CHAPTER 1

Evolution

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Can we live with a forest in a way that makes it possible for the forest to evolve? To me, that's very different from asking how to harvest the forest appropriately.[1]

Charles G. Krone

Humans often find themselves "doing battle" with nature. Lawn owners spend hours fighting weeds. Cities invest millions of dollars to manage storm-water and plow snow. Humanity puts its collective shoulder to the wheel to fight pests, control erosion, and barricade shorelines. Small wonder that these rearguard actions have turned into major economic drivers, resulting in responses as varied as the multibillion-dollar pesticide industry and the village repair shop.

We chalk up these costs—which can be energetic and political, as well as financial—to entropy, the idea that all things, even if they are maintained, will eventually deteriorate. We tell ourselves that entropy cannot be avoided.

You can plan for it, budget the time and money to counteract it, but you can't stop it.

There's just one problem with this premise. Simply put, *it is not an accurate description of the ways that living systems actually work*.

EVOLUTION VERSUS ENTROPY

Every human creation, whether it's a cottage garden powered by the sun or a company powered by employees, must function within a living planet made up of interconnected living systems. Living systems (sometimes called complex adaptive systems) are ubiquitous—hospitals, the human body, the stock market, estuaries, neighborhoods—all are living systems. Although subject to the law of entropy, living systems are also governed by the countervailing processes of evolution. Living systems don't just run down; they also grow up.

For this reason, one of the basic premises of regenerative development is that *every living system has inherent within it the possibility to move to new levels of order, differentiation, and organization*. This capacity to create increased order is the opposite of entropy.

> Premise One: Every living system has inherent within it the possibility to move to new levels of order, differentiation, and organization.

Our planet is a living system, shaping and shaped by the life that it supports. This aliveness is inherently creative and unpredictable. From the beginning, this ceaseless creativity has followed a consistent pattern. Life has evolved from simple to complex, from the homogeneity of the single-celled organisms that initially colonized the planet to the myriad, highly differentiated species, microbiota to megafauna, that make up a present day Amazonian rainforest.

The evolutionary drive has been key to life's four billion years of staying power. Failure to take it into account when we design puts us in conflict with the nature of living systems and our own nature as humans. For several centuries we have strived to set ourselves apart from the unpredictable, disorderly natural world, putting our ever more powerful technologies to work making life predictable and controllable. Shaped by the Industrial Era's interpretation of evolution and

natural selection as the struggle over scarce resources, we have worked to make sure we came out on top in any competition with other species.

From today's perspective, it is hard to defend this as a long-term or even short-term winning strategy. Pioneering ecologist Lawrence Slobodkin described evolution as a kind of existential game in which the only rule is to *stay in it*.[2] The implication is that, as relative newcomers to the planet, we humans need to learn how to avoid joining the 99.9 percent of species that once inhabited Earth but are now extinct.[3] For those who design and develop human habitat, the opportunity now is to redirect human activities away from the containment of life's "constant reign of evolution and perpetual novelty"[4] to collaboration with it.

Thus the first principle of regenerative development is to *design for evolution*. This represents a significant departure from the entropic ways that we've constructed our human habitat for the last four or five centuries.

Principle One: Design for evolution.

RECONCEIVING EVOLUTION

In the time since Charles Darwin published *The Origin of Species*, generations of evolutionary biologists have been refining, correcting, and adding new layers of insight as they draw on a growing body of scientific knowledge. While evolution is generally understood as a movement from simple to more complex, understanding the process through which this movement occurs is the subject of theory, research, and debate. With regard to sustainability, a particularly relevant school of thought views cooperation (deriving from the mutuality of interest among organisms and ecosystems) rather than competition as evolution's primary driver.

