Response, Recovery and Greening in the Red Zone: Lessons for Policy and Practice

Keith G. Tidball, Marianne E. Krasny,
and Elon D. Weinstein
Cornell University

Tidball, Keith G.; Krasny, Marianne E.; Weinstein, Elon D. 2019. Response, recovery and greening in the red zone: Lessons for policy and practice. In: Campbell, Lindsay K.; Svendsen, Erika; Sonti, Nancy Falxa; Hines, Sarah J.; Maddox, David, eds. Green readiness, response, and recovery: A collaborative synthesis. Gen. Tech. Rep. NRS-P-185. Newtown Square, PA: U.S. Department of Agriculture, Forest Service: 24-43. https://doi.org/10.2737/NRS-GTR-P-185-paper2.

In "Greening in the Red Zone: Disaster, Resilience, and Community Greening," Tidball and Krasny (2014a) make the case that creation of and access to green spaces promotes individual human health and community healing, especially in therapeutic contexts among those suffering traumatic events, asserting that making and being in green spaces confers resilience and recovery in social-ecological systems disrupted by violent conflict or disaster. To make this case, and to understand the broader implications of humans turning to nature in times of disaster or crisis, the authors proposed working definitions of greening and red zones, as well as a conceptual or explanatory framework. Such a framework describes the relationships between the act of greening and other components of the social-ecological system in which these actions are nested. The "Greening in the Red Zone" approach leverages the notion of resilience, which offers a strong foundation for understanding the role of greening following disaster and conflict at multiple, interrelated levels—individual, social, and ecosystem.

In brief, greening refers to the activities of humans, working alone or more commonly with others in their community, to restore local social-ecological systems through such activities as community gardening, community forestry, and improving habitat for wildlife and aquatic biodiversity (Tidball and Krasny 2014b). The term "red zone" refers to multiple settings (spatial and temporal) that may be characterized as intense, potentially or recently hostile or dangerous areas or times, including those in post-disaster situations caused by natural disasters such as hurricanes and earthquakes, as well as those associated with terrorist attacks and war (Tidball and Krasny 2014b). Social-ecological systems are complex, integrated systems in which humans are part of nature (Berkes and Folke 1998). Resilience, in broad terms, refers to the ability of humans, communities, and larger social-ecological systems to rebound and to reorganize in the face of outside stressors, including death of loved ones and full-blown war and conflict or disasters. During such times of crisis, breakdown, and reorganization, existing and potential sources of resilience often come to the fore; for this reason, discovering, building, and safeguarding those sources of resilience is critical to recovery from crisis (Walker et al. 2002). Greening, then, as a form of human agency and collective action applied to environmental stewardship, represents a critical source of resilience at individual, interpersonal, community, and even wider scales.

Examples

Although not often enough recognized in policy and research agendas, cases where humans who face disaster, conflict, or stress turn to greening as a source of resilience abound as evidenced by the chapters of "Greening in the Red Zone."

Often viewed from the perspective of their negative environmental, social, and cultural repercussions, shocks or crises that result in serious disruptions to normal processes can help communities move beyond a state of denial and in so doing, "open up opportunities for reevaluating the current situation, trigger social mobilization, recombine sources of experience and knowledge for learning, and spark novelty and innovation." Further, such changes may "lead to new kinds of adaptability or possibly to transformational change" (see also Olsson et al. 2007, quoted from Folke et al. 2010). Whereas a number of more formal processes exist for fostering such transformational change (e.g., scenario planning among watershed stakeholders, Peterson et al. 2003) here we are focused largely on transformational changes that emerge, or are "self-organized", following shock or crisis. We find multiple examples of how a crisis—including natural disturbance, conflict, and slower decline, often acting in concert—spark reevaluation, social mobilization, the coming together of multiple experiences and knowledge, and innovation. One needn't look far to find examples of self-organized greening that integrate components of transformation—whether in the creation of a community garden that brings together former enemies to create something of value and beauty on a site symbolic of devastating ethnic conflict in Soweto (Shava and Mentoor 2014), the construction of a series of 9/11 memorial green spaces in New York City (Svendsen and Campbell 2014), or the coming together of war veterans in a fishing stream in upstate New York (Krasny et al. 2014).

Even those greening responses that are initially self-organized with leadership from single community leaders or small groups of neighbors, often soon grow to involve multiple levels of governance reflecting a network of community organizations, government institutions, nongovernment organizations (NGOs), and sometimes business. Such connectivity enables those engaged in experimentation at small scales—the replanting of forests or reconstructing of wetlands—to learn across multiple experiments. The ability of actors from different levels of governance who are engaged in experimentation and learning to bridge from community to higher levels of social organization provides a means for what begins at a small scale to spark transformational change at increasingly wider scales (Folke et al. 2010). However, given barriers to transformational change embedded in existing policies and power structures (Pelling and Dill 2009), the challenge for proponents of greening's transformative potential continues to lie in understanding the processes and sources of resilience and adaptive and transformative change at multiple levels. Although at times critiqued for its broad notions of social-ecological processes (Brand and Jax 2007), the growing body of resilience scholarship provides an important avenue for gaining such an understanding through sharing results of experiments, observations, and

reflections among an international network of scholars and practitioners concerned with social-ecological system change (Elmqvist 2014).

