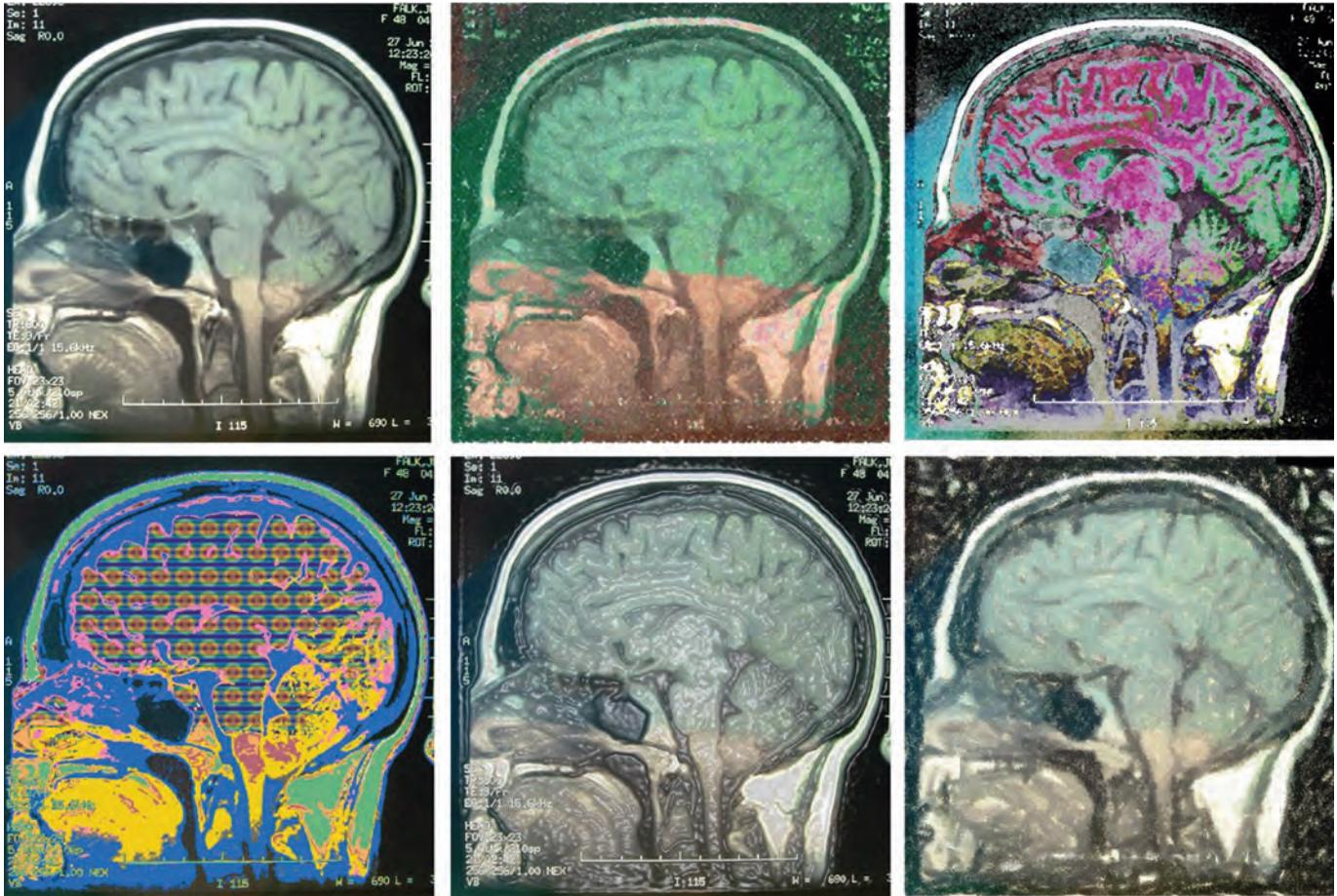


Feature

Scarcity-mind or Eco-mind: Where Do They Lead?

by Frances Moore Lappé



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Anthropology, neuroscience, and psychology increasingly recognize that human beings are “soft-wired” for profoundly social behavior, says the author. This puts a better world within reach.

