Chapter 35
Synthesis and Conclusion: Applying Greening in Red Zones

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

Abstract The authors posit that the critical question for the post-disaster and post-conflict policy-making community may be whether their actions foster or inhibit individual and societal expressions of urgent biophilia and restorative sense of place. The authors argue that inhibiting such expression may aggravate a disaster or conflict scenario, whereas the evidence presented in the case studies in the book *Greening in the Red Zone* suggests that fostering such expression releases a series of cascading effects whereby humans rebuild a sense of personal equilibrium, restore and reconcile their place in the ecosystem, create anew a sense of community and of place, and put into motion the first steps toward restoring a healthier social-ecological system. The authors call upon policy makers to consider the role of participatory natural resource management—or of greening—in responses to disaster and conflict.

Keywords Social-ecological system resilience • Post-conflict and post-disaster policy • Path dependencies • Greening

Co-editors Keith Tidball and Marianne Krasny join development expert Elon Weinstein to present an overview of the lessons learned through this collection of greening in the red zone real-life examples and research-based explanations. Focusing on policy makers, they recommend broadening planning perspectives to

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K.G. Tidball and M.E. Krasny (eds.), *Greening in the Red Zone: Disaster, Resilience and Community Greening*, DOI 10.1007/978-90-481-9947-1_35,

encompass human-nature relations, sense of place, and systems thinking, and engaging in new forms of governance that leverage existing local assets to foster resilience and recovery in post-catastrophe and slow-decline settings.

Introduction

Former US president Theodore Roosevelt, who understood trees and wild spaces as vital to the well-being of people and of a nation, once said: 'A people without children would face a hopeless future; a country without trees is almost as hopeless'. Political leaders in Japan following the Second World War similarly recognized the importance of nature to a nation's identity and resilience—in particular as part of the rebuilding process following the devastation of war. They initiated a national program to remove the ghost-like skeletons of trees that were a reminder of the horrors of armed conflict (Lifton 1991 [1969]), as well as to preserve surviving trees and to plant new ones (Cheng and McBride, Chap. 18, this volume). Despite these examples and related arguments by scholars writing about conflict and the environment (see Dabelko and Conca 2002; Machlis and Hanson 2008), in most cases policy makers dealing with conflict have expressed little interest in trees or other green infrastructure, except perhaps as a commodity (Jonnes 2011). Thus, in this final chapter we address two questions: 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? How might the policy-making community concerned with post-disaster and post-conflict apply the lessons of *Greening in the Red Zone*?

We begin by applying earlier discussions of social-ecological system resilience and feedbacks (Tidball and Krasny, Chap. 2, this volume) to build a visual conceptualization of greening in red zones that may prove useful for the policy-making community in understanding barriers to adopting greening policies. By policy-making community, we refer broadly to the elected officials, institutional policy makers and planners, policy implementers or bureaucrats, and members of the host community coming from the government, NGO, and private sectors. Next we describe how the nature of policy-making communities and their associated path-dependencies and institutional patterns of behavior make approaching greening in red zones challenging, while offering insights from the chapters in this volume into how these barriers also provide opportunities for the policy-making community to facilitate such greening. In the subsequent sections, we summarize key findings from the synthesis of the chapters in this volume, and then turn to recommendations for the policy-making community related to using greening as a tool—or as an especially useful 'arrow in the quiver' of strategies employed—for recovery and rebuilding in red zones. We conclude with several suggestions for future research on the importance of human-nature relations in red zones, and more broadly in the evolving human security discourse.

Visualizing Greening in Red Zones: Systems Implications

Given that social-ecological systems experiencing disaster and conflict can be resistant to further change, one cannot expect that single actions such as greening will enable a system to rebuild following a major disturbance. The social-ecological systems resilience framework (Chap. 2, this volume), and in particular notions about vicious and virtuous cycles or feedback loops (Gallopin 2002; Powell et al. 2002; Matthews and Selman 2006; Selman 2006; Tidball and Krasny 2011), are helpful in identifying barriers to change but also opportunities that can be leveraged for transformation (Fig. 35.1). Such cycles represent interactions that are typically self-sustaining and reinforce one another. If their direction of influence is negative, they are considered vicious cycles, and if their direction is positive, they are known as virtuous cycles (Varis 1999).

Poverty traps (also referred to as lock-in traps, see Allison and Hobbs 2004) can be considered a type of red zone system characterized by vicious cycles of poverty leading to crime and environmental degradation, which in turn foreclose economic development and other opportunities. However, it is within these same impoverished red zones that communities sometimes 'self-organize' to restore crime-ridden and degraded vacant lands, transforming them into community gardens and parks, which become sites that foster social capital and provide ecosystem services (Bolund and Hunhammar 1999; Shava and Mentoor, Chap. 6, this volume; Barthel et al. 2005). Such self-organized community greening, or 'civic ecology' practices (Tidball and Krasny 2007; Krasny and Tidball 2010), may be one among a number of factors that help to 'flip' these systems from a vicious cycle of red zone induced decay into a more virtuous cycle of recovery and rebirth (Tidball and Krasny 2008).

In the parlance of resilience scholars, vicious cycles (Gallopin 2002) represent one stable state within a landscape at a given moment in time (see Beisner et al. 2003). Any one landscape contains other possible stable states, such as virtuous cycles of people creating or restoring green space, leading to greater access to nature and community and ecosystem well-being, and setting the stage for further greening activity (Tidball and Stedman 2013; Tidball and Krasny 2008, 2011). Depicted in another way, a vicious cycle can be imagined as a ball that is constantly swirling around one basin within a larger landscape (for a detailed discussion of 'ball and cup' depictions of stability landscapes, see Pawlowski 2006); the goal of a policy maker is to move that ball to a different basin that represents a virtuous cycle (Fig. 35.2). To allow the ball to enter a different basin requires either making changes within the basin, or allowing the ball to move to a new basin by changing features of the landscape so that barriers between the two basins are lower (see Scheffer et al. (2001) and Walker et al. (2004) for a more thorough description of stability landscapes and basins of attraction). Most of the chapters in this volume speak to changing the conditions within a basin, for example by increasing the magnitude of the stewardship activities in a conflict-ridden neighborhood. In this chapter we address how planners and policy makers might develop policies that could shape the barriers between the vicious and virtuous basins of attraction to ensure that the system is able to adapt, and then adopt conditions of a desirable state.