Despite the many examples above and related arguments by scholars writing about major disturbances and the environment (cf. Dabelko and Conca 2002, Machlis and Hanson 2008), in most cases policymakers dealing with conflict have expressed little interest in trees or other green infrastructure, except perhaps as a commodity (Jonnes 2011). In stark opposition to notions of how greening may provide space for adaptive governance, novelty and learning in post-crisis, and thus may open up opportunities for self-organized and collaborative transformations to emerge, municipalities and governments often respond with increased rigidity following a disturbance. We see this often when law enforcement agencies refuse to allow citizens to enter public parks and green spaces after a crisis, such as after Hurricane Sandy (beaches; Chan et al. 2015) and Hurricane Katrina (green spaces; Deflem and Sutphin 2009).

While reestablishing order post-disturbance is critical, greening can be a next step in opening up possibilities for transforming a system that has collapsed or been severely damaged. Engaging people in meaningful and collective action that draws on their knowledge and experience in growing things and their capacity as local leaders, and that provides opportunities to participate in local governance, to express biophilia and topophilia, and to transform often degraded ecosystems, may be an overlooked source of resilience in post-conflict and post-disaster settings.

What challenges do members of the policy-making community face in considering green infrastructure, and perhaps more importantly the *act of greening*, as components of recovery efforts following war, disaster, or other sudden and large-scale perturbances? We can identify at least five major barriers and related opportunities regarding how practitioners might change the policy landscape in response and recovery efforts.

Barriers and Opportunities in the Greening in the Red Zone Approach

Similar to how social-ecological systems can be resistant to change, the policy-making "system" itself may be subject to its own resistant feedbacks and traps (Tidball 2016, Tidball et al. 2014, Tidball et al. 2016). Thus, one might envision a particular policy-making community as either a subsystem or "basin" characterized by certain features within a larger landscape of multiple policy options or basins, or as a meta-system itself containing multiple options or basins. As is the case in social-ecological systems, barriers to moving from one policy option to another are not easy to overcome (Figure 1).

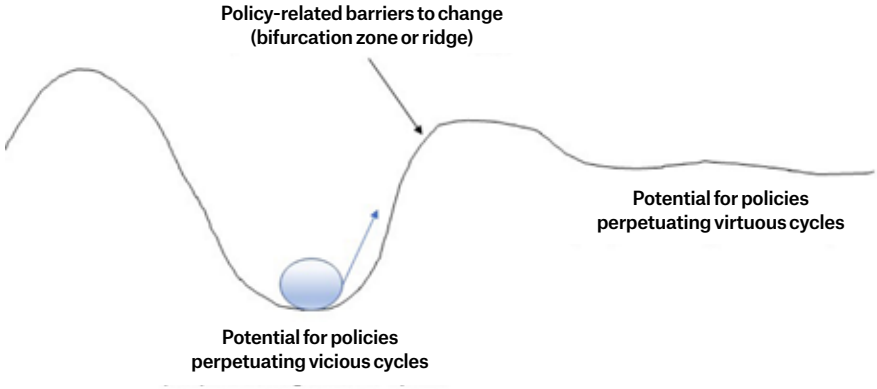

Figure 1: Policy barriers as ridges in a stability landscape, based on Tidball et al. 2014 and Tidball et al. 2018.

Image by Keith G. Tidball, used with permission.

Though ubiquitous, these stability landscapes, or ball-in-cup diagrams, are useful metaphors and heuristic devices for visualizing multiple system states (Tidball et al. 2017). Keeping this metaphor in mind, and following Pelling (2003), who has described feedback cycles as both "opportunities and barriers to building adaptive potential" in red zone contexts, we outline five barriers that limit rethinking of post-disaster policy options to incorporate greening, as well as how the insights garnered from the "Greening in the Red Zone" book might help address those barriers. These barriers—and related opportunities for rethinking policy options—fall into the following general categories:

1. Understanding Human-nature Relationships and the Importance of Place

Humans are of, and part of, nature (Krasny and Tidball 2015). This view is in contrast to notions of humans as being exempt from universal rules governing ecosystems—i.e., as a distinct group of beings who are outside of and have complete control over nature (see Tidball 2016 and Tidball and Stedman 2013 for further discussion on the problems of human exemptionalism and human exceptionalism). *Greening in the Red Zone* presents research-based evidence for the healing power of nature, and explicitly links psychological, sociological, and cultural understandings with biological, physiological, and genetic explanations for why humans might turn to nature in red zone times and places (Tidball and Krasny 2014a). Whereas humans engage with nature in a variety of ways during such taxing times the *act of greening* in whatever form, whether planting trees or producing food, recreating wildlife habitat or restoring wetlands, is a further means of experiencing the healing potential of interacting

with the rest of nature.

Moving from individuals to local communities, Stedman and Ingalls (2014) argue for the importance of attachment to places—or topophilia—in the well-being of red zone and other communities, and importantly, in the willingness of people to participate in greening and other civic renewal activities. Whereas civic renewal efforts centered on rebuilding the physical infrastructure play an important role in red zone communities (Kelling and Coles 1996, Vale and Campanella 2005), greening efforts go one step further by integrating the psychosocial aspects of humans' relationship with nature with other components of civic engagement. Greening also may reinforce or restore a positive sense of place through such mechanisms as providing continuity with past customs and values related to growing vegetables, herbs, and trees (e.g., of rural people who have moved to cities; see Shava et al. 2010).