In Brief

Humans see the world through largely unconscious frames that determine what we believe our nature to be and therefore what we believe to be possible. To address our biggest global challenges, we can shed this non-ecological mental map—what the author calls “scarcity-mind”—based in lack and fear. Locked in scarcity-mind, we remain blind to our own power and end up creating together a world that none of us, as individuals, would choose. But humans can actually change how we see, moving from a frame of lack and limits to one of alignment with nature. Based on research in neuroscience, psychology, and anthropology, this article explores a world seen with the emergent “eco-mind” in which possibility is all around us. Thinking like an ecosystem, no one is bereft of power.

It's the GDP-obsessed growth model, many reformers argue, that's leading us to perdition. They decry the irresponsibility of a relatively few taking more than their share, who are profligate with the earth's dwindling resources. Certainly this "we've hit the limits" framing rings true, for, inarguably, human societies have exceeded the limits of destruction, depletion, and disruption our planet can sustain without massive human and nonhuman loss and suffering.

But is there a more effective way of understanding the roots of our predicament?

Here's a possibility.

Let's start with findings from neuroscience and psychology that offer significant clues about how we got into this mess: Humans beings, it turns out, don't see the world as it is. "It is theory which decides what we can observe," wrote Albert Einstein in 1926. We humans see the world through culturally formed filters, what I call our mental maps. They determine what we see, what we cannot see, and therefore what we believe to be possible.^{1,2}

Scarcity-mind

Because every mental map is a culturally shaped filter, none can be complete. But that fact shouldn't blind us from seeing that some are more life-serving than others. And, unfortunately, I posit, much of humanity is now trapped in a truly dangerous mental map, a worldview that fails to protect life because it is *perversely* aligned with nature, including with human nature. I say *perversely* because its assumptions elicit the worst in us while stifling the best, and they defy the laws of wider nature as well, thus bringing both human and environmental destruction.

From this profound mal-alignment, humans end up creating together a world that, as individuals, few, if any, of us would choose.

What are the core assumptions of this deadly mental map?

Separateness. We each exist apart from one another and from nature. To borrow a metaphor that I associate with Buddhism, we experience ourselves as distinct waves, unable to see the ocean of which we are part.

Stasis. Reality is best understood as fixed and finished, everything from "human nature" to our capitalist economic system.

Key Concepts

- Humans see the world through culturally formed filters that determine what we can and cannot see and what we believe to be possible.
- Based on core assumptions of separateness, stasis, and scarcity, we see ourselves in perpetual competition with other selfish creatures.
- These assumptions drive a political and economic system characterized by concentrated power, a lack of transparency, and a culture of blame.
- Based on assumption of connection, continuous change, and co-creation, we can move away from this toward Living Democracy, which is positively aligned with our nature via the continuous dispersion of power, transparency in human relations, and cultures of mutual accountability.

Scarcity. There isn't enough of anything—neither enough goods nor enough goodness. Lack characterizes everything from food to energy. And, within human beings, love itself is scarce—for, while we do have the obvious capacity for compassion, all one can truly count on is that humans are selfish, materialistic, and competitive.

These assumptions make up what I call scarcity-mind. Through it, we see ourselves in perpetual competition with other selfish creatures over

scarce goods. The consequences are profound: Within cultures that today increasingly seem to whittle human nature down to "selfish sinners and shoppers," we come to distrust our capacity for common problem solving. As a result, self-governance—true democracy—seems out of reach and we're left few options: We come to believe we must give over our fates to those more powerful than we or trust in a magical market that responds automatically to our separate self-interests—able to sort out *outcomes on its own*, free of flawed human interference.

From these assumptions, however, we end up with a market that's driven not by the collective power even of our short-term interests, but by one rule: *whatever brings highest return to existing wealth*. As wealth then accrues to wealth, we arrive at such concentration that it infects and corrupts political decision-making. Combined economic and political power enables secrecy that further erodes trust. (Think only of the financial crisis in which a slogan of those creating the risky derivatives was IBG-YBG, "I'll be gone, you'll be gone."³ I.e., the perpetrators knew their transgressions would only come to light after they'd departed.)

Disenfranchised citizens then feel ever more powerless and fearful, and are easily swayed to blame one another for their plight.

From these assumptions of scarcity-mind flow economic and political systems characterized by three features:

1. **Concentrated power**
2. **Lack of transparency**, and
3. **A culture of blame** ("othering" as the cultural norm.)