For more than a century, natural selection has been conceptualized as the result of a competition over scarce resources. The idea of organisms battling one another for survival still holds sway in popular culture, but current science indicates that this isn't the whole story. In the words of Martin Nowak, Director of the Program for Evolutionary Dynamics at Harvard University,

"Cooperation is needed for evolution to construct new levels of organization. The emergence of genomes, cells, multi-cellular organisms, social insects and human society are all based on cooperation."[5]

Darwin himself wrote, "The most important of all causes of organic change is . . . the mutual relation of organism to organism—the improvement of one being entailing the improvement or the extermination of others."[6] Many interpretations of Darwin's work have placed misleading emphasis on extermination over improvement of species.

Evolutionary biologist Elisabet Sahtouris has asserted that cooperation is the hallmark of a species' evolutionary trajectory. She proposes that a tendency toward competition is the marker of an immature level of biological development, occurring when a relatively new species strives to establish itself before it learns to form cooperative alliances. "Young immature species are the ones that grab as much territory and resources as they can, multiplying as fast as they can. But the process of negotiations with other species matures them, thus maturing entire ecosystems. Rainforests that have evolved over millions of years are a good example. No species is in charge—the system's leadership is distributed among all species, all knowing their part in the dance, all cooperating in mutual consistency."[7]

Sahtouris also observes that, "Multi-celled creatures are relatively huge cooperative enterprises that could never have evolved if individual cells had been doomed to struggle in scarcity."[8] For her, "The best life insurance for any species in an ecosystem is to contribute usefully to sustaining the lives of other species, a lesson we are only beginning to learn as humans."[9]

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—Elisabet Sahtouris

Organisms work to reproduce and survive. But the organisms that succeed in evolution are the ones that become important to the complex, multileveled larger systems they depend upon. Cooperation among organisms isn't limited to members of the same species or direct interactions

among species. All organisms shape *environments* that influence other organisms.

For example, some squirrels eat the sugar-concentrated tips of spruce trees and the root-dwelling fungi that support the trees' health. In the gut of the animal, the sugars and fungal spores are brought together in the optimal conditions for spore activation. The squirrels' feces, deposited on the forest floor, carry the next generation of health-promoting fungi to the root zones of the spruce trees, and the mutualistic association continues. Every ecosystem contains examples of this kind of mutualism. It is no wonder that complexity scientist Stuart Kauffman describes the emergence and elaboration of life on our planet as, "the story not merely of evolution, but of co-evolution. We have all made our world together for almost four billion years."[10]

Even organisms that are seemingly at odds can "help" each other—not because they are altruistic, but because they play supportive roles within the ecosystem on which they mutually depend. In the Brazilian rainforest the toco toucan is the main predator of the eggs laid by the hyacinth macaw. At the same time, this macaw makes its nest in only one species of tree, whose seeds are spread almost entirely by the toco toucan.

The point is not who helps or who kills. It is that each and every organism on Earth is a *participant* in evolution. As participants, they shape not only their own destinies but the destinies of their ecosystems.

HUMAN ECOSYSTEMS

Humans have the potential to make unique contributions to the ongoing evolution of living systems by consciously participating in them. Unfortunately, for the most part we are fighting evolution rather than aligning with it. Natural systems are inherently complex, yet too often our engineering practices try to simplify them—dumbing them down, so to speak. For example, we channel, straighten, and dam rivers in order to control them for human purposes, but in the process we diminish their ability to manage themselves with regard to flooding, soil deposition, and habitat renewal (Figures 1.1 and 1.2). By treating rivers as simple conduits for delivering or removing a commodity (water), we undervalue and undermine their complex role in sustaining and elaborating life across multiple ecosystems.

FIGURE 1.1 The highly engineered drainage system of the Los Angeles River exemplifies the almost total degradation of a natural riparian system.

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FIGURE 1.2 In comparison, the drainage system of a healthy river watershed nurtures abundant and ever-evolving species in a web of complex relationships.

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Because humans are living organisms and products of evolutionary processes, we manifest the same complexity that we see in nature within our social behaviors and organizations. In the long run, the tendency toward differentiation, cooperation, altruism, and holism offer the same evolutionary advantages in human systems that they do in natural ones. Social programs intended to deliver universal access to benefits such as clean water or education create the basis for healthy, productive, and equitable societies. When such programs aim higher—for example, by seeking to realize the potential of each student rather than "teaching to the test"—they unleash the inherent capacity for holism and creativity that lies in human beings. Learning how to stay in the game, bringing human patterns into alignment with evolutionary processes, is not just a way to survive. It is also a way to prosper.