Yet, people's relationship to nature and to place is largely absent from the policy conversation despite the paramount role it plays in the psychology of residents and the success or failure of virtually all efforts in troubled regions. The policy-making community has a tendency to focus on things and people, deemphasizing relationships, and often ignoring the value of place. The implications of these tendencies for policy and program design are profound. Although creating an identity through association with place, as captured in the notion of topophilia, need not explicitly include greenness, the added existential quality of greening brings with it an unusual power to positively affect the psychology of those involved, precisely because it reaches something fundamentally present in the human psyche. Further, greening reinforces and restores a sound sense of place. This occurs not only through reinforcing a fundamental human connection to nature but also through "remembering and reifying" past traditions related to use and stewardship of green space (Tidball et al. 2010). Thus, for individuals and for communities, including those that have been incrementally decaying over decades and sinking into the complete chaos of the red zone, continuity with the past is rebuilt, and a sensation of the unbroken created, through greening. The "brokenness" is undone and a sense of balance returns to a community.

2. Understanding Systems Thinking

The natural resources and international development policy-making communities have recognized past failures of single-objective policies that reflect so-called policy silos (Peirce 2009, Staley 2009) or stovepipe thinking (Johnson-Freese and Nichols 2011). Social-ecological systems (SES) perspectives, which emphasize the connections among people, their actions, and other components of the environment, offer a promising alternative

(Berkes and Folke 2002, Folke et al. 2002). In particular, this literature highlights two fundamental aspects of a social-ecological systems approach to healing troubled or disaster-wrought people and places.

First, the nature of post-disaster environments demands recognition that individual elements and processes within that environment have some relationship to each other, whether through feedbacks, networks, or some other mechanism. These systems are ecological not because they are green or natural—though they may be—but because they are characterized by layers upon layers of relationships that ultimately link the fate of all parts of the system, importantly, including the people within them (cf. Carlock and Fenton 2001, Jamshidi 2009, Kotov 1997, Luskasik 1998, Pei 2000, Sage and Cuppan 2001, Tidball et al. 2008).

Second, SES are dynamic. As we have seen above, the SES resilience framework presents several heuristics, including feedbacks, vicious and virtuous cycles, and basins of attraction, that help us to understand the nature of change and resistance to change in systems over time. An understanding that systems are dynamic, and that policies can be designed around expectations of change rather than of stability, is fundamental to SES resilience thinking but has not yet been well integrated into planning nor applied by the policy community in post-conflict and post-disaster response contexts.

3. Finding the Right Vocabulary

In contrast to the focus on dynamic systems among SES researchers, the lexicon often used by government agencies and first responders to crisis situations reflects a dominant view of these kinds of places as static. That lexicon, which is stamped into plans and evaluations, also overwhelmingly emphasizes conditions over characteristics. A condition, such as stability, describes how a place is doing at a given point in time, whereas a characteristic, such as resilience, expresses the nature of a person, place or SES over varying time and spatial scales (Cutter et al. 2008, Werner 1995). The problem with setting stability as a policy objective is that systems are highly dynamic, and their condition is impermanent. Relative to dynamic characteristics such as resilience, stability is easier to understand, simpler to design for, and therefore more likely to find its way into operational plans. This emphasis on stability rather than resilience, and the unrealistic treatment of stability as a permanent state, is symptomatic of a command and control mentality that imagines policy and programs directly steering a place and its people towards a final objective (Holling and Meffe 1996).

In contrast, the examples in *"Greening in the Red Zone"*, and in this volume, suggest the presence of nascent processes of transformation—of initial attempts to break out of vicious cycles and move into more positive basins of attraction. Such processes beg us to consider a different role for

the policy-making community—one of catalytic enablers for locally derived transformations that are already underway. Although examples from government agencies may be harder to come by given the prevalence of top-down approaches, they do exist. For example, Svendsen and Campbell (2014) describe how the USDA Forest Service developed a national registry and other means to support self-organized greening efforts that emerged in communities across the United States as part of the 9/11 healing process (Svendsen and Campbell 2005, 2006).

This example is notable in two respects. First, it was directed by Congress, the members of which may have more freedom than career government employees to engage in "out of the box" thinking. Second, the Living Memorials project was facilitated by a small, nontraditional and perhaps adaptive team of urban social scientists working within the Forest Service. This and several other **"Greening in the Red Zone"** cases suggest how, at times and places where nascent efforts exist that have the potential to cultivate virtuous cycles on a landscape characterized by vicious cycles of violence and degraded spaces, the policy-making community can step back from top-down approaches and instead develop means of enabling self-discovered modes of healing and rebuilding. Such a shift in approach will require an expansion of the policy lexicon to incorporate notions of changing characteristics, self-organization, and resilience.

4. Developing a Culture of Open-mindedness and Attention to Locally Derived Solutions

Despite the universality of human-nature connections, the role of nature in how people absorb shock and exhibit resilience in the face of dire conditions varies widely. All the cases presented in the "Greening in the Red Zone" book reflect the unique attributes of place. As such, they present opportunities for further learning about how greening efforts vary depending on place. Perhaps they also will stimulate seeking out other such cases, as well as attempts to understand their implications and potential for developing policies at the local, regional, and nation-state levels. In contrast, a culture that focuses exclusively on comparing cold statistics across different conflict or disasters settings without regard to context—such as numbers of deaths, number of injured, and number of rapes—may inhibit disaster and first response professionals from considering greening in crafting approaches to healing a traumatized community. Such thinking also may lead the policy-making community to deemphasize relationships among people, between people and nature, and importantly between people and local place.

