

About EcoTipping Points

~ Gerry Marten

What are EcoTipping Points?

An **EcoTipping Point** is a lever that reverses environmental decline, setting in motion restoration and sustainability.

Twenty-two centuries ago, Archimedes said that, with the right lever and the right place to stand, he could move the world. Today, our world needs the right levers more than ever – to tip our planet and its ecological systems back from the brink.

Day by day, we face torrents of environmental bad news. Mother Nature's running a fever, and she's striking back at the human race, with storms, droughts and floods of Biblical proportions. Experts warn that our natural systems, from rainforests to ocean currents, may be nearing "tipping points," catastrophic changes that can't be undone for lifetimes to come.

It's hard to swim against a current propelled by powerful social and ecological forces. It's cheap and easy to destroy our natural support systems. It seems overwhelmingly complicated and costly to save them.

But quietly, around the globe, a different kind of tipping point is emerging. Environmental pioneers in community organizations, business, and government are demonstrating how the right change can turn ecosystems away from ruin and back towards health and sustainability.

Center stage are powerful levers we call "**EcoTipping Points**":

- A [Philippine marine sanctuary](#) rescues both a coral reef fishery and the islanders who depend on it.
- On Manhattan's Lower East Side, [community gardens](#) launch a transformation from urban decay to renewal.
- The revival of [rainwater catchment dams](#) in India brings dried-up rivers and shrinking farming villages back to life.
- In the [Peruvian rainforest](#), plastic jugs, which serve as breeding habitat for colorful frogs valued by hobbyists, give local farmers a reason to preserve the forest instead of cutting it down.
- Out of the flames of the Rodney King riots, a nature park sparks the revival of a South Central [Los Angeles](#) neighborhood.

- Instead of building an expensive wastewater plant, [Arcata](#), California builds an artificial wetland that filters water while attracting wildlife, birdwatchers and other visitors.
- [Ecological pest management](#) helps Indian cotton farmers to escape a descending spiral of pesticide poisoning and debt.
- [Community mangrove management](#) in Thailand restores the local fishery and revives the local economy.

Though richly diverse, these stories share a common plotline: Each combines the right environmental technology with the social organization to put it into practice. A single catalytic change tips a declining system in a new direction. After a strategic jump-start, nature takes over, using its inborn powers to mend itself. There's a bonus: Because cities, neighborhoods and nations are intimately intertwined with their natural support systems, EcoTipping Points help to solve social problems, as well.

When resources are limited, EcoTipping Points show how to leverage small investments into large returns. They provide alternatives to heavy regulation and public spending. Instead of paddling against the current, they change the flow of the river, offering a perspective that transcends political ideologies. They demonstrate that citizens and the private sector don't have to wait for government action.

EcoTipping Points are about hope in a time when it's easy to despair. But they're not magic bullets to solve environmental problems overnight. What they can do is set eco-social systems moving in healthier directions. And they're not about utopian dreams. They're already at work. Right now.

Origin of the “Tipping Point” Phrase

Sociologists coined the phrase “tipping point” fifty years ago. Malcolm Gladwell popularized the phrase in his book *The Tipping Point*.

The expression "tip point" was first used by Grodzins (1957) to refer to a very particular threshold. The "tip point" was the percentage of non-white residents in a previously white neighborhood that would precipitate a "white flight," switching the neighborhood to total occupation by non-whites. Wolf (1963) used the phrase "tipping point" to describe the same phenomenon, and Schelling (1978) applied "tipping point" to other social phenomena as well.

The "tipping point" phrase was popularized by Malcolm Gladwell's best-selling book *The Tipping Point: How Little Things Can Make a Big Difference* (Gladwell 2000). It used "tipping point" to represent the point in time when a new idea "takes off," spreading rapidly through a society. Though Grozdins, Wolf, Schelling, and Gladwell did not use systems jargon such as "feedback loops," their use of "tipping point" reflected the amplifying effects of feedback loops and the power of feedback loops to engender change.

We use "EcoTipping Point" to mean a lever that can "tip" an eco-social system from one set of mutually reinforcing processes (called a "stability domain" or "attractor basin" in systems jargon) to a stability domain that carries system change in a completely different direction. EcoTipping Points are catalytic, turning the system from decline to health and sustainability (Marten 2005, Marten et al. 2005, Marten 2006).