STAYING IN THE GAME

So what do we need to know about the game of evolution in order to become successful participants? How do we proactively design for evolution? Here are four fundamentals of living systems that provide some parameters for exploring this question.

The Only Constant Is Change

Living systems are marked by impermanence and change. A month of heavy rains might be followed by two months of dry weather. A bumper crop of apricots in one year might be followed by a year with a bud-killing frost. Populations of deer grow larger and larger until their predators catch up to them and thin the herds.

Designing for evolution requires us to treat change as a source of creativity. Too often, we approach projects from the mindset that change is something we are working to prevent. But this places us in conflict with living systems, trying to hold them in a state of stasis. The alternative is to harness the energies of change, as a surfer rides a wave, in order to outmaneuver the forces of entropy.

Of course, evolution not only responds to change, it also creates it. Each stage in the development of an ecosystem presents a new set of opportunities and challenges around which life must reorganize. In times of crisis (rapid and

disruptive change) evolution accelerates. Explosions of new species followed each of the five mass extinctions that occurred in our planet's history. Today, ecologists are finding that species evolution is speeding up, creating new challenges for sustainable ecosystem planning. Designers who wish to work creatively with change must embrace the fact that the process is continuous. They must help build the capability to use change positively into the systems in which they are working.

Diversity Is About Exchanging Value

Surprising and unpredictable new forms emerge as the result of collective creativity. In *Complexity: The Emerging Science at the Edge of Order and Chaos*, Mitchell Waldrop wrote, "John Holland, one of the pioneers of complexity science . . . argues that organisms in an ecosystem evolve because of their interactions with one another, as an organism's ability to survive depends on what other organisms are around—'for example flowers that evolved to be fertilized by bees, and bees that evolved to live off the nectar of flowers'" (Figure 1.3).

FIGURE 1.3 The exchange of pollen and nectar is a mutualism that has driven the evolution of bees and flowers.

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A diversity of elements, such as organisms in an ecosystem or buildings on a site, adds nothing if there is no beneficial exchange of resources, energy, or material among them. A forest doesn't become healthy because it contains a long list of plant and animal species; it becomes healthy when those species

actively nourish and shelter one another in an unbroken web of beneficial relationships. A downtown shopping district is more likely to foster a vibrant city economy when it is filled with local businesses that rely on local manufacturers, rather than with national chains.

> A diversity of elements, such as organisms in an ecosystem or buildings on a site, adds nothing if there is no beneficial exchange of resources, energy, or material among them.

Individual elements are not key, no matter how many different kinds of them there are in a system. The diversity that matters is the network of relationships that emerges from and around interacting elements. This dynamic network is critical to evolution. In Elisabet Sahtouris's words, "The evolutionary process is an awesome improvisational dance that weaves individual, communal, ecosystemic and planetary interests into a harmonious whole."[11]

Value Enhances Viability

Exchanges become important to evolution when they create *value*. Value arises when an object or service is delivered to a recipient. It increases when, as a result, that recipient is enabled to contribute to the viability of a larger system in a continually evolving world. To return to the example of flowers and bees, when an apple blossom is pollinated by a bee, the exchange results in fruit and honey. This creates a cascade of benefits throughout the system. The bee's hive is nourished; a bear eats the apples; the apple tree reproduces itself; and the bear's scat fertilizes the soil.

In another example from the history of life's origins, early carbon dioxide–consuming microorganisms increased the level of oxygen in the atmosphere to so high a level that all life on the planet was threatened with extinction. Happily, some of those organisms developed the ability to consume oxygen and release carbon dioxide. This created the atmospheric balancing act between oxygen producers and consumers that continues to this day. These organisms, in other words, evolved the specific nature of value creation that would enable life to persist.