But here is a really frightening part. These three conditions flowing from scarcity-mind are precisely those proven again and again to bring forth the worst in our species:



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Democracy is not a set system, but a set system of values. Democracy itself, says the author, is alive and always changing.

what we see, for example, in our long social history as bullies and perpetrators of genocide as well as in laboratory experiments in which we humans have been the guinea pigs. (Think of the 1971 Stanford Prison experiment, for example, in which subjects so brutalized each other that Professor Philip Zimbardo had to abort the experiment.⁴)

Here, let me underscore, these conditions are shown to bring out the worst, not in a few “evil” among us but in *most of us*. The Holocaust, after all, was not the work of a few mad men.¹

Under these conditions, inequalities then widen and ecocide ensues, so more and more people actually *experience scarcity*—whether psychological or real—no matter how much we produce. The experience of feeling stressed by “lack” seems to have increased greatly in the United

States since, say, the 1960s, even as my country’s GDP per capita in real dollars has almost tripled. And extreme, chronic undernourishment harms 868 million people today, even as food production per person has increased 30 percent since the 1960s—now supplying more than 2,800 calories for each of us daily.^{5,6}

As a result, ambient fear spreads, the three false assumptions of *separateness*, *stasis*, and *scarcity* are reinforced, and we create the very world we fear.

I admit, a one-page rendition of an entire worldview is perforce a caricature. I risk it here, with the aspiration of evoking useful dialogue.

Eco-mind

Fortunately, an evidence-based way of seeing is emerging worldwide that draws on ancient wisdom and disciplines from anthropology to

neuroscience. I believe it can free us from the self-reinforcing destructiveness of scarcity-mind.

For some time science has confirmed what great seers have told us for eons, that the nature of reality is not the above three S’s but rather three C’s:

Connection. In the web of life, all exists in relationship with all else. As German physicist Hans Peter Dürr once told me, in natural systems, “there are no parts, only participants.”

Continuous change. In other words, change is the one constant we can count on.

Co-creation. If connection and change are both givens, then all is both shaped by and shaping all that emerges in ongoing co-creation.

This evidence-based mental map I call the eco-mind, hoping to suggest “thinking like an ecosystem.” Its most obvious and helpful lesson is that we humans are, in one most critical way, like every other organism in the ecosystem: what we express is largely shaped by our context, the stimuli around us. With this realization in our bones, we know where to start: We start with a hypothesis about human nature—identifying what useful human traits are there to be tapped by our social environment for meeting the goal of planetary transition to life-serving cultures, and what tendencies need to be minimized by social rules and conditions, if we are to thrive.

I’ve already noted the proven potential for the vast majority of us to behave callously or even brutally in the wrong context. Now we ask, what about positive qualities? Unlike the assumption of a generalized “lack of goodness” within scarcity-mind, anthropology, neuroscience, and psychology converge to now tell us that human beings are in fact “soft-wired” for profoundly social capacities: empathy, a sense of fairness, and cooperation (importantly, including what development psychologist Michael Tomasello calls “shared intentionality,” a uniquely human aspect of co-creation), among others.⁷ And, from this strong social nature, we have, as well, needs beyond the physical. I condense them to three essentials:

1. **Power** (efficacy, agency)
2. **Meaning** (purpose beyond survival)
3. **Connection** (both to each other and wider nature)

Note that these needs are pro-social, but are also amoral. Each can express positively, of course, but also negatively. One need only think of the street-gang member holding a weapon (power), defending his territory (meaning), and deeply bonded to his buddies (connection). Equally true, these deep needs can be met through thriving, life-serving communities.

If there is truth here, then the next question is urgent and obvious: *what conditions elicit the best in us—the qualities we need now more than ever—and what conditions keep the worst in check?* Answering this question for me means growing up as a species, and foregoing the notion that our crisis is the fault of “the greedy, profligate ones,” or simply inevitable because of incorrigible, fixed, selfish human nature.