References:

Malcolm Gladwell. 2000. *The Tipping Point: How Little Things Can Make a Big Difference*. Little, Brown, and Company, Boston.

Morton Grodzins. 1957. Metropolitan segregation. *Scientific American* 197(4):33-41.

Gerald Marten. 2005. [EcoTipping Points: A new paradigm for restoring ecological security](#). *Journal of Policy Studies* (Japan) 20:75-87.

Gerald Marten, Steve Brooks, and Amanda Suutari. 2005. [EcoTipping Points: A new slant on strategic environmentalism](#). *WorldWatch Magazine* 18(6):10-14.

Gerald Marten and Donna Glee Williams. 2006. [Getting Clean: Recovering from pesticide addiction](#). *The Ecologist* 36(10):50-53.

Thomas Schelling. 1978. *Micromotives and Macrobehavior*. W. W. Norton & Company, New York.

Eleanor Wolf. 1963. The tipping-point in racially changing neighborhoods. *Journal of the American Institute of Planners* 29(3):217-222.

How Do EcoTipping Points Work?

Feedback loops are the key. EcoTipping Points set in motion a cascade of effects that reverse the vicious cycles (feedback loops) responsible for environmental decline. The vicious cycles are transformed into "virtuous cycles" that propel the eco-social system toward sustainability. The ensuing proliferation of positive effects creates additional virtuous cycles that "lock in" the benefits. Environmental success stories point to the key ingredients that make it all happen.

EcoTipping Points are typically an environmental technology (in the broadest sense), coupled with the social organization to put it into effective use. They are catalytic. EcoTipping Points set in motion a cascade of far-reaching effects through the system.

However, far-reaching effects are not enough. The environmental success stories that we've analyzed tell us that the crucial action for both problems and solutions resides in [feedback loops](#), circular chains of cause and effect that amplify small causes into large effects. Antibiotic resistance provides an example of a

feedback loop. Antibiotics encourage resistant bacteria, creating a **vicious cycle** of more antibiotics and more resistant bacteria.

Feedback loops explain why vicious cycles are so hard to break. But they also expose the strategic points at which the cycles can be reversed. Like Aikido, the martial art that turns an attacker's thrusts back on the attacker, EcoTipping Points can identify critical maneuvers for reversing the currents of ecological destruction. Instead of continuing to wear the system down, the same forces begin to build it back up. Environmental decline can be turned around if the vicious cycles responsible for decline are reversed.

EcoTipping Points connect to vicious cycles with the force necessary to do that. Once reversed, the vicious cycles become "**virtuous cycles**", driving positive change with the same power that drove the negative change. In effect, the virtuous cycles mobilize natural, social, and economic forces to work for sustainability instead of against it.

An Example of Feedback Loops in Action: New York City Community Gardens

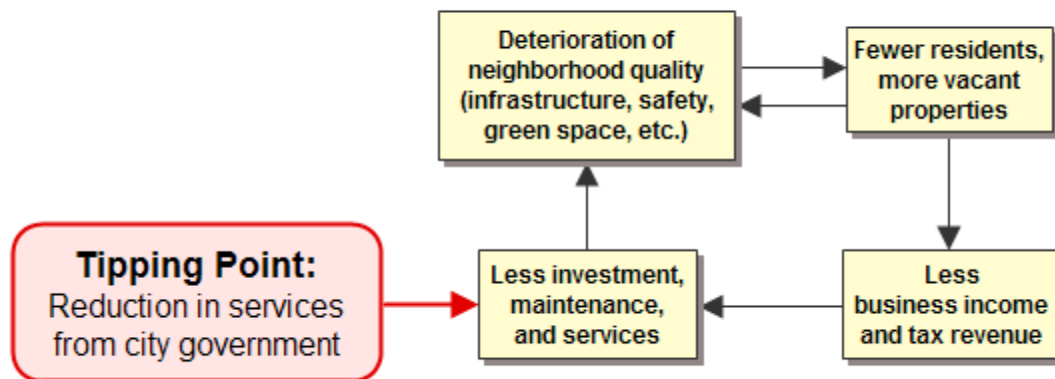
Urban decay and restoration in New York City's Bowery District show how:

- Vicious cycles were driving environmental and social decline.
- A community garden acted as a positive tipping point that reversed the decline, transforming the vicious cycles into virtuous cycles.
- New virtuous cycles formed to reinforce and "lock in" the recovery.