As living entities evolve, they upgrade the value delivered by what they produce. For example, a tree in a temperate forest builds soil by growing roots,

depositing leaves, and buffering the effects of sun, wind, and precipitation. The resulting soil enables the establishment of new life. Each new organism extends and elaborates the storage capacity of the soil and thus supports the growth of the original tree. A "virtuous cycle" is brought into being, whereby the tree strengthens its community, which in turn enables the tree to grow stronger and further strengthen the community.

Adding Value Is a Nested Phenomenon

Living systems are nested. They are always part of some larger living system, and they are made up of smaller living systems. Each living system contributes to the value-adding processes of the larger system within which it is nested, and that system in turn contributes to an even larger system.

For example, a tree is a member of a larger community, called a forest. One of the outputs of an intact forest is the quality of water that it produces. The thick carpet of organic material on the forest floor quickly absorbs rainwater and then slowly releases it into springs and creeks. This contribution of the forest ripples outward in the form of river habitat and abundant estuaries (Figure 1.4).

FIGURE 1.4 In healthy natural systems, a single element such as a tree adds value to the larger systems within which it is nested.

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If the forest is compromised or lost, then the negative effects also flow downstream. Rainwater fails to absorb into soils and runs off too quickly into creeks and streams. This creates flooding and erosion, which degrade the aquatic habitats.

Too often, people design systems with inadequate understanding of how their effects, positive and negative, will move outward into larger and larger systems (or inward into smaller and smaller systems). As a result they create unintended consequences and fail to deliver the value of which our projects are inherently capable. For example, when small, local businesses are replaced by megastores, local money no longer absorbs into the local economy. Social interactions fostered by small businesses dry up, and the downtown may become abandoned.

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REGENERATIVE GOALS

One early articulation of the role of evolution in design came from visionary social critic Stewart Brand. In his 1994 book, *How Buildings Learn: What Happens After They're Built*, he made the case that buildings should evolve in response to changing requirements over the long term. He believed that buildings evolve organically when their occupants refine and reshape them in response to their immediate needs. Brand called on designers to tap the inherent evolutionary power of living systems—in the case of a building, the changing community that occupies it.[12]

Brand's proposals were ahead of their time, but they were also narrow. They focused on buildings and their occupants in isolation, rather than seeing them as systems within nested and interdependent systems. The application of the principle, *design for evolution*, entails working with a complex, layered, and dynamic set of relationships. One of the first places this manifests is in *the nature of goals* that a regenerative project sets.

Projects—whether buildings, business incubators, farms, or any other organized endeavor—are undertaken to address perceived needs. Typically, they are judged to be successful based on how well they meet those needs. The success of a regenerative project is measured at another level altogether. As with Playa Viva, a regenerative project seeks to build the evolutionary capability of the systems into which it is designed—for example, organizations, communities, and watersheds.

The old adage that it's better to teach a man to fish than to give him a fish is about building capability. In the case of regenerative development, in addition to learning to fish, people learn to reestablish the inherent regenerative capacity of their fisheries, which become healthier and more productive in partnership with people (Figure 1.5). In other words, regenerative projects seek to transform human communities into *living systems enablers*. They help lay foundations for the ongoing evolution of natural and social systems, enabling them to increase in viability and health as the world changes around them.

FIGURE 1.5 Along with teaching people to fish, is it possible to teach them to regenerate the health of the fisheries on which they depend.

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EVOLUTION AND DESIGN

Evolution presents both challenges and opportunities for designers. It invites them to shift from working on things and structures in isolation from their context to the design of living systems with built-in evolutionary capacity. Designers who make the shift invite a far higher level of unpredictability into their work—or more accurately, they recognize the degree to which unpredictability is already present. By abandoning the illusion of control, designers enter a deeper practice, fostering the inherent creativity of the systems in which they are working.