With eyes wide open, and thinking like an ecosystem, we can see that our task right now is taking the three social conditions above that have proven to bring forth the worst and striving with laser focus to flip each of them to its opposite. Doing so, we arrive at three conditions that are essential for human, and, thus, for ecological thriving that flows from the assumptions above:

1. **The continuous dispersion of power**
2. **Transparency in human relations**
3. **Cultures of mutual accountability**

We now have a compass. These three social conditions, I believe, make it possible for each of us to meet, in positive ways, our three core needs—for meaning, power, and connection. We can then imagine societies in which we each enjoy dignity (perhaps the ultimate human need) because no one is a mere instrument of another. In such societies, trust—the foundation of social well-being—spreads, and fear recedes.

The great news is that to get there, and to harmonize our relationship with the earth, we don’t have to transform human nature. A big relief! With this reframe, both our compassion and motivation can grow.

Living Democracy

Through this lens we can envision, very practically, a more functional social ecology—rules and norms we create that are positively aligned both with our nature and the laws of wider nature. I mean that we can

perceive mechanisms for making choices together—governance, formal and informal—that align positively with our nature, and understand why they are essential to wider, ecological health.

The benefits are immediate. We can stop taking current versions of liberal democracy for granted, as the best we humans can do. An eco-mind, focusing on context, suggests that humans may well have what it takes to create forms of democracy better aligned with our nature because they embody the above three essential characteristics—the dispersion of power, transparency, and mutual accountability—at every level of social organization. They thus enable societies to make decisions serving shared and long-term interests.

In other words, “thinking like an ecosystem” and applying it to our social reality we can perceive the possibility of what I call Living Democracy—now appearing as perhaps the next historical stage of democracy. It begins as we admit that democracy understood as “elections plus a market” is not working. Democracy as a distant political structure, fixed and finished, cannot work because it allows the entrenchment of the very conditions known to bring out our worst and fails to meet the human need for power, meaning, and connection.

We realize that what best reflects and meets human needs is instead democracy understood as a way of life—not something we inherit, or build once and for all, but what we continuously create together.⁸ Living Democracy suggests not a set system but a *set of system values and conditions*—the dispersion of power, transparency, and mutual accountability—that work across all dimensions of public life, from our workplaces to our schools. It builds from the insight that today’s problems are too complex, interwoven, and pervasive to be solved from the top down. They require the ingenuity,



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Deliberative forums in Texas, demonstrating the power of living democracy, have helped the state become a leader in U.S. wind power.

insights, experience, and “buy-in” of those most directly affected by the problems we face.

Living Democracy appreciates that we may not be born with the skills of deliberative problem-solving required to maintain the three conditions essential to bring out our best, but almost all of us have the capacity to learn them.

The term *Living Democracy* suggests democracy as both a lived experience and an evolving, organic reality itself—“easily lost but never finally won,” in the words of the first African-American federal judge William Hastie.⁹

But are we capable? many might ask.

Didn't human beings evolve within strict hierarchies, vestiges of which linger today in gender, class, and caste power structures? Actually, anthropologists paint a different picture: that, during 95 percent of our evolution, humans lived in highly egalitarian tribes. We kept them that way through counter-dominance strategies because we humans thrive best when we work together, not under the thumb of one strong man.¹⁰

And what does this emergent Living Democracy look and feel like? Its values infuse every dimension of community life:

Education life. A Living Democracy perspective emphasizes that in addition to quality education in academic subjects, citizens from the earliest ages have the opportunity to learn and practice the arts of democracy—e.g., listening, mediation, negotiation, and more—and these arts are afforded the same priority as reading and writing. As part of learning such public arts, students also have plentiful opportunity to engage in community problem-solving through “apprentice citizenship.” In the U.S. an exemplar incorporating the democratic arts into student learning is the KIDS Consortium. Another example is taking hold in dozens of countries in which children learn the art of mediating disputes among themselves, rather than turning to an authority to solve the problem for them, or fighting.¹¹

Economic life. With an eco-mind, economic life is no longer bound up

by the fiction of a “free market,” so it is possible to create values boundaries around the market to keep it fair, open, and aligned with nature's laws. (Perhaps a free market is best redefined as one in which all are free to participate in it because it is kept fair and accessible.) Moreover, we are able to see a strong rationale for going beyond the goal of fair distribution to embrace as well that of *fair production*; for it fulfills the core human need for agency. Fair production suggests opportunities for people to participate in coproduction via cooperatives, for example, and other forms of co-ownership. Already, cooperatives of all types worldwide enjoy many more members, a billion, than there are people who own shares in publicly traded companies.¹² They produce 20 percent more jobs than do multinational corporations.¹³ In rural India, for example, 67 percent of consumer needs are met by cooperatives.¹²

