their hands and other simple tools in the rubble, the local yakuza clans organized the delivery of supplies (Fukushima 1995). Some have claimed that the Yamaguchi-gumi criminal syndicate – one of the largest in Japan – was "one of the most responsive forces on the ground" (Adelstein 2011). While these groups operate beyond the law and have been implicated in crimes including stock market manipulation, extortion, and prostitution, they effectively provided post-disaster assistance. Beyond the work of these peripheral social groups post-disaster, recent events in Japan have triggered a renaissance in civil society.

8.6 The Surge in Civic Activities in Post-3/11 Japan 359

Residents who believe that their governments and dedicated aid organizations are performing poorly may take action when such citizens in the past were reluctant to do so, and this has been the case in post 3/11 Japan. Outsiders have regularly seen Japanese civil society as weak, with civil society organizations (CSOs) only coming into their own since the 1980s (Hirata 2002). Observers have categorized civil society in Japan as "underdeveloped in the arenas that promote democratic agenda" and "underprofessionalized" as it lacks a large cadre of trained professionals in the field (Lowry 2008).

368 Past disasters in Japan have created 'silver linings' of volunteerism. After the
369 1995 Kobe earthquake, for example, more than one million volunteers flooded into
370 the city to assist, and this outpouring of volunteers triggered a radical shift in Japan's
371 laws towards nonprofit organizations (NPOs) (Haddad 2007). In 1998 the govern-
372 ment passed the so-called NPO Law (Law for the Promotion of Specified NonProfit
373 Activities) and followed up with the 2001 tax reform which provided tax privileges
374 to the NPOs (Pekkanen 2006). These regulations made it far easier for groups across
375 Japan to receive administrative and financial benefits if they registered with the
376 government and were officially recognized. In the late 1990s, there were fewer than
377 1,000 recognized NPOs in Japan, but by 2005 more than 20,000 had signed up, and
378 by 2011 more than 41,000 were in the system. Despite this tremendous growth
379 in the number of registered NPOs, in international perspective, these numbers
380 (especially as a percentage of the population) are quite small, and NPOs remain
381 constrained by very small budgets, staffs, and membership levels.

382 The Tōhoku disaster and the resulting Fukushima nuclear crisis have altered the
383 civil society landscape for many Japanese residents, however. For the first few days
384 after earthquake and tsunami struck, many people living nearby the Fukushima
385 Dai-ichi received contradictory information. The Fukushima government initially
386 ordered those within 2 km to leave at 7 p.m. on the day of the tsunami, and then the
387 next day the government expanded this evacuation zone to 20 km. On March 16 the
388 United States government advised US citizens within 80 km of the plant to seek
389 shelter elsewhere, while the Japanese government told citizens within 20–30 km not
390 to leave their homes (BBC News, 16 March 2011). Specifically, then-Prime Minister
391 Naoto Kan told residents, "Please do not go outside. Please stay indoors. Please
392 close windows and make your homes airtight." The US government, at the same
393 time, assisted US military and diplomatic personnel with evacuation from the
394 country. Government authorities argued that they relied on information provided
395 to them by the Tokyo Electric Power Company (TEPCO), which was slow in
396 revealing radiation levels at and around the plant. Later TEPCO argued that failed
397 sensors caused it to under report radiation exposure both to workers at the plant and
398 nearby residents.

399 Many Fukushima prefecture residents argued that they felt betrayed by years of
400 reassurances that accidents at Japanese nuclear power plants were not possible. One
401 older evacuee told reporters, "We knew it was close by, but they told us over and
402 over again that it was safe, safe, safe, safe. I can't believe them now. Not at all" (AP
403 News, 15 March 2011). Mothers of children have been especially vocal about their
404 distrust of the government and the private sector's statements. One mother, who
405 planned on moving some 20 miles further from the plant, told her interviewer that
406 "When the explosion happened, they didn't say anything about it being dangerous.
407 We don't trust the media either, since the nuclear plant operator sponsors many
408 newspapers and television stations" (Lim 2011).

409 Parents of school aged children have argued that the government did little to deal
410 with the pressing issue of decontamination of playgrounds and topsoil near schools,
411 where children regularly play. As a result, many school administrators and parents
412 have kept children indoors during the spring and summer because of fears about

radiation exposure. To avoid having tremendous amounts of land declared hazardous, the government has relaxed standards from pre-Fukushima levels in another move which had many Japanese citizens wondering about 'safe' levels of exposure (Watts 2011). The central government recently released additional funding to help remove topsoil from schools in and around the area, but for many parents, it was too little, too late. In Fukushima, each resident can now receive a full body radiation scan along with an invitation to participate in a longitudinal health study on the effects of radiation exposure on health.