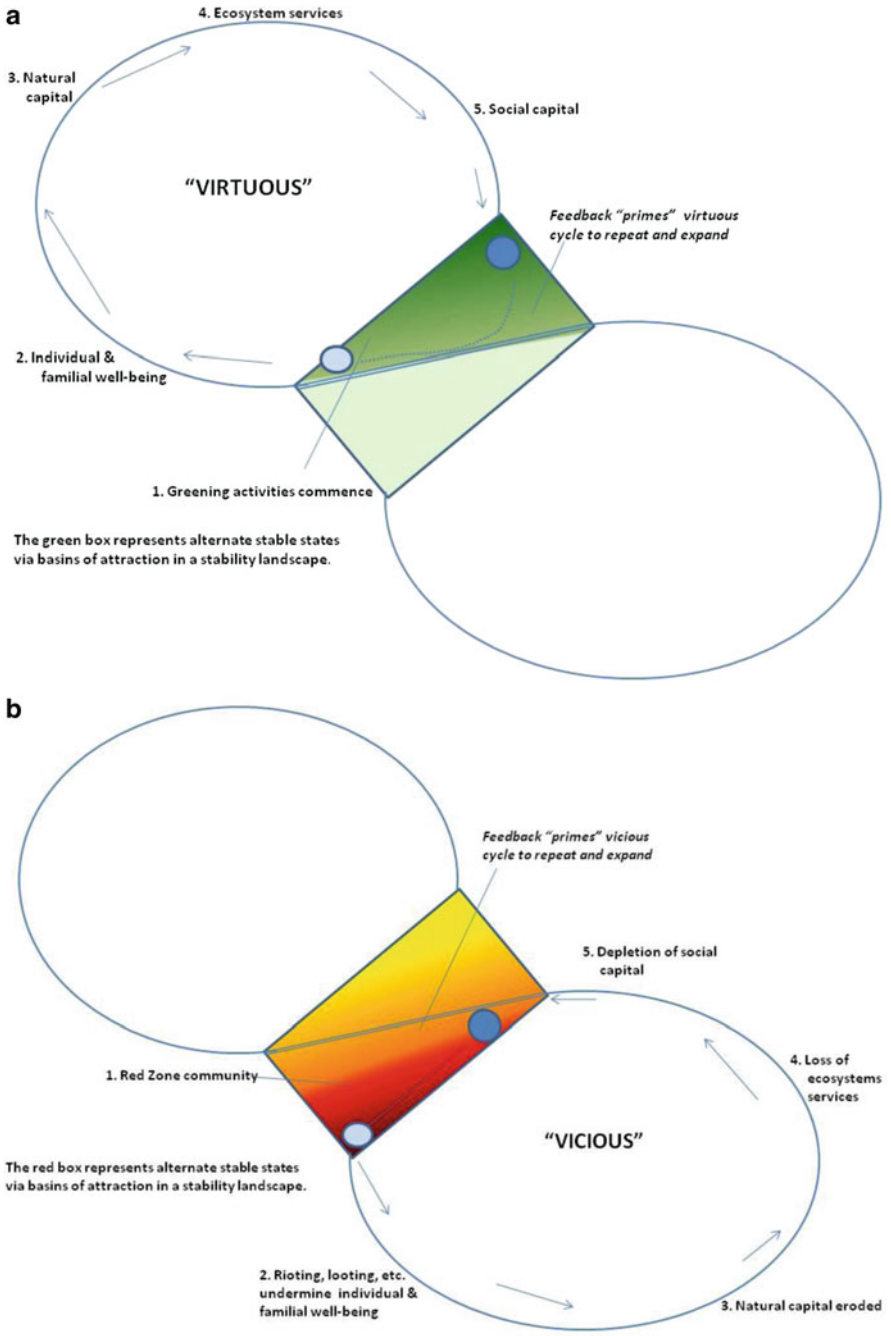

Fig. 35.1 Virtuous and vicious cycles, adapted from Tidball and Krasny, 2011

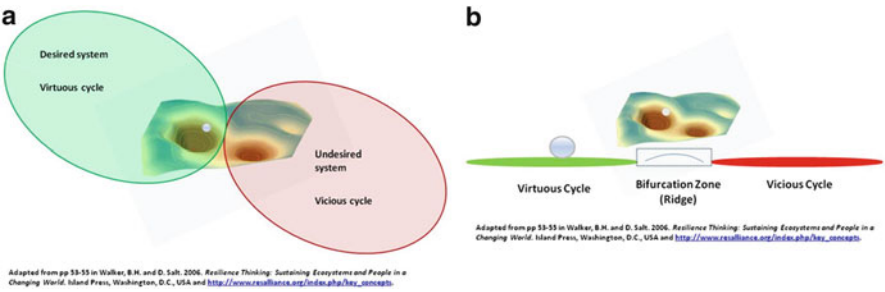

Fig. 35.2 Virtuous and vicious cycles viewed as ball and cup diagrams

How might one change the landscape to lower barriers between the red vicious and the green virtuous cycles? One can envision a 'ridge' or bifurcation zone (Scheffer 2009) separating the two cycles or basins. Then one can envision that by reducing the height of the ridge, it becomes easier to move the ball from the vicious cycle to the virtuous cycle basin. Conversely, shoring up the ridge might prevent the ball from moving from a virtuous greening cycle to a vicious cycle of degraded green space and crime. In this metaphorical model, the ridge could represent legal barriers, unfavorable public opinion, competition for scarce resources, or as is central to this chapter, absence of a policy framework that fosters greening practices. Altering the ridge might require a change in government or NGO policy or an influx of money or other resources from outside the vicious cycle (Fig. 35.3). Changes in government policy or resources may be dependent upon the discovery of evidence in support of the value of greening practices in these contexts.

When viewed from this perspective, it becomes increasingly more difficult to envision greening in a red zone acting alone to overcome the ridge that separates the vicious from the virtuous cycle basin. Hence the importance for policy makers to become aware of the value of greening strategies and their application in red zones, and to adopt a social-ecological systems view that attempts to ascertain how such strategies can work in consort with other initiatives attempting to tip the balance—that is, to reduce the barriers to crossing from resistant vicious to more virtuous feedback cycles within perturbed systems.

Changing the Policy Landscape: Challenges and Opportunities

Similar to how social-ecological systems can be resistant to change, the policy-making 'system' itself may be subject to its own resistant feedbacks. Thus, one might envision a particular policy-making community as either a sub-system or 'basin' characterized by certain features within a larger landscape of multiple policy

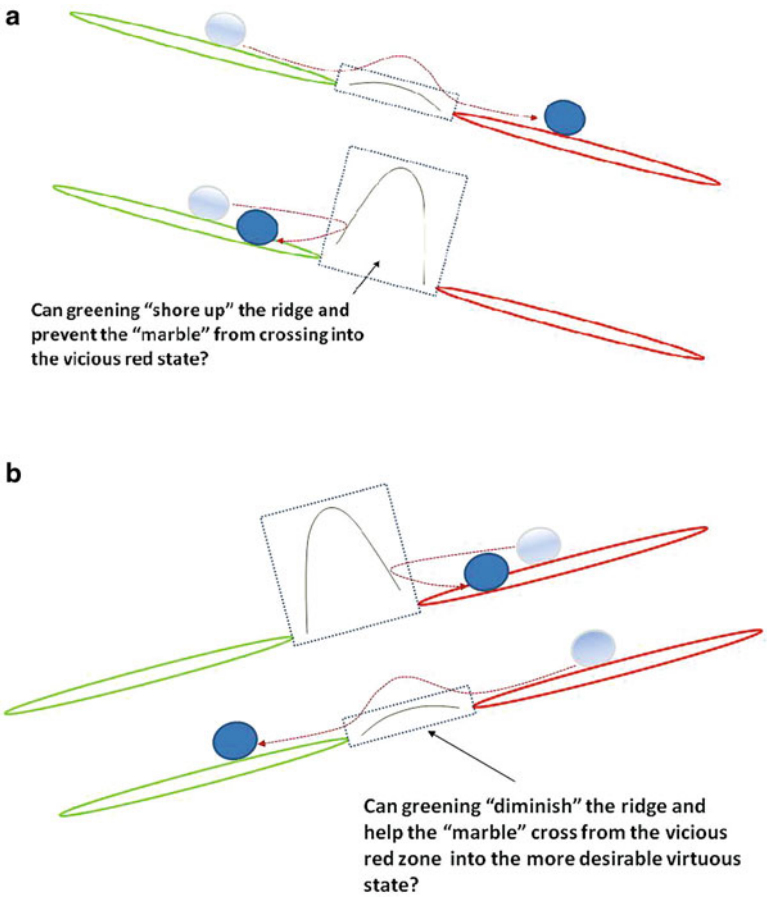

Fig. 35.3 Maintaining barriers to vicious states, and reducing barriers to transition to virtuous states, adapted from Tidball and Krasny, 2011

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—to crossing the ridge separating policy basins—are not easy to overcome (Fig. 35.4).

Keeping this metaphor in mind, and following Pelling (2007) 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 through the chapters in this volume might help address those barriers. These barriers—and related opportunities for rethinking policy options—fall into the following general categories: understanding human-nature relationships and the importance of place, understanding systems thinking, finding the right vocabulary, developing a culture of open-mindedness and attention to locally derived solutions, and embracing new forms of governance.