By implication, this means that designers will need to adopt new measures of success. For example, ecologist C.S. Holling wrote that in really complex systems, wealth should be measured in the ability to evolve and adapt.[13] By this measure, the wealth or poverty of a great city might be measured by the agility or opportunism with which it addresses climate disruptions, a capability related more to the capacity for rapid and powerful collective learning than to the median income of its residents.

A regenerative approach shifts the focus of sustainable design from slowing down entropy to building the capability of living communities to evolve toward greater value. This is a much needed new role for design professionals, whose training predisposes them to manage and integrate complexity. If they accept it, designers can help correct the imbalances created by material cultures that have become divorced from natural order.

A regenerative approach shifts the focus of sustainable design from slowing down entropy to building the capability of living communities to evolve toward greater value.

ARCHITECTURE FOR CHANGE

By now it should be apparent that an understanding of the ways that living systems evolve can be as relevant to urban design as it is to ecosystem management. The work of architect and urban theorist Teddy Cruz offers compelling examples of the application of an evolutionary point of view to the needs

of impoverished communities. His project in partnership with Casa Familiar, a San Diego community development organization, is one of these.

Early in the new century, Casa Familiar and Cruz came together to pilot a new approach to neighborhood housing in San Ysidro, a border town whose median income was 60 percent lower than the rest of the county's. The result, Living Rooms at the Border, was not only conceived as a new type of affordable housing, it was designed to stimulate political, economic, and social transformation. In the years since, the project has attracted broad acclaim and was selected for the Museum of Modern Art's *MOMA 2012 Small Scale Big Change* exhibit.

Living Rooms at the Border calls for a whole new pattern of mixed-use development that is flexible enough to adapt to the changing needs of the communities it serves, even as it occupies a small, high-density site. An abandoned church located in the center of the site was repurposed as a community center and offices for Casa Familiar. A community garden and series of open-air rooms equipped with electricity and movable urban furniture enabled improvised community activities. Two buildings on either side of the church offered affordable live/work studios for artists, starter housing for young couples or single parents and children, larger houses for extended families, and accessory spaces adaptable for alternative housing as needs changed (Figure 1.6).

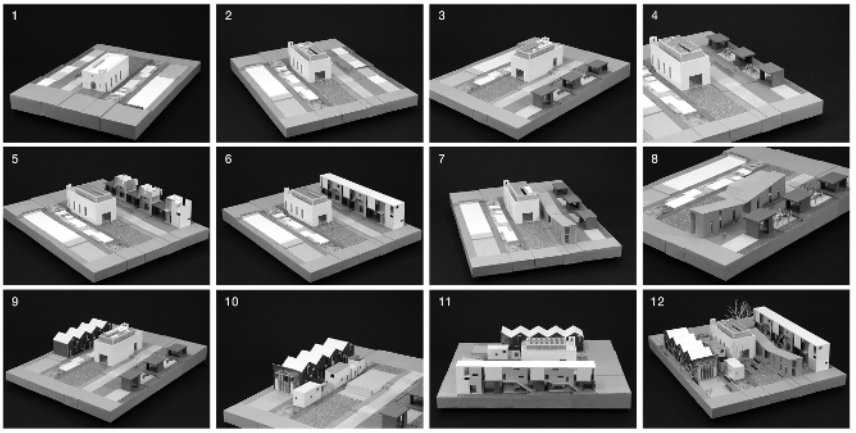

FIGURE 1.6 Teddy Cruz's renderings for Living Rooms at the Border show the project's emphasis on flexibility for the small, high-density site.

Copyright © Estudio Teddy Cruz/Living Rooms at the Border

Cruz believes that housing density needs to be understood not in terms of number of units but "in relationship to the larger infrastructure of the city, which includes transportation, ecological networks, the politics and economics of land use, and particular cultural idiosyncrasies of place."[14] He began by seeking to understand the community's living patterns. His research revealed that the formerly homogeneous suburban area had been transformed by a wide range of nonconforming, ad hoc land uses that freely mixed commercial, cultural, and residential spaces. In a workshop series called Ysidro Sin Limites, Cruz and the Casa Familiar staff met monthly with local residents to discuss their ideas of the kinds of density, interaction, spatial use, and financing that would best serve the well-being of their community.