Political life and civic life. An implication of Living Democracy's participatory, trust-enhancing culture is that society's political development involves much more than

fair elections understood as honest balloting. Living Democracy suggests, for example, rules that prevent the influence of concentrated private wealth and corporations in campaigns and legislative decisions, along with election rules barring advertising and ensuring candidates' fair access to media and other public forums. In this way, all candidates can be heard and all citizens can hear and discuss a range of views.

Fair elections and formal political decision-making accountable to citizens—not private interests—are but one essential ingredient. Living Democracy suggests multiple avenues for citizen engagement and empowerment. Effective models emerging worldwide include citizen juries that, for example, in the Global South have brought diverse interests together to come to judgment on the direction of agricultural development, leading to strengthening ecological farming.¹⁴ The deliberative poll is another form of more direct engagement: In Japan, in 2012, this practice helped move the government to adopt the goal of ending all reliance on nuclear power before 2040. And in Texas, a deliberative poll used by utility companies helped the state become a leader in wind power.¹⁵ Participedia.net, created by Harvard democracy theorist Archon Fung, is a source for exemplars of Living Democracy

In Living Democracy, citizens also become active co-creators of knowledge: Examples include citizen water monitors, responsible for gathering water-quality data now in 77 countries.¹⁶ Citizens also contribute to community well-being by sharing their knowledge and monitoring well-being, as, for example, Nepal's community health volunteers who advise pregnant women and offer other critical health-related support.¹⁷

In each of these arenas, and more, Living Democracy approaches are increasingly showing up worldwide.

Implications for "World-Changers"

What if we were to define the challenge for our planet today as moving ourselves and our societies from scarcity-mind to eco-mind? What would be the implications for environmental campaigners and others actively working to transform our cultures to support life?

Where we assign blame. Thinking like an ecosystem, we see that, since we are all connected, we are all implicated in every social outcome. We can therefore forego preaching and pleading, as we realize that much of the terrible dysfunction evident today—from random violence to persistent, massive hunger—is the result

We also embrace the challenge of transforming our failing decision-making structures. Thinking in systems, we "operationalize" the truth that accountable polities are a *sine qua non* for the spread of effective policies. So with at least equal passion, we can engage in remaking how we come to public decisions, recreating social rules and norms that now bring out the worst in us so that they tap our pro-social needs and capacities.

In this regard, it seems telling that, in a global survey ranking countries on how well they regulate the flow of money into politics, Germany (a world leader in solar energy despite its cloudy skies!) ranked highest with a score of 83, while the U.S. ranked 29, tying Tajikistan.¹⁹

Humans beings, it turns out, don't see the world as it is. We see the world through culturally formed filters... They determine what we see, what we cannot see, and therefore what we believe to be possible.

of social systems perversely aligned with our nature. We see that when systems thwart the positive satisfaction of core psychological needs for meaning, power, and connection, many try to satisfy them through negative means—coercion, for example, and addictive consumption. Or, they give up: Globally, suicide now takes more lives annually than do homicide and war combined, with the rate rising by 60 percent since 1945.¹⁸

With an eco-mind, we acknowledge our own complicity and focus on transforming a system that concentrates power, denying essential needs.

What we encompass in our agendas for change. We move from narrowly applying our energies to the design and creation of life-promoting policies.

How we communicate—what metaphors and analogies we use.

We move from metaphors such as *hitting the limits* that could suggest quantitative excess as the root cause, and toward metaphors and terms that focus attention instead on the destruction and waste built into the DNA of our economic and political systems themselves.

Defining the problem as "limitless growth," for example could keep us in a mechanistic frame, when we know that reducing quantities alone will not protect ecological systems. Humanity could reduce plastic disposal by half, for example, and still be creating an oceanic plastic soup the size of Texas. Moreover, identifying growth as our core problem might distract attention from how our systems actually often generate more

waste and destruction than they do growth of anything we want. Over 40 percent of food in the United States is wasted. Most energy entering power plants is wasted, and so on.^{20,21} Naming the problem as addiction to growth can also distract attention from the truth that our economic system is not designed for growth in wealth, even narrowly defined. More centrally, today's economies are built for wealth *accumulation* by those already well-placed.