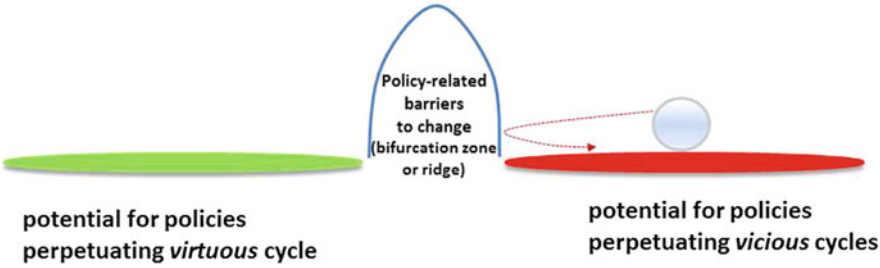

Fig. 35.4 Policy barriers as ridges in a ball and cup diagram

Understanding Human-Nature Relationships and the Importance of Place

This volume makes a clear case that humans are of, and part of, nature. 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. Further, the chapters by Wells (Chap. 7), Okvat and Zautra (Chap. 5), and Tidball (Chap. 4) present research-based evidence for the healing power of nature, and Tidball goes one step further by explicitly linking psychological, sociological, and cultural understandings with biological, physiological, and genetic explanations for why humans might turn to nature in red zone times and places. Whereas humans engage with nature in a variety of ways during taxing times (see Krasny et al., Chap. 13), 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 (Chap. 10) 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 (see also Tidball and Stedman 2013). 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; or of people in small, recently industrialized villages seeking to recreate village groves, see Lee, Chap. 12, this volume).

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.

The notion of 'broken windows' (Wilson and Kelling 1982) is critical in this regard, and offers potential for bringing greening into the policy conversation. Broken windows describes a situation where government and communities disinvest in places lacking orderliness, starting with smaller blights or incivilities such as broken windows or litter that no one bothers to repair or pick up, and leading to loss of pride in one's community, crime, degraded green space, and eventually red zone vicious cycles even in the absence of a sudden large perturbance. This notion may have informed Mayor Guiliani's thinking in launching his successful efforts to restore safe neighborhoods in New York City, which started with simple yet symbolic acts such as arresting people who skipped over subway ticket booths (Gladwell 2000). Although one person not paying the subway fee, carelessly littering, or breaking a window may seem inconsequential compared to serious crime such as assault or robbery (all of which plagued NYC's subway system in the 1990s), each small act is symbolic of how people treat their place, and small acts can lead to disinvestment, uncaring, and even despair. Thus the importance of *Fixing Broken Windows* (Kelling and Coles 1996).

Yet Guiliani's and other 'fixing broken windows' policies have focused nearly exclusively on reinstituting public order and on repairing man-made structures and symbols of urbanism, while overlooking community capacity, green infrastructure, and acts of greening. The famous 'drive-by' videos of Felton Earls and colleagues in Chicago (Earls et al. 1995) originally identified concentrated poverty and collective efficacy as two factors necessary for successful neighborhood efficacy (Sampson et al. 1997). Later, in an interview with the *New York Times*, Earls commented specifically on how the presence of community gardens and the collective efficacy cultivated in them might be associated with fewer broken windows and other incivilities and with lower incidence of crime, and went on to say that the greatest influence in ameliorating red-zone like conditions may be neighbors' willingness to act, when needed, for one another's benefit, and particularly for the benefit of one another's children (Hurley 2004). Earls further suggested that rather than focusing on arresting perpetrators of petty crimes, local governments should support the development of cooperative efforts in low-income neighborhoods by encouraging neighbors to meet and work together, and that cities that sow community gardens 'may reap a harvest of not only kale and tomatoes, but safer neighborhoods and healthier children' (ibid). Earls' insights challenge the dominant urban renewal policy paradigm focusing exclusively on order and the built infrastructure. The chapters in this book provide an explanation for how the community gardens that Earls references, along with the crucial greening acts behind those green spaces, could play a role in reducing crime and other red zone conditions. In particular, how the psychosocial components of greening contribute to its meaning and to its effectiveness in mitigating red zone conditions are captured in the notions of biophilia, urgent biophilia, and topophilia, and in the myriad empirical studies of the cognitive, emotional, and social impacts of green space and greening reviewed in this book.

Paramount to greening as a means to 'fix broken windows' by investing in collective efficacy is the role that place plays in the identity of community members and of entire communities. 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.

Time and time again, whether with civilians in war zones, criminals in prisons, children in playgrounds, or soldiers with post-traumatic stress syndrome trying to reintegrate into civilian life, greening reaches a deeply buried chord that can promote personal healing, as well as provide vast opportunities to bring people together by making explicit the shared relationship to nature and the act of greening. Further, greening heals the *place* as well as the people in it. Such greening can be for food security in West Africa or aesthetic qualities in Japan, or to 'fix broken windows' and rediscover collective efficacy in Detroit. Regardless, the rebuilding of place and self are part and parcel of the same enterprise, and the re-greening of a stricken environment by a stricken people is a path with special potential for helping to shift the landscape—or shaping the barrier between vicious and virtuous basins on a landscape.

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 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 (see Kotov 1997; Luskasik 1998; Pei 2000; Carlock and Fenton 2001; Sage and Cuppan 2001; Tidball et al. 2008; Jamshidi 2009). Second, social-ecological systems are dynamic. As we have seen above and in the chapter on resilience (Chap. 2, this volume), the social-ecological systems resilience framework presents several heuristics, including the adaptive cycle, 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 social-ecological systems 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.

Thus, we hope this book will provoke the policy-making community to further explore, adapt, and apply systems thinking to red zone contexts. Vicious and virtuous cycles and basins of attraction provide an important heuristic for the policy-making community in developing an understanding of how dynamic processes reinforce each other—for the good and for the bad.

Finding the Right Vocabulary

In contrast to the focus on dynamic systems among social-ecological systems researchers, the lexicon often used by government agencies and NGOs to describe development, disaster response, and conflicted theatres 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 social-ecological system over varying time and spatial scales (Werner 1995; Cutter et al. 2008). The problem with setting stability as a policy objective is that systems are highly dynamic, and their conditions are 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. The 2007 surge of 20,000 US troops in Iraq is one of the most prominent recent examples of expending vast resources simply to alter conditions—to create stability—with limited consideration given to longer-term characteristics such as social-ecological system resilience. Such interventions run the danger of creating stable conditions for the short term, but causing a population to feel dependent, vulnerable, exploited and even oppressed, and thus setting the conditions for future violence.

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 greening examples 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, in the chapter by Svendsen and Campbell (Chap. 25), the US Forest Service developed a national registry and other means to support self-organized greening efforts that emerged in communities across the US as part of the 9/11 healing process (Svendsen and Campbell 2005a, b). This example is notable in two respects. First, it was directed by the US Congress, the members of which may have more freedom than government bureaucrats to engage in 'out of the box' thinking. Second, the Living Memorials project was facilitated by a small, non-traditional and perhaps more flexible team of urban social scientists working within the larger bureaucracy of the US 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.

In this volume, we have started to propose a lexicon that may prove useful to the policy-making community interested in the role of human connections to nature in post-disaster and post-conflict rebuilding. This lexicon starts with the title of this book, greening in the red zone, and includes other concepts emerging in resource management and development contexts, including biophilia, urgent biophilia, topophilia, social-ecological systems, resilience, vicious and virtuous circles, basins of attraction, and asset-based approaches. Another attempt to create a new vocabulary is our previous work on 'environment-shaping'. This work explores post-conflict and post-disaster planning that rests on five fundamental elements: (1) an asset-based rather than a deficit, gap, or needs approach; (2) a systems view of sustainability in the form of societal and physical feedback loops; (3) participatory methods throughout all aspects of planning; (4) an emphasis on locals' perceptions as a key driver of policy and programming decisions; and (5) critical path-styled planning that focuses first on objectives, and only on sectors or other categorical sub-divisions of planning in the translation to implementation plans (Weinstein and Tidball 2007; Tidball and Weinstein 2011).