This led the partnership to expand the project into the policy arena. It became evident that it would be necessary to identify and legalize zoning rules that would accommodate the informal negotiation of boundaries and spaces that characterized the community. This would require new stakeholder collaborations with San Diego officials. The project site was a small parcel, zoned for only three housing units. Rather than settle for a one-time rezoning, Cruz worked with the city and Casa Familiar to develop a new zoning category, the Affordable Housing Overlay Zone. This provided a framework for San Ysidro to evolve new kinds of housing and urban settlement patterns.

Cruz challenges some of the most fundamental assumptions about sustainability and sustainable communities, calling for a redefinition of density, housing, infrastructure, the role of buildings and design, and the purview and purpose of architecture itself. His practice focuses on projects that "primarily engage the micro scale of the neighborhood, transforming it into the urban laboratory of the 21st century."[15]

As inspiration, Cruz cites border towns like Tijuana, Mexico. Rather than limit himself to the characteristic architectural concerns of structure and space, Cruz studies these communities as living systems. He looks beneath their surface phenomena to see the cultural and economic exchanges by which they adaptively meet changing conditions. He has seen residents rapidly transform generic neighborhoods of identical houses into complex, layered systems of private dwellings and communal spaces. One characteristic of this evolution is the weaving of small, informal businesses throughout the fabric of the neighborhood.

Where others see poverty, Cruz sees vibrant, creative communities. This has led him to predict that, "the best ideas for the shape of cities in the future will not come from any place of economic power and abundance, but in fact from sectors of conflict and scarcity from which an urgent imagination can inspire us to rethink urban growth today."[16] At the 2009 Creative Time Summit, Cruz challenged his peers to reimagine the purpose of urban design:

> We need to redefine density, not as a series of objects thrown on the territory but as a series of exchanges. We need to negotiate a new economy and micro-politics between the top-down economics and politics of development and the bottom-up social activism of neighborhoods, creating out of these dynamics new micro-policies, micro-economies at the level of the neighborhood. . . . These dynamics need to redefine our tools, our practice. We as artists and architects can be the translators of [the] . . . intelligence embedded in these communities. . . . We can be the producers of new conceptions of citizenship and the reorganizers of resources and collaborations across jurisdictions and communities. Finally we . . . could be the designers of political processes and alternative economic frameworks.[17]

Cruz's practice illustrates the shift from design of buildings to design of systems that have the capacity to continue designing and adapting themselves. His discoveries are potentially useful to any community designer. Looked at from a regenerative perspective, they include four key ideas:

1. *Focus less on physical buildings and more on inhabitants' social flows and exchanges.* Sustainable density is not just about units per site but the number of social and economic exchanges that can occur within or flow through a site. Sustainable housing is not just affordable spaces; it is the systems of economic and cultural interactions that such spaces engender.
2. *Draw on the inherent design intelligence of the community and leave open the potential for that intelligence to source future evolution.* For development to be sustainable, it must be fundamentally inclusive.
3. *Stimulate collaborations that can engender new political processes and economic frameworks.* Designers have an important role to play as mediators between the top-down economics and politics of development and the social and creative activism of neighborhoods.

4. *Design to grow value-generating capacity*, "shifting neighborhoods from systems for consumption to producers of cultural and economic wealth." Emphasize "the construction of synergies, allowing people to move to the next level in terms of jobs and forming communities."[18]

THE BRATTLEBORO CO-OP

The first principle of regenerative development, *design for evolution,* is a reminder. It is easy to become enamored of structures—buildings, transportation networks, organizations—and their beauty. But structures are secondary. The real product of design is the work that these structures enable. For regenerative development, this work always includes the ability of people and communities to evolve to a new level of value-adding capability. In this way, regenerative projects become instruments of co-evolution in the places where they operate. (See Chapter 6 for more on value-adding.)