A fiscal crisis in city government during the 1960s precipitated the negative tipping point: a reduction in services (e.g., police and fire protection) in the already depressed Bowery. A system of interconnected and mutually reinforcing vicious cycles was set in motion by the cascade of effects that followed:

- Reduction in public services led to a deterioration of public infrastructure and safety, causing people to move away.
- Fewer people on the streets and more vacant properties led to garbage dumping, criminal activity, and homeless beggars, with further deterioration of public safety and more people moving away.
- Less income for local businesses and less tax revenue for city government led to even less expenditure by city government, landlords, and local businesses for maintenance of buildings and other infrastructure. Buildings and streets fell into disrepair, contributing to further neighborhood deterioration, and more people moved away.

New York City Bowery: Negative Tip



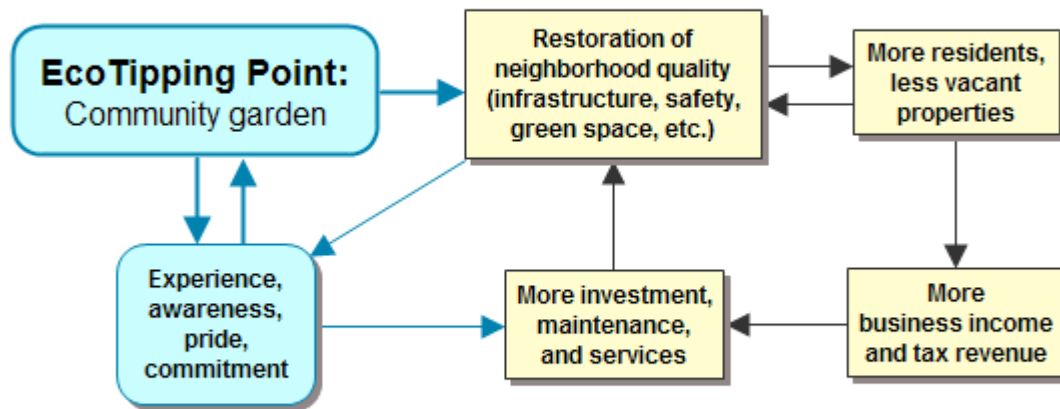
The **positive tipping point** began in 1973 when a young artist named Liz Christy saw a small boy playing in a trash-filled, rat-infested vacant lot and she decided to do something about it. She organized some friends to haul out the garbage and truck in soil to establish the Bowery Houston Community Farm Garden.

At first skeptical, the mostly African-American and Hispanic neighbors began to pitch in, and within a few months they were taking home armloads of tomatoes and cucumbers. Besides displacing rats and drug dealers, and creating a much needed green space, the garden also became an “outdoor community center.”

As can be seen in the diagram below, the garden served as the EcoTipping Point that reversed the vicious cycles described above. **The vicious cycles of the negative tip were transformed into virtuous cycles** (shown in black below):

- The improvement in neighborhood quality – public safety, buildings and other infrastructure, visual attractiveness, and community spirit – attracted people to move into the neighborhood. More residents meant even more people on the streets and even greater public safety.
- More residents and fewer vacant properties meant more business income and tax revenue, leading to investment in neighborhood restoration.
- More income and tax revenue also increased public and private services, further contributing to neighborhood quality.
- At the same time, a new virtuous cycle of “success breeds success” (shown in blue) arose around the garden, which served as a symbol for improving the neighborhood. The success of the garden, experience with managing it, and improvements in neighborhood quality instilled awareness, pride, and commitment to improving both the garden and the neighborhood even further.

New York City Bowery: Positive Tip



Yellow: Vicious cycles reversed by positive tip to form virtuous cycles.

Blue: New virtuous cycles directly connected to the positive tipping point.