In this blizzard of anxiety and confusing and often contradictory claims, many citizens have stepped forward and begun to work to produce clear information through transparent citizen science. Combining 'street science' with crowdsourcing social media tools, the new NGO Safecast project enables volunteers to post radiation level readings to a public website. The maps on Safecast's website utilize more than 600,000 data points collected by volunteers across Japan wielding Geiger counters; by working collectively, they have created detailed, up to date color-coded radiation level maps of Japan. Where the bureaucratic response to a nuclear accident has been to evacuate citizens in concentric circles, these bottom-up maps have shown instead that wind patterns, topology, and geography create hot (and cold) spots in nonlinear, non-predictable ways. Beyond a group of core volunteers who use their cars to take continuous readings, the project enables anyone within Japan to submit their own Geiger counter readings. Sociologists and anthropologists studying Japan often stress the norms of obedience and submission to authority (Nakane 1967; Miyamoto 1995); the creation and maintenance of the Safecast project has been one way that an independent and engaged civil society has emerged in the post 3/11 environment.

Another interesting site of a more active civil society has been the interaction between Fukushima citizens and government decision makers. Past research on conflict in Japan has stressed that Japanese parties usually seek to privatize conflict, removing it from the public realm and thus 'saving face' for participants (Pharr 1990). Hence many studies have shown that Japan has fewer marches and demonstrations than Western nations, and that surveys underscore many Japanese citizens are far less likely to participate in such public protest than counterparts abroad. Therefore recent videos of open strife between local residents and government bureaucrats over the issue of radiation exposure and contamination show how much has changed. Audience members at public meetings asked questions such as, "As other people do, Fukushima residents have a right to avoid radiation exposure and live healthy lives, right?" to which the attending bureaucrats could only respond, "The government has tried to reduce radiation exposure as much as it can." Amazingly, audience members then raised their voices to express their displeasure, shouting out that the civil servants had not answered the question. This and other uncomfortable confrontations in post 3/11 Japan – such as the TEPCO president's visits to temporary shelters where evacuees challenged his handling of the situation – illuminate a society in which citizens may no longer accept the government's or private sector's answers as gospel. A final sign of a more active citizenry have been the large scale marches against nuclear power in Tokyo and other major urban

458 centers. In mid-September 2011, some 50,000 people marched in the Sayonara
459 Nuclear Power rallies, undertaking some of the largest demonstrations in that nation
460 in decades (The Economist, 24 September 2011). While the 3/11 disaster may have
461 put many lives at risk, it may also be opening up a new era in civil society-state rela-
462 tions where local residents, the social networks that bind them, and civil society
463 organizations work together to enact policies in their best interest.

464 8.7 Conclusions

465 This chapter has pushed for the recognition of social resources as critical ones in
466 response to disasters. Where standard government and NGO policies on disaster
467 recovery have pushed for physical infrastructure repair and maintenance, such as
468 the repair of bridges, homes, and ports, this approach to crisis has instead seen
469 social infrastructure as the most important factor. Recent research in a number of
470 disaster sites, including post World War II Japan and post Katrina New Orleans has
471 found qualitative and quantitative evidence that social networks matter. The different
472 types of social capital – bonding, which links like-minded people, bridging, which
473 brings together different races, ethnicities, and religions, and linking, which connects
474 people at different power levels – work to assist survivors during and after crises.
475 Social capital works through reducing the use of ‘exit’ and strengthening ‘voice,’ the
476 provision of mutual assistance, the overcoming of barriers to collective action.

477 In developing nations like Haiti and advanced industrial democracies like Japan,
478 social networks provide critical resources, advice, and motivation to survivors and
479 guide them in their post-disaster behaviors. In Japan, after years of relative inactivity,
480 the 1995 Kobe earthquake and the 2011 Tōhoku earthquake have created new forms
481 of participation and altered the legislation relating to civil society. Where the
482 Japanese government and private sector have been slow to provide information,
483 citizen scientists have used social media tools to create transparent databases on
484 radiation exposure levels across the country. Where citizens previously attended
485 government-run meetings which were run as ‘rituals of assent’ (Gusterson 2000),
486 they now openly challenge decision makers and push them to answer questions
487 directly, along with gathering by the tens of thousands to show their displeasure
488 with central government policies.

489 Further, much work on civil society in Japan has emphasized the tight connec-
490 tions between civil society organizations and the central government (c.f. Schwartz
491 and Pharr 2003). Many observers would argue that trust in government regularly
492 correlates strongly with trust in other citizens. The new resurgence in civic activism
493 following 3/11 has challenged these conventional approaches to the field, and shown
494 that many citizens now act autonomously in direct opposition to government
495 policies. Where before the state’s intervention in civil society may have gone
496 unchallenged, many activists have raised their voices against the ‘nuclear village’
497 (*genshiryoku mura*) constructed with deliberate intent by central government deci-
498 sion makers. Citizens who before had faith that the government was acting in their

best interests have been pained by revelations that decision makers deliberately withheld critical data about radioactive contamination. 499
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Decision makers in NGOs and governments alike must understand that social networks will continue to play important roles in both mitigation and recovery from disaster. Whereas some disaster responses, such as the random placement of survivors in temporary shelters, actually damage existing social networks, future responses should incorporate social capital into their implementation. In an era when the number and costs of disasters will increase because of global climate change, social networks around the world will continue to serve as the engines of recovery. 501
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Author Queries

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Queries	Details Required	Author's Response
AU1	Olson (1964) has been changed to Olson (1965) as per the Reference list. Please check if appropriate.	
AU2	Please confirm inserted page rage for the reference Aldrich (2012).	

Uncorrected Proof