Here is an example that helps illustrate this point. Regenesis was asked to help the Brattleboro Food Co-op think about how to develop a new grocery store. In the process, the organization transformed its understanding of what it means to be a co-op and how to play an expanded role in the life of its community.

Formed in Brattleboro, Vermont, in 1975, the co-op started as a small buying club (Figure 1.7). Today, it occupies an entire city block, acts as an anchor business for the downtown, serves as a hub for the regional food system, promotes community accessibility to healthy local food, and supports local farmers (Figures 1.8 and 1.9). The four-story building was developed collaboratively by the co-op, the Windham and Windsor Housing Trust, and Housing Vermont. It includes a 14,580-square foot natural foods market and deli on the ground floor. The three floors above contain the co-op offices, a commissary kitchen, a cooking classroom, and 24 residential apartments on the three floors above. There are solar panels on the roof, and the entire structure uses recycled heat from the store's refrigerators. More important, the building has helped to regenerate the 6,000-member co-op's commitment to community and local food.

FIGURE 1.7 The Brattleboro Food Co-op started in 1975 as a small buying club located near the center of downtown Brattleboro.

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FIGURE 1.8 The co-op's new building, completed in 2012, is still located near the center of downtown, where it serves as an important anchor business. Its multipurpose design supports and helps to continuously renew the 6,000-member co-op's commitment to community building and a vital local food system.

Copyright © Brattleboro Food Co-op

FIGURE 1.9 Welcome to the Brattleboro Food Co-op.

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The transformation from buying club to regional powerhouse represents an evolution of vision and action. It began in 2002 and took nearly a decade to complete. Reflecting on the changes, Mark Goehring, the co-op's former board president said, "The most significant outcomes were the mind shifts that occurred, the changes in how we (the co-op board and management) think about things." After years of working on the co-op's internal structures and operations, "It was time to look outward. . . . No longer would the mission simply be about building and stocking a grocery store but rather taking a key role in creating a sustainable community."[19]

The co-op's growing business required new facilities. It had spent a number of years exploring its identity and articulating its values and wanted a building that reflected these. It had also explored whether to move to a new site, but had been persuaded by its members and town leaders that it had a necessary role to play in the future of downtown Brattleboro.

During these early deliberations, the co-op's board of directors became aware of the concept of regenerative development and asked Regenesis to help them think about how to shift the co-op's role from grocery store to regenerative marketplace. The ambition was to deepen their practice of their values. They knew that a green building was a start, but their vision required more. They wanted to be a positive contributor to the community and region.

Regenesis helped the board identify three changing dynamics that posed key threats to the future viability of the co-op. First, there were rumors that Whole Foods had taken note of the co-op's success and was considering opening a store in Brattleboro. Second, the co-op was vulnerable to disruption of supply lines. Like most food stores in the United States, almost all of the food on its shelves came from far away—1,500 miles on average. Third, what had once been a rich agricultural region around Brattleboro was degenerating due to depleted soils, urbanization, and an aging farmer population. The co-op was a committed community institution with deep roots in place, but also a store dependent on imported foods and vulnerable to crop failures, fuel prices, truckers' strikes, and many other external variables.

It became clear that the co-op needed a strategy to avoid displacement by a large national chain. It was also clear that the co-op needed to look beyond the task that it had initially set for itself, to build a green store (Figure 1.10).

FIGURE 1.10 A primary purpose or role of the Brattleboro Food Co-op is to support the region's farm economy and make local foods available to members.

Copyright © Brattleboro Food Co-op

The co-op developed a two-pronged strategy. First, it grounded itself in a profound awareness of place and its vanishing food heritage. It wasn't lost on the board that the energy savings that its new building might achieve would be negligible compared to the energy that could be saved by shortening the transportation distance of the food it sold. By promoting local farming and food culture through its market, the co-op could simultaneously reduce its energy footprint while making itself non-displaceable in its region.

Second, it needed to expand its conception of co-operative work to include other local organizations, businesses, and food co-ops. It set to work building a resilient business network, aligned around a shared regenerative vision of place. This opened up the possibility of considerable cost savings by sharing information, facilities, and investments in new infrastructure.