Further, many members of the policy-making community may not have opportunities to observe or take part in community greening activities and

thus may not see greening as a local asset. One means to ground policy decisions in attention to place and to a role for greening is to draw on existing and facilitate new connections to local place and nature, as well as with community, among members of the policy-making community. In one such effort, the U.S. Secretary of Agriculture launched the People's Garden initiative, challenging all USDA facilities across the United States to implement a garden on-site or to become engaged with a local community garden. The response was overwhelming, perhaps reflecting a longing for engagement with nature and community. For example, within 45 minutes of sending an email calling for volunteers to help at the USDA headquarters garden in Washington, D.C., over 75 employees had responded, and within a year of launching the nationwide program, over 400 gardens had been established at USDA facilities.[1] Regardless of the agency for which they work, many government bureaucrats likely garden at home and are aware of the role gardening and other nature-based activities play in their everyday mental health and in recovery following personal hardship. Proponents of greening in red zones working in agencies and first response organizations might leverage these social-ecological memories and draw on such activities and awareness to create a culture of understanding of the importance of the role of local greening in recovery and resilience.

In pursuing policies that leverage existing self-organized, place-based practices and local assets, development professionals will be forced to devolve substantial design control to recipients of aid, even as they fund such efforts. The ability of members of the policy-making community to trust those who they intend to help requires a readiness to accept risk, patience, and a willingness to wait and see what green emerges from red and how they can best reinforce the positives of what emerges. This entails asking what sorts of nascent transformations in social-ecological systems are already underway, and whether it is desirable to see that change continue. Further, it requires asking if, and what sorts of, interventions are in fact needed to move the marble in the direction of a different basin. This thinking is challenging, given the political pressure on development professionals for rapid progress coupled with limited resources, and thus we recognize the challenges they face vis-à-vis our calls for recognition and facilitation of self-organized practices and assets.

The approaches we call for also place greater burden on potential recipients of aid, who are being called upon to act and to form more equal partnerships, rather than remain passive recipients of outside assistance. Such approaches require that local people recognize how much of their identity, health, and resilience is dependent on nurturing their active relationship with nature. These approaches may

1. L. Marquez, USDA, pers. comm.

also call on local people to engage in monitoring the results of their efforts, thus contributing knowledge as a kind of feedback that can be used in adapting resource management practices (Tidball and Krasny 2012). An important sign of resilience in a community and among individuals is the emergence or reemergence of healthy behaviors and relationships without prompting from outsiders, including actively engaging with nature. "To green" is a verb, not a noun, and it is the act of greening, not just the bearing of witness, that reinforces self-sufficiency, sense of community, and attachment to place.

5. Embracing New Forms of Governance

For most of the cases detailed in the *Greening in Red Zone* volume, leadership comes from the nongovernment sector. Nobel laureate Elinor Ostrom referred to "polycentric systems" of governance characterized by "multiple governing authorities at differing scales" (Ostrom 2010), and a similar concept, "overlap in governance", is one of 11 attributes of resilient systems outlined by Walker and Salt (2006). These notions reflect governance arrangements in many of the red zone greening cases in this book, where local residents, grassroots community groups, NGOs, government agencies, and sometimes university researchers form partnerships that span from neighborhood-scale greening practices to national and trans-national nascent networks and policies.

For the policy-making community, this implies embracing new, more agile forms of governance in place of more rigid notions of *government*. An example of where this is already happening comes from the U.S. Environmental Protection Agency, which has adopted a multi-institution partnership model, including partners that engage communities in hands-on stewardship, in addressing control of nonpoint source pollution and other intransigent resource problems where more adversarial and command-control regulatory policies have proven ineffective (Sirianni 2009). Such polycentric governance approaches that incorporate human and nature interactions could be expanded to encompass planning for and responding to red zone situations, and are consistent with the notion that multiple efforts acting in partnership are needed to reduce the barriers between vicious and virtuous basins on a landscape.

Recommendations for Policymaking

The recommendations that follow are difficult, may take a long time to bring about, and demand courage from those involved. We recognize the challenges, but we firmly believe that avoiding some of the mistakes of the past will entail taking responsibility for fully confronting the existential quality of our personal and of humankind's relationship with nature.

1. Treat environmental issues and environmentally-based solutions to policy problems with a priority that reflects their actual level of impact

The case has been made for the impact that green and greening has on lives both individually and collectively. Whether we are rich or poor, live an urban or rural existence, or are at war or peace, there is no disassociating ourselves from our relationship to nature or our dependence upon the services nature provides to us. We do not have the liberty to walk away from nature for the simple reason that we are an integral part of it. Innately we understand that our place in nature, our relationship to it, is existential. Our physical and psychological survival is ultimately dependent on the degree to which we recognize and embrace how we relate to the natural world that feeds us, slakes our thirst, cleanses our air, and calms our spirit. Things "green" and by extension the act of greening are an absolute national security imperative for every nation on earth, but particularly for those whose population density and behavior demand the most attention. Numerous other authors have made this point through discussions of food and energy security (Gleick 1990, Kobtzeff 2000), and of conflicts over natural resources (Machlis and Hanson 2008, Machlis et al. 2011). Still others have talked about a role for trans-boundary parks and conservation in peace-making (Dabelko and Conca 2002). In this volume, we add to these literatures a consideration of the importance of engagement in hands-on greening with the intent to build resilience in individuals, communities, and ecosystems impacted by conflict and disaster.