Further work is needed however. For example, what language can we use to describe how approaches consistent with greening in red zones could be used by a military that has been trained to depersonalize the enemy? And how might the media describe such efforts as important elements of security policy, rather than 'touchy-feely' human-interest story after-thoughts? Or how might development agencies depict systems thinking and learning from locally-derived solutions in their policy documents and hiring criteria? Developing such a vocabulary will help to transform sometimes implicit understandings of the importance of human-nature relationships felt nearly universally among humans, and from the evidence presented in this volume, into more explicit understandings and policies for multiple development scenarios.

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 this book reflect the unique attributes of place—whether they be small-scale, local efforts such as the Martissant Park in Port-au-Prince (Chap. 3), coming together around greening amidst the fraying social structure of neighborhoods within Rotterdam (Chap. 29), or community forestry in the aftermath of a hurricane in New Orleans (Chap. 20); regional efforts such as collaborative wildlife management in Kenya (Chap. 28); nationally-significant initiatives such as tree-planting following war in Serbia/Herzegovina (Chap. 22) or Japan (Chap.18); or cases transcending two nation-states such as the greening of the red line in Cyprus (Chap. 33) or of the Demilitarized Zone in Korea (Chap. 15). 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 development 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, members of the policy-making community sequestered in office buildings 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 US Secretary of Agriculture launched the People's Garden initiative, challenging all US Department of Agriculture (USDA) facilities across the US 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 min of sending an email calling for volunteers to help at the USDA headquarters garden in Washington DC, over 75 employees had responded, and within a year of launching the nationwide program, over 400 gardens had been established at USDA facilities (L Marquez, USDA, personal communication). 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 NGOs 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 willingness to accept risk, patience, and a substantial diminishment of ego as they take a step back and 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-a-vis our calls for recognition and facilitation of self-organized practices and assets.

In cases where the policy-making community embraces locally-derived approaches to dealing with disaster, they also face issues related to balancing local and practical knowledge with specialized and technical expertise (Schipper and Pelling 2006). The chapter by Laćan and McBride (Chap. 22) provides an example of how the expertise of university scientists was incorporated into local efforts to replant a tree canopy following its devastation during the war in Sarajevo. Similarly, the chapters by Grichting (Chap. 33) and Winterbottom (Chap. 30) describe cases of university landscape architects working with community members to plan and implement greening projects.

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 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.

Embracing New Forms of Governance

For most of the greening in red zone cases in this volume, leadership comes from the non-government sector. NGOs provided leadership for Martissant Park in Haiti (the Foundation for Knowledge and Liberty or FOKAL), wildlife management in Kenya (Northern Rangelands Trust), and the village grove restoration efforts in Korea (Forest for Life). In other cases, university scientists played a lead role, as in

the reforestation efforts in Sarajevo (Laćan and McBride, Chap. 22, this volume), planning for the greening of the red line separating the two nations on the island of Cyprus (Grichting, Chap. 33), and planning and installing gardens in Guatemala and Bosnia (Winterbottom, Chap. 30). In some examples, such as the Korean village groves, NGOs leveraged community-driven efforts into a national movement (Lee, Chap. 12). Similarly, in Germany, grass-roots and NGO-initiated efforts received support from government and were transformed into a project—the greening of the Berlin Wall—of national and trans-national post- cold war significance (Cramer, Chap. 34). And in Russia, grassroots gardening efforts were recognized and further enabled by government, which granted the gardeners long-term leases to plots of land (Boukharaeva, Chap. 26). In cases that are early in their development, such as the self-organized greening efforts by veterans returning from Iraq and Afghanistan (Krasny et al., Chap. 13), the opportunity exists for NGOs and government to play a similar role in supporting and facilitating small local efforts, and in helping to create a national network of such efforts that provides opportunities for participants to share resources and learn from each other.

Nobel laureate Elinor Ostrom has 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 US Environmental Protection Agency, which has adopted a multi-institution partnership model, including partners that engage communities in hands-on stewardship, in addressing control of non-point 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-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.

Challenges and Opportunities Recap

Resilience thinkers look to red zones and policy traps as opportunities for reorganization, rebuilding, and recreating—for shifting from approaches aimed at accommodation or adaptation to those aimed at transformations (Pelling and Dill 2010). One way to rebuild—and to potentially shift the landscape toward more virtuous cycles of environmental and community stewardship and well-being—is to seek

out, learn from, and leverage nascent examples of people connecting to place, and of local citizens engaging in greening as a means of personal, community, and ecosystem recovery. Healing traumatized communities is no easy or quick task, and the challenges posed to the policy-making community hardly make their position an enviable one; but what better place to address dystopian problems than in the places most in need of a hint of utopia? Policy makers at a higher level also can learn from cases where formal government, NGO, university and other partners in a polycentric system of governance have already joined together to facilitate greening in red zones. Recent scholarship on social-ecological systems resilience and human-nature relations, along with the cases and lexicon presented in this volume, present a starting point for rethinking approaches and helping to tip the policy landscape to a new way of acting.

Lessons Learned

We now turn to a synthesis of more specific lessons learned through compiling this volume. We organize the lessons around the five barriers and related opportunities to changing the policy landscape presented in the previous section.

Understanding Human-Nature Relationships and the Importance of Place

Greening Can Contribute to a Shared Sense of Identity and to Rebuilding Identity Post-crisis

The notion of topophilia introduced in the chapter by Stedman and Ingalls, i.e., an attachment to or love of place largely garnered through experience, has important implications for post-disaster/ post-conflict rebuilding. Topophilia is something that virtually all of us experience, whether it is love for a forest grove, park, or the local bookstore or bar. Where topophilia incorporates nature as part of place, a more universal biophilia with potential evolutionary origins may play a role (Wilson 1984; Tidball, Chap. 4, this volume; Kellert and Wilson 1993; Kellert 1997a, b).

Place is often the basis for individuals' and a community's sense of identity, whether tied to a specific geographic location (e.g., Nigeria or New York) or the characteristic activities of a place (e.g., fishing, farming, or city dwelling). Several chapters help us to understand the degree to which topophilia and the act of greening play a role in defining, discovering, and rediscovering identity. These chapters also help us understand more about the *loss* of 'placeness' (Relph 1976), and the strong urge to regain a sense of place. In instances where a physical place

has been destroyed or reconfigured, self-identity can be severely challenged. This appears to be especially true for children (Blizzard and Schuster 2004). The act of rebuilding place therefore is not just about returning utility to the built infrastructure (Vale and Campanella 2005), but also about reconstructing self and community identity. Barthel and colleagues (Chap. 11) explore the implications of deep self-identification with place within the context of urban allotment gardens, whereas Hull (Chap. 19) and Tidball (Chap. 20) widen the scope of greening as part of rebuilding identity to include tree-planting in southeastern US cities, where live oaks are symbols of not only local place, but also of recovery and determination, and of re-birth.

In addition to rebuilding an internal sense of identity based in social memories of past environments and traditions, greening plays a role in reconstructing the actual physical and living environment following destruction due to war or natural disaster. In these cases, physical manifestations in the form of green spaces reappear as a symbol of identity not just for those actively engaged in greening, but also for those who passively witness such reemergence. Of particular relevance to the policy-making community, the reification of identity through acts of greening as rebuilding provides an important opportunity for members of a broader community to collectively discover ways in which a past identity is shared, and to reshape a new identity that is shared more broadly in the present (Tidball, Chap. 20; Hull, Chap. 19; Dark, Chap. 23, this volume). In the discovery of shared identity, and the shared process of building together and negotiating that identity, are the seeds of prevention of future internal conflicts, and a deepening resilience in the face of future traumatic events.