Today, the Brattleboro Food Co-op employs 100 people, and more than 60 percent of its products come from nearby farms. In partnership with local housing trusts, it provides mixed-income housing in the heart of downtown Brattleboro in an award-winning, highly energy efficient building. Indeed, the building is an energy generator and member of a local energy-generation

co-op. Perhaps most significantly, it has convened an association of cooperatives and other organizations as the first stage of its 100-year plan to grow a sustainable agriculture, community, and economy for the entire region.

GUIDELINES FOR APPLYING THE PRINCIPLE

Designing *for* evolution doesn't mean designing evolution. Evolution is an emergent process—one that arises out of multiple interactions among living beings and their environments. We can't design or predict specific outcomes of evolution, but we can create evolution-friendly conditions that influence the trajectory and speed of change. The following criteria and guidelines can be used by designers to help communities steer their own evolution.

Designing *for* evolution doesn't mean designing evolution.

Maintain the potential for evolution. The designer's first task is to identify barriers to evolution. Often these are obvious, arising from attempts to control change. For example, homeowners' association rules, zoning restrictions, or building codes might have been developed for a world that no longer exists. But because they are hard to change, they continue to survive, even when they don't make much sense.

Other barriers might be less obvious. Architectural programming, a process for evaluating a client's needs and goals, has become increasingly sophisticated and inclusive. But it can be a barrier to future evolution if it perpetuates the "center out" approach, in which an individual or group designs a building for others to use.

For the Casa Familiar project, Teddy Cruz's programming process focused more on life-enhancing social flows and transformative exchanges than on physical structures. He designed buildings that were easy to modify and expand, inviting the creative engagement of both present and future users. He also engaged local government to create alternative zoning categories and new economic frameworks in order to open the door to future innovative, community-driven solutions.

Align with the wisdom of nature. Nature is a master developer. The "projects" through which the Earth structures itself—forests, meadows, reefs, estuaries—are expressions of life-generating optimum conditions for itself. Living systems structure themselves in response to their environments. By studying these systems, we can create structures that are equally responsive. For example, through understanding how a given ecosystem manages water, we gain insight into how to manage water when living within that ecosystem.

In the same way, we can pattern design solutions on the cumulative intelligence embedded in local cultures. In Tijuana, where others saw poverty and desperation, Teddy Cruz saw a vital system of micro-economies and social exchanges. Living Rooms at the Border tapped this scrappy spirit, discovering indigenous patterns rather than replicating generic, middle-class neighborhoods.

Define projects by their roles. Typically, projects are thought about in terms of the services they deliver (for example, community center, sustainable housing, water treatment). By thinking of a project in terms of its role we locate it within a systemic context. This is because a role is always played in relationship to other actors or roles and needs to be adapted to respond appropriately.

When the Brattleboro Food Co-op shifted roles from grocery store to regenerative agent, it discovered a living system of partners and allies. Not only was it able to work on its own viability; it was now a value-generating member of the entire regional community.

Grow value-generating capacity. Built structures are primarily useful because they enable value-generating activities that would be difficult or impossible without them. Unfortunately, many in the Western world, especially those who are designers, have a strong bias toward the physical. It can be hard to shift focus from the structures we want to create to the processes those structures are intended to support.

But if the intention is to work with dynamic, evolving systems, then the processes those systems use to generate value need to be the central concern: How can our projects improve the ability of everyone involved to generate more value? How can they become sources of community and economic

renewal? How can the forests, meadows, and watersheds we occupy become healthier and more productive because of our presence?

From its outset, the aim of Living Rooms at the Border was to "shift neighborhoods from systems for consumption to producers of cultural and economic wealth."[20] It was intended to become a source of value generation for both residents of the housing development and their larger community. The project integrated socioeconomic programs to address economic, cultural, and educational needs. At the same time, flexible structures and live/work studios were designed to support the creative entrepreneurial energies of residents, offering opportunities for informal markets and shared spaces for production.

ENDNOTES

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