2. Emphasize characteristics rather than conditions, and systems thinking

Identify and address system characteristics, such as resilience and transformability, rather than focus more narrowly on achieving static conditions. Such an emphasis on dynamic processes is consistent with systems thinking. Previous work by Tidball and Weinstein (Tidball and Weinstein 2011, Weinstein and Tidball 2007) suggests how an environment-shaping strategy provides a path for applying such thinking in post-conflict and post-disaster development contexts.

3. Allow human experience to guide policymaking

In rare instances torture victims, disaster survivors, or former combatants confront policymakers directly. Such events are momentarily galvanizing if only because they are so dramatic and the audience so unprepared to manage and effectively internalize what they are witnessing, and they may be instrumental in sparking discussions about changes in policy. But what is the role of human experience in more rational policymaking? And what is it that is meant to be

secured if not peoples' abilities to enable positive experiences and to limit bad ones? We ignore the psychological and social impacts of our decisions at our peril. Only now, for example, is the U.S. military fully confronting the magnitude of psychological impacts of repeated deployments to combat zones, which reach far beyond military institutions deeply into our communities. Greening should be an important part of the multifaceted human experience that is considered in policymaking.

4. Relinquish control when needed

One of the defining characteristics of a dynamic system is that by definition, it is constantly changing, usually in unpredictable ways and at unpredicted magnitudes, and for unforeseen reasons. We live in complex systems, and thus imagining that we are in control may not reflect reality. And yet, policy and program design—not just in military domains but also environmental, economic, social, and virtually all other domains as well—is dominated by a command and control mentality. The analogies of holding a shallow pan of water or riding a bucking horse are apropos. The harder one holds on the more certain the water will spill or the rider will crash to the ground. Attempts at absolute control virtually ensures failure, whereas adaptation to an enabling and constraining role substantially improves our odds at making a meaningful difference, relies heavily on existing resilient qualities of the system, and by extension reduces the likelihood that we will contribute to comprehensive system failure.

Similarly, policy solutions based on the inherent assets of a place and its people are more likely to take hold and influence substantial change than those that are developed in a vacuum without input. Grassroots or bottom-up solutions may be neglected because they challenge "expert" opinion, reduce command and control, or may not conform to "regular" practice. The participatory approaches that are required of an asset-based strategy to policy and program design take time and a willingness to accept that the role of the professional is not only to educate, but also to listen, absorb, understand, and then translate that understanding into the actionable.

5. Resist pressure for immediate results

Allowing systems to transform takes time. Trust renews over generations, and collectively recognizing shared interests takes years. While people and political systems are highly impatient, long-standing strategies culled from the world of participatory project management make it possible to demonstrate continual progress by designing incremental but meaningful gains over the course of an otherwise slow process.

The policy-making community is therefore challenged not to make decisions between little and quickly on the one hand, and big and slow on the

other, but instead to seek a better understanding of the relationships between local communities' identities and institutions, and those of nations, and the contributions immediate short-term efforts can have in lowering or heightening barriers to the whole system shifting from one basin of attraction to another. In this respect, we suggest a perspective that emphasizes multiple vertical and horizontal interactions over hierarchies—that a particular level of action be treated not as a point lower or higher up in a hierarchy, but rather as a node in a network of relationships.

6. Work across sectors to incrementally incorporate environmental stewardship and management into existing programs

Addressing seemingly categorical issues, such as environment, security, education, or economic well-being, requires policymakers to work across multiple functional areas. This is made difficult through highly bifurcated implementing bureaucracies, i.e., agencies and departments charged with implementing programs that choose not to collaborate. However, innumerable opportunities exist to introduce greening into existing efforts, even if they are not yet fully connected to other programs or policies. Community-based land and resource management, for example, may be incorporated into school curricula and out-of-school environmental education programs (Krasny and Tidball 2009, Krasny and Roth 2010), and micro-lending and micro-economic development programs can favor or even explicitly encourage effective bottom-up resource management or community farming/greening efforts. Judicial and legal oriented reform projects can highlight environmental and land issues such as property rights and land use.

Community development and organizing efforts can use community greening as building blocks. Eventually enough greening-related programs will reside in multiple components of the development puzzle so that tying them together into a self-reinforcing web will not be such an impossible task after all. Greening, or the environment more broadly, may serve as a theme that roots each of the disparate sectors in holistic approaches to development post-disaster or conflict. A critical factor in incorporating greening into development strategies will be adding an individual with environmental and greening expertise onto inter-disciplinary teams in post-disaster and post-conflict settings.

Conclusion

We call upon policymakers to consider the role of participatory natural resource management—or of greening—in responses to red zones. We may look to the insights of the resilient Japanese, who have transformed their society in the 20th century to become a model of democracy and efficiency, and

who are now facing perhaps an even greater challenge in the 21st century to rebuild and transform in the aftermath of disaster of almost unimaginable scale. Yet policymakers in Japan from the very highest levels are listening to scholars and experts as well as farmers and fishermen who are encouraging a visionary approach to rebuilding after the great East Japan earthquake, tsunami, and nuclear catastrophe (Global Environmental Action 2011). Policymakers are seeking counsel from scholars of Satoyama and Satoumi (Morimoto et al. 2009, Shidei 2006, Takeuchi et al. 2003), who are encouraging a remembering and a reconnection of the Japanese culture's deep historical connection to nature. They are seeking new ways of thinking about themselves in relation to nature in the 21st century, they are reflecting societal concerns regarding safe and sustainable renewable energy alternatives, and they have invited conversation specifically about greening in the red zone. They have, simply, decided to embrace transformation, to think big about greening and sustainability.