But just as shared place meanings and identity bind community members to each other, so differences in attributed meaning to the same place can lead to conflict. The city of Jerusalem, claimed by innumerable groups as exclusively central to their identity, is perhaps the most prominent example. Symbols such as trees and forests are sometimes used for less than benevolent purposes and can contribute to red zones rather than ameliorating them (Guha 1989; Fairhead and Leach 1996; Scott 1998; Cronon 2003; Prudham 2004). Again related to the Israel-Palestine territorial conflict are two dominant and highly symbolic treed landscapes—pine forests and olive groves (Braverman 2009). The pine tree is associated with Zionist aforestation of the Promised Land, while the olive tree symbolizes agricultural connections to the land long held by Palestinians (ibid). In his book *Painted Flags: Trees, Land, and Law in Israel/Palestine*, Braverman describes in great depth the story of trees through the narratives of military and government officials, architects, lawyers, Palestinian and Israeli farmers, and Jewish settlers, including cases of trees actually being targeted by military forces, removed, and destroyed, sometimes repeatedly. He sums up the situation:

> (I)n this pitting of the pine tree and its people against the olive tree and its people, a discursive and material split is constructed with dogged determination by the two national ideologies that compete in and over the landscape of Israel/Palestine, so that these two tree types assume the totemic quality of their people, reflecting and reifying the standing conflict (p. 165).

The Act of Greening Differs from Green Spaces

Similar to connecting to green spaces, the collective act of community greening leads to improved psychological, cognitive, and social health. The *act* of greening has the further benefit of fostering a deeper sense of self-worth as an individual contributes to the community's overall well-being. Greening also serves as a basis for framing place meaning and identity, and for empowerment through demonstrable opportunities for community organizing. Through these outcomes, as well as through producing food and other ecosystem services, one form of greening—community gardening—serves as an enabler of community (Okvat and Zautra, Chap. 5; Stedman and Ingalls, Chap. 10, this volume) and even national (Lawson, Chap. 14) resilience. Further, although community greening is often initiated by local residents for local residents, such projects generally form partnerships with NGOs, government, and universities; thus greening is consistent with current polycentric governance (Ostrom 2010) and civic renewal (Sirianni 2009) strategies aimed at environmental enhancement. Critical to the thesis of this book, the act of greening has broader implications than green spaces per se, albeit the vast majority of research in this area has focused on exposure to green spaces or even less, simply views of green features (Ulrich 1983, 1984, 1993; Sullivan and Kuo 1996; Wells 2000; Faber Taylor et al. 2002).

The Soweto Mountain of Hope (Chap. 6) provides a powerful case of how the *thing* community gardens—the actual green spaces—while important in themselves may not be as relevant as the *action* community gardening, which for many is a transformative process. The primary beneficiaries of greening are those who participate, even if secondary benefits can be had by those who simply witness or use the resultant green spaces. The policy-making community may want to take particular heed of the Soweto case and of the myriad of similar examples that demonstrate the power of harnessing dynamic practices—rather than focusing more narrowly on formal memorials or static spaces—as a form of transformation and a means to greater resilience. By highlighting the act of greening, this volume continues an important emphasis shifting from the lexicon of condition—managing for a stable endpoint—to the characteristics that form the basis of, or processes that build resilient communities.

Understanding Systems Thinking

Crises Open Up Opportunities for Renewal

As described in the chapter on resilience, disasters, conflict and other situations that tip a system toward chaos also create opportunities for renewal (Pelling and Dill 2010). In best case scenarios, such renewal has implications that spiral up levels of organization, described as panarachies (Gunderson and Holling 2002). So for example, the 9/11 terrorist attacks opened up opportunities for expressions of greening

that led to recognition of the importance of greening by the US government (Chap. 25), and the collapse of the communist Soviet Eastern Bloc created an opportunity for transforming the Berlin Wall—a space with global significance related to conflict and oppression—to a space of beauty, freedom of expression, and freedom to enjoy nature—the Berlin Wall Trail (Chap. 34).

Within the Context of Resilience, Greening Operates Back and Forth Across Scales of Time and Space

The introductory chapter by Tidball and Krasny explores the seeming tension between problem-framing at a national versus at a local and even individual level by asking the question: 'where, or at what scale, is resilience?' While it is impossible to avoid discussing development and post-disaster or conflict without at least acknowledging a national context, nations are hardly monolithic. Instead they are aggregations of overlapping communities within communities (Scheffer 2009; see also literatures on cybernetics, systems of systems, and complex systems; Wimberley 2009), each composed of both shared and unique attributes. Further, various aspects of communities transform over time and at different rates, depending on internal and external factors. Thus, greening at a neighborhood scale post-disaster as in the 9/11 Living Memorial examples in the chapter by Svendsen and Campbell (Chap. 25) may be repeated in multiple communities and have implications for resilience at the local as well as national scale. Greening also may be one of the first practices emerging almost immediately after a disaster or even during a 'slow burn' decline such as in current-day Detroit. Greening in turn may lay the groundwork for—or tip the balance in favor of—other resilience processes, such as rebuilding the built infrastructure. Notably, formerly crime ridden, trash-strewn neighborhoods in lower Manhattan spawned a slew of community gardens, which some people credit with subsequent renewal of the area.

Interestingly, resilience as it relates to greening may move over multiple levels of organization from the local to the national and back to the local, almost as if the greening processes were at once 'fractal' and 'scale free' (see Mandelbrot 1982; Andriani and McKelvey 2009). Resilience *resides* in human-nature interactions and in the ability to express them through greening. At the same time, human-nature interactions as expressed through greening may be *sources* of resilience for individuals, communities, and nations when faced with red zone conditions. Thus, on a day to day basis as we engage in greening, we are expressing our resilience as well as creating a source of resilience in the face of future crises at multiple scales.

Further, although transformation may be framed as incremental versus whole system, greening may obfuscate such distinctions. Related to both scale and pace, greening may be unusual in its ability to treat individuals, communities and nations simultaneously, as it can bring immediate salve to individuals and communities while slowly establishing the foundation for a deeper resilience that may be drawn on in future crises.

Red Zone Boundaries Are Fluid

Systems thinking often emphasizes defining system boundaries, which can be fluid during times of crisis. For example, Stedman and Ingalls (Chap. 10) ask the question of when does a 'slow burn' system, such as a declining rust-belt city, tip over into a red zone. Similarly the boundaries between direct victims of, leaders in green responses to, and others present and working within red zones are not readily defined. Whereas civilians severely affected by disaster and conflict are quickly recognized as victims, the trauma experienced by soldiers and other participants in conflict, including rescue workers, is often less readily apparent either to themselves or to others. As the United States military has increasingly recognized post-traumatic stress disorder as a real phenomenon worthy of naming and treatment, and as significant government resources are now being allocated toward addressing this problem, little has been written about the veterans who themselves are organizing responses to their own crisis through greening (Chap. 13). Though current wars on terrorism have largely spared civilians in developed countries, many poorer societies are almost entirely militarized. In areas of Somalia and Afghanistan, for example, where whole communities may be actively involved in conflict, either directly as part-time armed combatants, as human shields or suicide bombers, or as indirect support personnel to combat action by cooking, providing intelligence, or logistical and transport provision, whole communities are victims, yet some victims also emerge as leading efforts to restore a sense of hope and a return to normal functioning. The chapter by Holder (Chap. 32) shows how war has impacted women in Liberia, the chapter by Winterbottom (Chap. 30) provides testimony to how families and children have been displaced by war and poverty in Guatemala, and the chapter by Lawson (Chap. 14) recounts how an overseas war impacted food production and other aspects of life across an entire nation despite the fact that its citizens were thousands of miles from military action. Similarly, Lindemuth's (Chap. 27) example of greening in prisons clouds the distinction between criminal and civilian players in dystopia. Yet each of these chapters presents the unsung heroes who lead efforts to act no longer as victims but as transformers of the social and ecological chaos they are enduring.