Plus, the word *growth* itself presents a challenge, for we love seeing our children, garden, or retirement funds grow. Thus anti-growth reformers can end up associating what to most ears is positive—growth—with a reality that is more destructive than creative. Moreover, in a world where at least one-third of us experience the pain of absolute scarcity, opposition to growth will likely be seen as downright frightening to people.

supplies today are sufficient for all; and ecological farming could increase production and store more carbon than chemical farming.²² As to energy, we've barely begun to tap renewable sources. Deprivation in these cases is not the result of the earth's limits but of concentrations of wealth and power: income of less than 2 percent of the world's people is as great as that of the bottom 77 percent.²³

Finally, naming the problem as *hitting the earth's limits* could communicate that the obstacle is not in our behaviors but *out there*—in nature's lack. So, understandably, some might well respond: "We've gone as far as nature can take us, so we've got to do one better than nature"! So the message could inadvertently make people more vulnerable to claims of promoters of bioengineering and genetic engineering that only their tools can overcome nature's limits and save us.

Moving with nature's flow of energy is suggested in phrases like *cradle-to-cradle* and *zero-waste* and *biomimicry* in design, for example. Nature is no longer a threat, nor a too-skimpy source of stuff. Nature is a wondrous teacher. To name but one tiny example, we learn that the humble spinach plant is such an efficient converter of sunlight to energy that, by combining its unique photosynthetic capacity with silicon, we multiply the power of current photovoltaics.²⁴

As users of material in our daily lives, attention expands beyond quantities to questions like: What is the item made of, where is it produced, and under what conditions? Speaking personally, applying such judgments to daily choices, I don't feel that I'm limiting myself to serve a moral imperative, but I'm enlarging my world and experiencing more meaning—maybe experiencing less need for connection through *common purchases* and enjoying more connection through *common purposes*. Seeing ripples, I feel more powerful.

All this is what stirred me in 1971 to write *Diet for a Small Planet*. It was alignment: the joy of realizing that eating what is also best for my body is best for the earth and is best for all of us. Over the years, I've felt that readers have received the book's philosophy as less about restricting choices and more about enhancing meaning and a sense of agency in our daily lives.

For me, a powerful motivation for the reframing of causes I've laid out here, as well as my suggested rendering of our communication, is the finding of neuroscience that fear easily trumps other emotions in our brains. Psychologists also tell us that fear often makes humans more self-interested, blaming, materialistic, and stuck.²⁵ These findings suggest that it's worth our care and effort to deflect incoming fear stimuli and replace them with positive stimuli.

We can then imagine, really envision, societies in which we each enjoy dignity because no one is a mere instrument of another. In such societies, trust—the foundation of social well-being—spreads, and fear recedes.

So let's call it like it is: Ours is not a growth economy but an economy of waste and destruction; and to capture what we're birthing let's use terms like *flourishing* and *thriving*.

A drawback of the hitting the limits frame includes the fact that for the most part *finitude does not explain today's crises*. Many aspects of our planetary existence are finite, of course, including a finite amount of forests we can destroy or water we can pollute without killing ourselves and other species, along with finite land area, finite rare minerals, and on and on. At the same time, most obviously, as noted earlier, food

Shifting Our Frame: From Limits to Alignment with Nature

Through an ecological lens, however, we can move toward defining the problem as mal-alignment with nature—producing waste, destruction, widespread deprivation, and feelings of powerlessness. In so doing, we focus attention on the need to remake the ground rules of our economies and begin to see how our economies, and our daily choices, can align with nature's generative power. We can tap the commonly understood truth that it's a whole lot easier to swim (or float!) with the current than fight against it. This is alignment.



CGIAR

The International Institute for Development has documented how democratic institutions in West Africa have helped support more ecologically sustainable farming practices.

In this moment, what then are some powerful, positive emotions we can deliberately evoke—whether with the public, among friends, or in our own inner dialogue:

Exhilaration in feeling powerful as a contributor to work that is truly historic.

Dignity and self-respect, for don't we all secretly want to be heroes, at least to ourselves?