Greening in the red zone, as a way of describing human-nature interaction after disaster and war, and as a policy approach, requires a kind of suspension of disbelief, and also a pragmatic understanding of the limitations of such an approach. Certainly greening and its attendant multiple benefits are not a magic wand to be waived over tragic circumstances to green-wash away the grim realities of disaster and war. Yet, the preponderance of empirical evidence and anecdotal corroboration as presented in this book and elsewhere regarding the value of greening in the red zone merits attention by the post-disaster and post-conflict planning and response communities. If planting trees, or caring for habitat, or gardening can restore both human morale and ecosystem service provision, and these things can happen in emergent and participatory ways with relatively minimal investment and transaction costs, and can catalyze and reinforce positive feedbacks and virtuous cycles in such tenuous and fragile periods, why wouldn't one add this arrow to the quiver of disaster planners and response practitioners?

This is what we hope to accomplish with this volume—to shed light upon the virtues of greening in the red zone, and to encourage adaptation and adoption of this approach as soon as is practicable. In light of inevitable climate change and future shocks, adding new approaches to the menu of options is the order of the day. But as important as quivers of new arrows are, the most important element is the knowledge and willingness to use them. We are boldly suggesting that the post-disaster and post-conflict response communities be bold, to think big like Roosevelt in his day, to accept the challenge of transformation following the lead of Japan today, to affirm fundamental inclinations like urgent biophilia and restorative topophilia, and to reap the multiple benefits of virtuous cycles and social-ecological services provided, via greening in the red zone.

Literature Cited

Berkes, F.; Folke, C. 2002. Back to the future: ecosystem dynamics and local knowledge. In: Gunderson, L.H.; Holling, C.S., eds. Panarchy: understanding transformation in systems of humans and nature. Washington, DC: Island Press: 121–146.

Brand, F.S.; Jax, K. 2007. Focusing the meaning(s) of resilience: resilience as a descriptive concept and a boundary object. Ecology and Society. 12(1): 23.

Carlock, P.G.; Fenton, R.E. 2001. System of systems (SoS) enterprise systems for information-intensive organizations. Systems Engineering. 4(4): 242–261. : https://doi.org/10.1002/sys.1021.

Chan, J.; DuBois, B.; Tidball, K.G. 2015. Refuges of local resilience: Community gardens in post-Sandy New York City. Urban Forestry & Urban Greening. 14: 625–635. https://doi.org/10.1016/j.ufug.2015.06.005.

Cutter, S.L.; Barnes, L.; Berry, M.; Burton, C.; Evans, E. [et al.]. 2008. A place-based model for understanding community resilience to natural disasters. Global Environmental Change. 18(4): 598–606. https://doi.org/10.1016/j.gloenvcha.2008.07.013.

Dabelko, G.D.; Conca, K. 2002. Environmental peacemaking. Baltimore, MD: Johns Hopkins University Press. 264 p. ISBN: 978-0-8018-7193-1.

Deflem, M.; Sutphin, S. 2009. Policing Katrina: managing law enforcement in New Orleans. Policing. 3: 41–49. https://doi.org/10.1093/police/pan071.

Elmqvist, T. 2014. Urban resilience thinking. The Solutions Journal. 5(5): 26–30.

Folke, C.; Carpenter, S.; Elmqvist, S.T.; Gunderson, L.; Holling, C.S. [et al.]. 2002. Resilience for sustainable development: building adaptive capacity in a world of transformations. ICSU series on science for sustainable development No. 3. Paris: International Council for Scientific Unions (ICSU). 37 p.

Folke, C.; Carpenter, S.R.; Walker, B.; Scheffer, M.; Chapin, T.; Rockström, J. 2010. Resilience thinking: integrating resilience, adaptability and transformability. Ecology and Society. 15(4): 20. http://www.ecologyandsociety.org/vol15/iss4/art20/.

Gleick, P.H. 1990. Environment, resources, and international security and politics. In: Arnett, E., ed. Science and international security: responding to a changing world. Washington, DC: American Association for the Advancement of Science Press: 501–523.

Global Environmental Action. 2011. GEA International Conference 2011: Building sustainable societies through reconstruction; 2011 October 14-15; Tokyo, Global Environmental Action.

Holling, C.S.; Meffe, G.K. 1996. Command and control and the pathology of natural resource management. Conservation Biology. 10: 328–337. https://doi.org/10.1046/j.1523-1739.1996.10020328.x

Jamshidi, M., ed. 2009. System of systems engineering: innovations for the 21st century. Hoboken, NJ: Wiley & Sons. 616 p. ISBN: 978-0470195901.

Johnson-Freese, J.; Nichols, T.M. 2011. Academic stovepipes undermine U.S. security. World Politics Review. April 14.

Jonnes, J. 2011. What is a tree worth? Wilson Quarterly. 35(1): 34–41. https://doi.org/10.2307/41001066.

Kelling, G.L.; Coles, C.M. 1996. Fixing broken windows: restoring order and reducing crime in our communities. New York, NY: Simon Schuster. 322 p. ISBN: 978-0684837383.

Kobtzeff, O. 2000. Environmental security and civil society. In: Gardner, H., ed. Central and southeastern Europe in transition: perspectives on success and failure since 1989. Westport, CT: Praeger: 219–296. ISBN: 978-0275964603.

Kotov, V. 1997. Systems of systems as communicating structures. Hewlett Packard Laboratory Paper HPL-97-124. Palo Alto, CA: Hewlett Packard. 15 p.