Lawson's chapter further highlights how, just as traumatic events spare no one in an impacted community, the web of food production impacts virtually all aspects of community life, the economy, and the environment. Of particular salience to policy makers struggling with resource-starved systems that have experienced substantial physical damage to roads, ports, airfields, and manufacturing facilities, Lawson ties the entire supply chain of food production to issues of resource management and to war effort economies. Her Victory Gardens case demonstrates how food grown at home requires less transport and has fewer logistical costs and resource requirements, and thus can contribute not just to patriotic fervor and civilian commitment in the face of war, but also to freeing up resources to respond to the war effort. Thus, not just are boundaries between red zone and slowly decaying social-ecological

systems, and boundaries between victims, responders and others impacted, fluid, so too are the boundaries between greening and other more widely recognized responses to disaster and conflict.

Developing a Culture of Open-Mindedness and Attention to Locally Derived Solutions

Assets Can Be Identified Even in Dystopic Environments

Okvat and Zautra (Chap. 5) and Tidball (Chap. 20) present an overview of research demonstrating how the ability to express positive emotions through interaction with nature during times of hardship facilitates recovery, a finding which is consistent with a shift among health professionals from a focus on negative to positive influences on health (Chap. 7). A similar shift from emphasizing deficits, i.e., the ways in which a place and people are weak or sick, to assets, i.e., the ways in which a community exhibits strength and health, characterize policy initiatives that leverage local greening efforts to meaningfully contribute to the long-term well-being of their partner communities (see environment shaping, Weinstein and Tidball 2007; Tidball and Weinstein 2011).

Small Cases May Point to Larger Implications

Moore's case study of greening in a refugee camp in Northern Cameroon (Chap. 31) may have substantially broader implications than presented. At the beginning of 2010 over 2.5 million people resided in refugee camps.[1] One camp alone in Dagahaley, Kenya housed 93,000 people, a fraction of the 256,000 who live in the network of Kenyan Dadaab camps. Furthermore many refugee camps are essentially permanent; hundreds of thousands of Burundians representing multiple generations of refugees have occupied Tanzanian refugee camps since 1972. For younger residents these camps are the only home they know. In addition to the red zone tensions that led to the flight of refugees, the persistence of these camps has created tensions between Tanzania and Burundi, between Tanzanians and the Burundian refugees, and within the camps themselves. Moore's view of the Cameroonian refugee camps as possible centers of food and forest production is intriguing, because it holds the potential both for introducing self-sufficiency to camps and for relieving tensions within the camps and between the camp residents and their hosts, particularly in those instances in which repatriation is not forthcoming. In the refugee camp and other cases, the policy-making community is confronted with questions about how one might scale-up and adapt grass-roots and NGO-initiated greening efforts to similar situations across multiple contexts.

[1] United Nations Refugee Agency, Statistical Yearbook 2009, p.9.

Engaging in New Forms of Governance

Policy Makers and Development Professionals Have an Important Role to Play

While most chapters in this volume have pointed towards reinforcing indigenously-derived, emergent practices leading to community resilience, the re-greening of Tokyo and Hiroshima after allied bombing in the contribution by Cheng and McBride (Chap. 18) is an important example of how policy makers have the power to contribute directly and substantively. The policy-making community holds a unique position in their ability to couple a macro view of the problem and its solutions with financial and other resources. The result is an opportunity to have broad impact when compared to strictly bottom-up approaches whose potential scope is limited due to their inherently localized nature and resource scarcity. Boukharaeva (Chap. 26) depicts how self-organized urban gardening efforts served as a shock absorber of trauma, and how they were recognized and reinforced by the actions of policy makers who, in a radical gesture given the history of land ownership in Soviet Russia, granted property rights to the gardeners. Mid-level policy makers, through their influence on day-to-day responses to disaster and conflict, also occupy a pivotal linking function between community groups and NGOs on the one hand, and politicians and even other nation-states trying to influence the policy of weaker states on the other (Pelling and Dill 2010). Much more work remains to be done in identifying roles for government and other components of a governance system in facilitating different types of greening occurring in diverse red zone settings.

Recommendations

In this section, we synthesize our observations and lessons learned into recommendations for the policy-making community. The recommendations that follow are difficult, may take a long time to bring about, and demand courage from those involved. We recognize the challenges. At the same time 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. To do so is to say, simply, 'nature matters'.

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 (Tidball and Stedman 2013). 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.

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 (Weinstein and Tidball 2007; Tidball and Weinstein 2011) suggests how an environment shaping strategy provides a path for applying such thinking in post-conflict and post-disaster development contexts.

Allow Human Experience to Guide Policy Making

In rare instances torture victims, disaster survivors, or former combatants confront policy makers 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, that they may be instrumental in sparking discussions about changes in policy. But what is the role of human experience in more rational policy making? And what is it that is meant to be secured if not people's 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 US military fully confronting the magnitude of psychological impacts of repeated deployments to combat zones, which reach far beyond military institutions and deeply into our communities. Greening should be an important part of the multifaceted human experience that is considered in policy making.

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 mismatched. Grassroots or bottom-up derived solutions sometimes get short shrift because they challenge the reputation of the policy maker as an expert, deny the viability of command and control, and don't always dovetail perfectly with our own world view. The participatory approaches that are required of an asset-based strategy to policy and program design take time and a real 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.

At Times 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.

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 policy makers 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.

Pursuing a *Greening in the Red Zone* Research Agenda

The evidence accumulated in this volume comes from synthesizing on-the-ground examples of greening in red zones with research about human-nature relations and social-ecological systems resilience. Because research that focuses specifically on greening responses in red zones is hard to come by, this volume is meant to stimulate thinking about possibilities—about the potential for greening to help people reorganize and rebuild in red zones—rather than to suggest that we have all the answers. Such thinking will inevitably raise questions that could be answered by inter-disciplinary research drawing from the social and ecological sciences.

For example, in the area of human-nature relations, much work has been done on the emotional, psychological and cognitive impacts of exposure to green spaces among hospital patients, young children, and residents of low income housing, and a few studies have been conducted on the outcomes of active engagement in greening among urban greening participants (see Okvat and Zautra, Chap. 5; Tidball, Chap. 4; and Wells, Chap. 7 for reviews). Further, a number of authors in this volume have collected testimony on the power of gardening and other forms of greening and green spaces from soldiers and civilians in war zones (Helphand, Chap. 17 and

Krasny et al., Chap. 13), children under conditions of extreme poverty (Chawla, Chap. 8), hurricane survivors (Tidball, Chap. 20), women in post-war Liberia (Holder, Chap. 32), among others experiencing red zone conditions. However, we lack empirical research, such as long-term, comparative, or other studies, that more rigorously tests the impacts of greening specifically on individuals and communities in red zones.

Relative to social-ecological systems resilience, many studies have described social and ecological processes within particular systems, for example fishing dependent villages in Southeast Asia (Daw et al. 2009), First Nations communities in the boreal region of Canada (Berkes et al. 2000), and forest dependent communities in the Pacific Northwest (Fernandez-Gimenez et al. 2008). Other authors have described rebuilding processes post-disaster (Vale and Campanella 2005) or have distilled characteristics of disasters, including frequency, magnitude, and extent, that can be used as a basis for planning interventions (Pelling 2007). However, we are not aware of empirical studies that use a social-ecological systems framework to study processes occurring in disaster and conflict zones, and that treat red zones as a type of emergent and relatively short-lived social-ecological system with a unique set of characteristics different from those of other systems. Do red zone systems share commonalities relative to social and ecological processes that cut across specific contexts?