Once news of the garden's success spread, an entire movement developed. Neighboring neighborhoods established gardens, and in 1978 the city parks department began the Green Thumb program which offered plants, tools, expertise, and \$1-per-year leases to community groups. By the late 1980s New York City was home to over 800 community gardens. They even attracted international attention, with people from as far away as China and Sweden visiting to learn how to start community gardens.

Most important, new virtuous cycles “**locked in**” the benefits. When property values in neighborhoods with gardens increased, the city government tried to sell garden lots for development. However, the pride and commitment of neighborhood residents, as well as experience and organizational capacity they acquired in the course of developing the gardens, enabled residents to take on the city bureaucracy, consolidating the legal tenure of the gardens.

This story shows how reversal of vicious cycles harnessed social and environmental forces that were responsible for the problem, so instead they worked for the solution. The basic cause-and-effect relationships remained the same during both decay and restoration. Only the direction of change was different.

See the complete story about [New York City gardens](#).

Interested in how EcoTipping Points have transformed vicious cycles to virtuous cycles in other parts of the world? Take a look at thumbnail sketches and feedback diagrams for the following stories:

- [Marine Sanctuary at Apo Island](#)

- [Rajasthan Rainwater Harvest](#)
- [Pesticide Trap in Andhra Pradesh](#)
- [Thailand - Community Mangrove Management](#)
- [Thailand – Agroforestry and Community Forests](#)
- [Feedback diagrams for all of these stories](#)

Lessons We've Learned

As we explore cases from around the world, we're assembling a picture of what it takes to create an EcoTipping Point success story.

Here is what we've found so far:

- EcoTipping Points are catalytic, setting in motion a cascade of effects through ecosystem and social system.
- The cascade of effects ties into vicious cycles with sufficient force to turn them around, transforming the vicious cycles into “virtuous cycles” that mobilize nature and natural social processes to propel the system toward sustainability.
- EcoTipping Points are typically an environmental technology (in the broadest sense of the word) combined with the social organization to put the technology into practice. The social organization includes a “social commons” that connects to the “environmental commons” addressed by the EcoTipping Point.
- EcoTipping Points usually require outside stimulation and facilitation.
- EcoTipping Points are associated with strong local democratic institutions and enduring commitment of local leadership.
- EcoTipping Points often generate powerful symbols that mobilize community action to carry the “positive tip” forward.
- EcoTipping Points lead to rapid success, which stimulates further efforts towards success.
- EcoTipping Points are co-adaptive. They generate mutually reinforcing improvements in both social system and ecosystem, which progressively adjust to each other so they function more sustainably together.
- EcoTipping Points frequently transform ‘waste’ (e.g., degraded/abandoned land or buildings, sewage, garbage, marginalized people) into valued social or material capital.
- EcoTipping Points use social and ecological diversity as a resource to expand choices. They similarly use social and ecological memory as a resource.

- EcoTipping Points enhance resilience, “locking in” the system to resist “negative tips” that threaten to carry it into unsustainability. (See the Resilience Alliance website for a comprehensive exploration of resilience, including the roles of ecological and social diversity and memory.)
- EcoTipping Points typically “scale-up” by replicating local success. People come to see what’s happening and decide to try it back home. In other instances, EcoTipping Points originate on a larger scale that fits the problem. For example, citizen-based metropolitan regional planning.

See how the [Apo Island story](#) demonstrates these lessons.

Finding Ecotipping Points

The key to EcoTipping Points lies in [feedback loops](#). During brainstorming or visioning processes, communities can:

- Sketch out the chains of cause and effect responsible for their environmental problems.
- Identify the vicious cycles that are driving negative tips.
- Think of interventions that will build up under their own momentum, connecting to key elements of the vicious cycles with sufficient force to turn them around. The newly formed virtuous cycles will take it from there.

We’re looking for individuals or groups – community, government, education, business – who want to work with us on applying EcoTipping Points to their own situation. It’s an opportunity to start dealing effectively with environmental problems in your community, while helping to refine the EcoTipping Points toolkit and its dissemination for broader use. [Contact us](#) if you’re interested in giving it a try.

[Back to top](#)