Krasny, M.; Roth, W.-M. 2010. Environmental education for social-ecological system resilience: a perspective from activity theory. Environmental Education Research. 16(5-6): 545–558. https://doi.org/10.1080/13504622.2010.505431.

Krasny, M.E.; Tidball, K.G. 2009. Community gardens as contexts for science, stewardship, and civic action learning. Cities and the Environment. 2(1): art. 8. http://escholarship.bc.edu/cate/vol2/iss1/8.

Krasny, M.E.; Tidball, K.G. 2015. Civic ecology: adaptation and transformation from the ground up. Cambridge, MA: MIT Press. 328 p. https://doi.org/10.7551/mitpress/9780262028653.001.0001.

Krasny, M. E.; Pace, K. G.; Tidball, K.G.; Helphand. 2014. Nature engagement to foster resilience in military communities. In: Tidball, K.G.; Krasny, M.E., eds. Greening in the red zone: disaster, resilience, and community greening. New York, NY: Springer: 163–180. https://doi.org/10.1007/978-90-481-9947-1.

Luskasik, S.J. 1998. Systems, systems of systems, and the education of engineers. Artificial Intelligence for Engineering Design, Analysis, and Manufacturing. 12(1): 11–60. https://doi.org/10.1017/S0890060498121078.

Machlis, G.E.; Hanson, T. 2008. Warfare ecology. BioScience. 58(8): 729–736. https://doi.org/10.1641/B580809.

Machlis, G.E.; Hanson, T.; Špirić, Z.; McKendry, J.E., eds. 2011. Warfare ecology: a new synthesis for peace and security. Dordrecht, The Netherlands: Springer. https://doi.org/10.1007/978-94-007-1214-0.

Morimoto, J.; Kondo, T.; Miyauchi, T. 2009. Satoyama–satoumi sub-global assessment in Japan and involvement of the Hokkaido Cluster. Landscape and Ecological Engineering. 5(1): 91–96. https://doi.org/10.1007/s11355-008-0059-y.

Olsson, P.; Folke, C.; Galaz, V.; Hahn, T.; Schultz, L. 2007. Enhancing the fit through adaptive comanagement: Creating and maintaining bridging functions for matching scales in the Kristianstads Vattenrike Biosphere Reserve Sweden. Ecology and Society. 12(1): art. 28. http://www.ecologyandsociety.org/vol12/iss1/art28/.

Ostrom, E. 2010. Polycentric systems for coping with collective action and global environmental change. Global Environmental Change. 20: 550–557. https://doi.org/10.1016/j.gloenvcha.2010.07.004.

Pei, R.S. 2000. Systems of systems integration (SoSI): a smart way of acquiring army C4I2WS systems. In: Proceedings of the 2000 Summer Computer Simulation conference: Simulation and modeling technology for the twenty-first century; 2000 July 16-20; Vancouver, BC, Canada. San Diego, CA: Society for Computer Simulation.

Peirce, N. 2009. An overdue breakout from 'silos,' borders. Nation's Cities Weekly. June 29.

Pelling, M. 2003. The vulnerability of cities: natural disaster and social resilience. London: Earthscan. 224 p. ISBN: 978-1853838293.

Pelling, M.; Dill, K. 2009. Disaster politics: tipping points for change in the adaptation of sociopolitical regimes. Progress in Human Geography. 34(1): 21–37. https://doi.org/10.1177/0309132509105004.

Peterson, G. D.; Cumming, G.S.; Carpenter, S.R. 2003. Scenario planning: a tool for conservation in an uncertain world. Conservation Biology. 17: 358–366. https://doi.org/10.1046/j.1523-1739.2003.01491.x.

Sage, A.P.; Cuppan, C.D. 2001. On the systems engineering and management of systems of systems and federations of systems. Information, Knowledge, Systems Management. 2(4): 325–334.

Shava, S.; Krasny, M.E.; Tidball, K.G.; Zazu, C. 2010. Agricultural knowledge in urban and resettled communities: applications to social–ecological resilience and environmental education. Environmental Education Research. 16(5): 325–329. https://doi.org/10.1080/13504622.2010.505436.

Shava, S.; Mentoor, M. 2014. Turning degraded open space into a community asset - The Soweto Mountain of Hope greening case. In: Tidball, K.G.; Krasny, M.E., eds. Greening in the red zone: disaster, resilience, and community greening. New York, NY: Springer: 91-94. https://doi.org/10.1007/978-90-481-9947-1_6.

Shidei, T. 2006. Forest should not be "mori" and "hayashi"—my forest theory. Kyoto, Japan: Nakanishiya Shuppan Co.

Sirianni, C. 2009. Investing in democracy: engaging citizens in collaborative governance. Washington, DC: Brookings Institution Press. 304 p. ISBN: 978-0815703129.

Staley, S. 2009. Does breaking down policy silos mean the end of Federalism? Los Angeles, CA: Reason Foundation. http://reason.org/news/printer/does-breaking-down-policy-silo (accessed January 12, 2018).

Stedman, R.C.; Ingalls, M. 2014. Topophilia, biophilia and greening in the red zone. In: Tidball, K.G.; Krasny, M.E., eds. Greening in the red zone: disaster, resilience, and community greening. New York, NY: Springer: 129–144.

Svendsen, E.S.; Campbell, L.K. 2005. Living Memorials Project: year 1 social and site assessment. Gen.Tech. Rep. NE-333. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 123 p.