A fundamental issue for greening in red zone researchers is how they might partner with on-the-ground implementers and policy makers in defining research questions, collecting data, and other aspects of the research process. When policy makers, project implementers, and community leaders working in red zones are involved in research, questions may be better informed by real-life experience and needs, and the results may be more readily reinserted into policies and on-the-ground practices. Policy makers with the foresight and courage to invite multiple stakeholders into research they fund may develop more robust plans informed by data on specific outcomes of interest. For example, the defense and development agencies might be interested in ways to leverage incipient greening efforts to improve group behavioral dynamics and morale.

A number of difficulties face a researcher investigating the role of greening in red zones. Given the dangerous and challenging conditions that characterize all red zones and the oft-times spontaneous responses, controlled experiments will likely not be possible. Instead ‘natural’ experiments looking at variations in conditions that occur in the field, or qualitative research that follows greening practices in-depth and over time, may be employed. In addition, commonly held notions about linear relationships may not hold. For example, the ability of a community to mount a greening or other response to disaster depends in part on existing human capital, yet at the same time when a community is able to take charge and respond effectively to a disaster, human capital may be created. The same may be true for social, cultural, and natural capital, as well as for sense of place. Further complicating any research endeavor, these different capitals interact with each other through greening, as when a group of individuals with trusting relationships and a history of volunteerism (aspects of social capital) is able to come together to recreate natural capital lost

in a disaster (e.g., by planting trees). These relationships may be envisioned as the different forms of capital nested within each other in a progressively larger series of concentric rings (from human to social to ecological, see Wimberley 2009). Alternatively, processes at the individual, social-cultural, and ecological scale may be viewed as nested adaptive cycles forming panarchies of small-scale, relatively fast processes both impacting and being impacted by larger and slower processes (see Gunderson and Holling 2002). To add to the research challenges, multiple forms of capital that are integrated in a greening response serve as both sources and expressions of resilience during disaster as well as during the rebuilding period.

Despite this complexity, in thinking about a future research agenda, we have found it possible to break down the types of questions into those about the nature of the greening response and about the nature of the red zone, both of which are addressed below. We then address questions related to sense of place, which may be used to help connect various greening responses to the particulars of the red zone. Finally, we briefly address questions related to the role of the policy-making community in leveraging greening efforts as part of post-conflict and post-disaster response.

Greening Response

The chapters in this book point to the myriad of possible greening responses in red zones, and thus set the foundation for research about what determines the particular greening actions observed under various conditions. So for example, are there forms of greening that are universal and immediate (e.g., planting flowers or community gardening), as well as expressions of greening related to the symbols of particular cultures and places (e.g., planting live oak trees in New Orleans)? Under what conditions do people engage in greening with immediate visible results (e.g., planting flowers) versus forms of greening that are more long-term yet involve greater investment and risk of failure (e.g., tree-planting, larger-scale greening of contested spaces such as the Berlin Wall)? What is the role of human capital (e.g., local leadership) and social capital (e.g., social connectivity, volunteerism) in fostering various greening responses? And what role do social and ecological memories play in eliciting a particular greening response?

The type of greening response may be determined not only by factors such as local leadership, culture, and social-ecological memories, but also by the nature of the red zone. Thus, another set of questions relates to how people respond to the particulars of the red zone, such as whether it is the result of slow, low-level, but sustained disturbances or a sudden, dramatic and rare event. The chapter on rust-belt cities (Chap. 10) raises a slew of potential inquiries concerning the relationship between the speed and magnitude of the catastrophe and the rate of rebuilding efforts. How do the slow-burn decays of rust-belt cities mute or distort residents' memories of more favorable conditions, leading in a vicious cycle like process to less motivation to green and subsequent further decline? Could a seemingly more

rapid renewal of the city of New Orleans relative to the city of Detroit, both of which have been suffering decline over a period of many years, be attributed in part to a reaction to the subsequent massive disturbance in the form of hurricanes in New Orleans? Are there similarities in the types of response to repeated disturbances, such as long-term economic decline in Detroit, or the serial extinction of tree species over time due to repeated insect invasions in the northeastern US, even though the social-ecological systems in which they take place differ radically? How might one characterize greening responses generally among slow versus fast disturbances? And what are the differences in greening responses to both fast and slow disturbances impacting a particular system, such as a forest that experiences slow erosion of species composition versus a sudden forest fire? Predicting a greening response to a particular type of disturbance is further complicated by the fact that we generally cannot predict when a disturbance or series of disturbances, such as earthquakes, influxes of refugees, or slow economic decline, may transform social-ecological systems into less desirable basins of attraction or red zones. For example, we are unable to identify or quantify the factors that suddenly transform a landscape characterized by a trickling of refugees into one where massive migrations occur.

In addition to rate and magnitude of the disturbance, other factors related to red zone characteristics undoubtedly play a role in determining any sort of greening response. Whereas hurricanes, floods, and other 'acts of god' all can result in significant environmental contamination, some disasters—including oil spills, nuclear bombs, nuclear plant melt downs, and chemical plant explosions—by their very nature are associated with pollution over wide areas and impacting significant numbers of people. Although we see greening actions in response to such disturbances, for example, planting trees in post-atomic bomb Japan and rehabilitating oiled birds along the Gulf Coast of the US, questions arise as to the deeper impacts of such responses for the individuals and communities as well as the ecosystems involved. For example, does cleaning oiled birds result in the same cognitive and emotional outcomes as reestablishing native plants in more 'natural' salt marshes? One might hypothesize that cleaning up after a human caused disaster will lead to different types of satisfactions and other psychological outcomes than greening after a disaster that is perceived as 'an act of god'. Finally, questions may arise about how real dangers, such as from exposure to contaminants or being attacked in a war zone, impact greening responses.

Greening Outcomes

In addition to looking at factors determining the type of greening response, researchers may pose questions related to the role various greening actions play in disaster recovery at multiple scales. What determines whether greening in a red zone is simply an individual spontaneous act of defiance to regain a sense of personal equilibrium in the face of unbearable conditions, an action taken with neighbors to re-create a

sense of community or sense of place, and/or an act of political protest? An example of the latter is the scrap metal sculpture at the Soweto Mountain of Hope in South Africa; a larger-than-life human figure holds a world globe and a Chevron sign, thus expressing an anti-globalization message. Another example might be Latino guerilla gardens planted on contested spaces in the US or in Latin America. Because symbolism and ritual may be closely linked to the greening response, in particular when greening is seen as a political action, questions arise as to how green spaces and greening are viewed as symbols of culture and protest, and the meaning of the rituals that arise around such acts.

A research agenda would also include a set of questions focusing on greening outcomes for ecosystems. The recounting of the replanting of Sarjevo by Laćan and McBride (Chap. 22) is one of the few chapters in this volume that addresses ecosystem resilience rather than social outcomes. Given what we know about the relatively small scale of greening efforts, what sorts of outcomes do they have for ecosystems? One particular challenge is developing measures for ecosystem responses that are appropriate for the scale of greening efforts and for red zone settings, and that are sensitive to any scaling-up of greening from the work of a few individuals to a network of many active programs.

Sense of Place, Greening, and Conflict

The symbolic nature of place generally includes a green or biophysical component. This may be related to trees, such as the live oak trees symbolic of New Orleans or Charleston SC (see Tidball, Chap. 20 and Hull, Chap. 19, this volume), cedars in Israel or olive trees defining Palestine as a place (Braverman 2009), or other iconic species such as the oysters that once defined the character of New York City (Kurlansky 2006). Landscape features, such as the lakes of Wisconsin, may also play an important role in residents' sense of place, including place attachment and place meaning (Stedman 2003). The relationship between place, greening, and conflict or disaster is multi-faceted. For example, place attachment may erode over time due to repeated assaults on a particular place's green and built elements, as seen in the economic, social, and environmental decline of the rust-belt cities described by Stedman and Ingalls (Chap. 10). Yet we know little about how various levels of place attachment or types of place meaning might impact motivations to rebuild following disaster, or how re-greening post-disaster might affect place attachment and place meaning. Other potential areas for research include the psychological impacts on war victims of purposeful destruction of symbols of place—such as the cutting of olive trees by Israeli youth in Palestine (Braverman 2009).

Further, there may be connections between active engagement in greening, sense of place, and notions of social and ecological justice. For example, how does protest through greening and green spaces—such as planting gardens on 'claimed' land or camping out in trees in defiance of efforts to cut them down—connect building or expressing sense of place to notions of justice? Conversely, how does destruction of green space relate to notions of justice? How might one define and explore notions of social-ecological or 'sense of place justice'?

Government and NGO Responses to Greening

Whereas grassroots greening efforts pose particular challenges for policy-makers used to defining and implementing their own solutions, this volume presents several examples of governments recognizing the value of self-organized greening by granting property rights to gardeners in Russia (Boukharaeva, Chap. 26) or official status as Living Memorials to planting efforts in the US (Svendsen and Campbell, Chap. 25). Research could investigate outcomes of government and NGO strategies for supporting existing and incubating new greening efforts. The outcomes of any interventions would be expected to vary according to many of the factors mentioned above, including symbolic meanings of and rituals attached to different kinds of trees, green spaces and greening responses; the frequency and type of disturbance; as well as the political, social and ecological context in which the interventions take place.

Understanding processes leading to decline and rebuilding is critical for policy makers engaged in development and aid programs (Pelling and Dill 2010). To be effective, the policy-making community needs to have answers to questions such as: What are the thresholds that divide a red zone from a non-red zone state? When, and under what conditions, might a place shift from a red basin to a green one, or back? Under what set of conditions and how long might this transition be expected to last? When should development agencies intervene so as to most effectively enable virtuous cycles or mitigate vicious ones? For how long should they continue their efforts before barriers between basins have been sufficiently built up or broken down?

Conclusion

We began this final chapter with a quote from Theodore Roosevelt, whose interest in the outdoors and conservation may have stemmed from how he used nature study and embracing a strenuous life to overcome childhood asthma, and who, as President of the US, set aside over 200 million acres as national parks, forests, wildlife preserves, and other conservation areas (Beale 1956; Morris 1979; Donald 2007). Thus, the life and accomplishments of Theodore Roosevelt connect a central theme addressed in the chapters of this book—humans as *of* and *part of* nature, and as turning to nature as a source of resilience—with this closing chapter about policy making.

Although Roosevelt was no stranger to war and conflict, which he both participated in as a soldier, deliberated about as a policy maker,[2] and suffered from deeply when his youngest and favorite son was killed at age 20 in aerial combat during World War I, we are not aware of evidence that he connected his interest in nature directly with any post-conflict policies *per se*. Nor would he have been privy to discussions about more recent notions of social-ecological systems, feedbacks, and landscapes dotted with basins of attraction including vicious and virtuous cycles, or

[2] Theodore Roosevelt was the first US president to receive the Nobel Peace Prize, in 1906.

about the potential of participatory, bottom-up approaches to address local and even national-level post-conflict and post-disaster rebuilding. Yet, Roosevelt understood the power of human-nature interactions and healing on multiple levels, as is demonstrated by his actions during a formative period of his life.

As Linda Heyd, park ranger and interpreter at Theodore Roosevelt National Park Ranger tells it, an old rustic cabin sits behind the park visitor center in Medora, North Dakota. Structurally humble, one might wonder why it still exists and why people work so hard to preserve it. The reason is that it once housed a future US president at a pivotal moment in his development as a man. Heavily burdened by grief and anguish, Roosevelt retreated to North Dakota after his young wife and his mother died at their home in New York within hours of each other. Trying to remove the painful memory of these tragic deaths from his mind, Theodore escaped the bustling east coast with its cities and streets full of ghosts, to head west and find healing in the great expanse of grass and sky.[3] He did heal there, and as he did, he reconnected with the natural world in all its detail, diversity, and restorative bounty. And as a policy maker, he later went on to think big regarding human-nature interactions, and establish or enlarge 150 national forests, 51 federal bird reservations, 4 national game preserves, 5 national parks, and 18 national monuments.[4] Although Roosevelt's moments of turning to nature as a means of personal resilience were separated in time and space from his actions as a policy maker, there is much to learn from Roosevelt's use of nature in time of crisis, and the possible link between his personal actions and his later grand impact on national and even global policy. The rustic cabin and numerous other monuments and parks also embody lessons about the memorialization that has since occurred, reifying the importance of our relationships to nature and of places for healing.

As policy makers, researchers, practitioners, and simply humans, we have the potential to connect our relationship with nature as expressed through greening, with policies aimed at 'tipping' the balance in favor of more virtuous, greener and community-minded basins across post-disaster and post-conflict landscapes. How might we not only create and reinforce virtuous cycles of greening and rebuilding in social-ecological systems, but also virtuous cycles of being attentive to and leveraging existing assets in the very policy-making communities that impact these systems? We have seen from the myriad examples presented in this volume the diverse forms that greening can take, in part related to local, regional, and nation-state histories, cultures, and ecologies. Whereas some forms of greening post-disaster seem to cut across multiple contexts—such as gardening in post-war Liberia and Serbia, in post-apartheid South African townships, and after 9/11 in the US—others are more regionally-specific, such as wildlife management in Kenya or village groves in South Korea. In some instances local efforts gain regional or global importance as symbols of recovery, such as the greening of the Berlin Wall or of the red line separating Cyprus. Because so much variability exists both within greening activities and

[3] http://medorand.com/attractions/?401

[4] http://www.theodoreroosevelt.org/life/conNatPark.htm

the contexts where they are applied, policy makers will need to fine-tune any ideas or recommendations they have gleaned from this book to take into account specific contexts. Part of a local context is the nature of small-scale, self-organized greening initiatives that reflect local culture and social-ecological memories.

In short, we are calling for policy makers to join with researchers to take a systems view—to model and understand the multiple networks of relationships among communities, regions, and nation-states, as well as the networks of governing institutions that work at various levels. At the same time, we are asking the policy-making community to join with the community greeners—to recognize not only the role of human-nature relations in the abstract, but also how such relationships are manifested in specific acts, at specific places, and at specific times. Reflecting the notion that multiple efforts addressing a suite of problems simultaneously are required to transform vicious into virtuous cycles in social-ecological systems, multiple, cross-sector, and integrative efforts among the greening, research, and policy communities will be needed to tip the balance in favor of policies that support greening and transformation in red zones. To this end we are also encouraging the policy making community to *think big*, like Roosevelt did, but armed with new and exciting ideas.

At a fundamental level, the critical question for the post-disaster and post-conflict policy-making community may be whether their actions foster or inhibit individual and societal expressions of urgent biophilia and restorative sense of place. We believe that inhibiting such expression may aggravate a disaster or conflict scenario, whereas the evidence presented in this book suggests that fostering such expression releases a series of cascading effects whereby humans rebuild a sense of personal equilibrium, restore and reconcile their place in the ecosystem, create anew a sense of community and of place, and put into motion the first steps toward restoring a healthier social-ecological system.

Thus, we call upon policy makers to consider the role of participatory natural resource management—or of greening—in responses to red zones. Again we may look to the insights of the resilient Japanese, who have transformed their society in the twentieth century to become a model of democracy and efficiency, and who are now facing perhaps an even greater challenge in the twenty-first century to rebuild and transform in the aftermath of disaster of almost unimaginable scale. Yet policy makers 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). Policy makers are seeking counsel from scholars of Satoyama and Satoumi (Takeuchi et al. 2003; Shidei 2006; Morimoto et al. 2009), 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 twenty-first 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. The many authors of this volume do not wish to convey that greening and its attendant multiple benefits are a magic wand to be waved over tragic circumstances to green-wash away the grim realities of disaster and war. Yet, we feel that the preponderance of empirical evidence and anecdotal corroboration as presented here 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.

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