Svendsen, E.S.; Campbell, L.K. 2006. Land-markings: 12 Journeys through 9/11 Living Memorials. NRS-INF-1-06. Newtown Square, PA, U.S. Department of Agriculture, Forest Service, Northern Research Station. 49 p.

Svendsen, E.; Campbell, L. 2014. Community-based memorials to September 11, 2001: environmental stewardship as memory work. In: Tidball, K.G.; Krasny, M.E., eds. Greening in the red zone: disaster, resilience, and community greening. New York, NY: Springer: 339–355.

Takeuchi, K.; Brown, R.; Washitani, I.; Yokohari, M., eds. 2003. Satoyama—the traditional rural landscape of Japan. Tokyo: Springer. 221 p. https://doi.org/10.1007/978-4-431-67861-8.

Tidball, K.G. 2016. Traps in and of our minds: relationships between human logic, dialectical traps and social-ecological traps. Sustainability Science. 11(6): 867–876. https://doi.org/10.1007/s11625-016-0396-y.

Tidball, K.G.; Elmqvist, T.; Frantzeskaki, N. 2014. Tips or traps? Advancing understanding to steer clear of impoverishment traps and tipping points. In: Resilience 2014: resilience and development: mobilizing for transformation; Third international science and policy conference on the resilience of social and ecological systems; 2014 May 4-8; Montpelier, France.

Tidball, K.G.; Frantzeskaki, N.; Elmqvist, T. 2016. Traps! An introduction to expanding thinking on persistent maladaptive states in pursuit of resilience. Sustainability Science. 11(6): 861–866. https://doi.org/10.1007/s11625-016-0398-9.

Tidball, K.G.; Krasny, M.E. 2012. A role for citizen science in disaster and conflict recovery and resilience. In: Dickinson, J.L.; Bonney, R., eds. Citizen science: public participation in environmental research. Ithaca, NY, Cornell University Press: 226–234. https://doi.org/10.7591/9780801463952-023.

Tidball, K.G.; Krasny, M.E., eds. 2014a. Greening in the red zone: disaster, resilience, and community greening. New York, NY: Springer. 503 p. https://doi.org/10.1007/978-90-481-9947-1.

Tidball, K.G.; Krasny, M.E. 2014b. Introduction: greening in the red zone. In: Tidball, K.G.; Krasny, M.E., eds. Greening in the red zone: disaster, resilience, and community greening. New York, NY: Springer: 3–24.

Tidball, K.G.; Krasny, M.E.; Svendsen, E.; Campbell, L.; Helphand, K. 2010. Stewardship, learning, and memory in disaster resilience. Environmental Education Research.16(5): 341–357. https://doi.org/10.1080/13504622.2010.505437.

Tidball, K. G.; Metcalf S.; Bain, M.; Elmqvist, T. 2017. Community-led reforestation: cultivating the potential of virtuous cycles to confer resilience in disaster disrupted social–ecological systems. Sustainability Science. 13(3): 797–813. https://doi.org/10.1007/s11625-017-0506-5.

Tidball, K.G.; Metcalf, S.; Bain, M.; Elmqvist, T. 2018. Community-led reforestation: cultivating the potential of virtuous cycles to confer resilience in disaster disrupted social–ecological systems. Sustainability Science. 13(3): 797–813. https://doi.org/10.1007/s11625-017-0506-5.

Tidball, K.G.; Stedman, R. 2013. Positive dependency and virtuous cycles: From resource dependence to resilience in urban social-ecological systems. Ecological Economics. 86: 292–299. https://doi.org/10.1016/j.ecolecon.2012.10.004.

Tidball, K.G.; Weinstein, E.D. 2011. Applying the environment shaping methodology: conceptual and practical challenges. Journal of Intervention and Statebuilding. 5(4): 369–394. https://doi.org/10.1080/17502977.2011.625787.

Tidball, K.G.; Weinstein, E.; Kaisler, S.; Grossman, R.; Tousley, S. 2008. Stake-holder asset-based planning environment. DOD/OSD 2007 STTR Topic 003 Final Technical Report. Washington, DC: Logos Technologies, Inc., Cornell University, and International Sustainable Systems. 114 p. https://www.academia.edu/3240008/Stake-holder_asset-based_planning_environment._DOD_OSD_2007_STTR_Topic_003_Final_Technical_Report_?auto=download (accessed Jan. 16, 2018).

Vale, L.J.; Campanella, T.J., eds. 2005. The resilient city: how modern cities recover from disaster. New York, NY: Oxford University Press. 392 p. ISBN: 978-0195175837.

Walker, B.; Carpenter, S.; Anderies, J.; Abel, N.; Cumming, G.S. [et al.]. 2002. Resilience management in social-ecological systems: a working hypothesis for a participatory approach. Conservation Ecology. 6(1): 14 p. http://www.consecol.org/vol6/iss1/art14/.

Walker, B.; Salt, D. 2006. Resilience thinking: sustaining ecosystems and people in a changing world. Washington, DC: Island Press. 192 p. ISBN: 978-1597260930.

Weinstein, E.; Tidball, K.G. 2007. Environment shaping: an alternative approach to development and aid. Journal of Intervention and Statebuilding. 1(1): 67–85. https://doi.org/10.1080/17502970601075923.

Werner, E.E. 1995. Resilience in development. Current Directions in Psychological Science. 4(3): 81–85. http://www.jstor.org/stable/20182335.