Camaraderie in knowing that we're walking shoulder to shoulder with others in common work.

Curiosity and excitement in novel experiences as we experiment with new ways to tap nature's genius and try out new ways of living.

Here, I've shared a working theory of causation and way of framing our predicament that gives my life direction. In a world plagued by feelings of powerlessness, fear, and despair, may we in the *Solutions* community debate openly and vigorously our theories of causation and how most effectively to communicate with the wider world. Only in so doing can we offer ever-more compelling visions of societies aligned with nature—including all we now know of our own nature, along with do-able steps taking us there and methods for measuring our progress. 

REFERENCES

1. Fromm, E. *The Anatomy of Human Destructiveness* (Holt, Reinhart & Winston, 1973).
2. Simons, DJ & Chabris, CF. *The Invisible Gorilla: And Other Ways Our Institutions Deceive Us* (Crown, New York, 2010).
3. Wall Street Fraud and Fiduciary Duties: Can Jail Time Serve As an Adequate Deterrent for Willful Violations? Before the Subcommittee on Crime, Senate Judiciary Committee, 111th Congress (2010).
4. Zimbardo, P. *The Lucifer Effect* (Random House Publishing Group, New York, 2007).
5. United Nations Food and Agricultural Organization. *State of Food Insecurity 2012* [online] (2012). www.fao.org/docrep/016/i3027e/i3027e00.htm.
6. United Nations Food and Agricultural Organization. *Food Balance Sheets* [online] (2009). faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor.
7. Tomasello, M, with Dweck, C, Silk, J, Skyrms, B &



Bread for the World

Mothers laugh during a nutrition education seminar hosted by Care Development Organization, which encourages community members to get involved as healthcare educators.

- Selke, E. *Why We Cooperate* (MIT Press, Cambridge, MA, 2009).
8. Barber, B. R. *Strong Democracy: Participatory Politics for a New Age* (University of California Press, Berkeley, 2003)
 9. Hastie, WH, quoted in *The Great Quotations* (Seldes, G, ed) 265 (Pocketbooks, New York, 1967).
 10. Hrdy, SB. *Mothers and Others: The Evolutionary Origins of Mutual Understanding* (Belknap Press, Cambridge, MA, 2009).
 11. School Mediation Associates [online]. www.schoolmediation.com.
 12. International Co-operative Alliance. Blueprint for a Co-operative Decade [online]. <http://ica.coop/en/blueprint>
 13. Chavez, H & Maria, E. 100 Million Jobs: The contribution of cooperatives to employment creation. United Nations International Labor Organization [online] (2008). http://www.ilo.org/global/publications/ilo-bookstore/order-online/books/WCMS_181836/lang-en/index.htm
 14. Pimbert, M, Barry, B, Berson, A & Tran-Thanh, K. *Democratising Agricultural research for Food Sovereignty in West Africa*. The International Institute for Environment and Development [online] (2010). <http://pubs.iied.org/pdfs/14603IIED.pdf>.
 15. Fishkin, J. *When People Speak* (Oxford University Press, Oxford, 2009).
 16. World Water Monitoring Day. Year in Review 2011 [online] <http://monitorwater.org/uploadedfiles/reports/2011/index.html>
 17. Barnes, B. *Governance and Health, Case Study: Linking Governance and Empowerment to Improved Maternal and Newborn Health Services in Nepal*. CARE [online] (2011) <http://www.care.org/careswork/whatwedo/health/srh/CARE-Nepal-Governance-Health-Study.pdf>.
 18. Ougrin, D et al. Suicide survey in a London borough: Primary care and public health perspectives. *Journal of Public Health* 33, 385–39 (2011).
 19. Global Integrity Project. *Global Integrity Report 2011* [online] (2011). www.globalintegrity.org/report.
 20. Harrison, J. Study: Nation Wastes Nearly Half its Food. *UA News* [online] (11/18/2004) <http://uanews.org/story/study-nation-wastes-nearly-half-its-food>
 21. Sawin, JL, & Moomaw, W, R. Renewable Revolution: Low-Carbon Energy by 2030. World Watch Institute [online] (2009). <http://www.worldwatch.org/bookstore/publication/renewable-revolution-low-carbon-energy-2030>
 22. Badgley, C. et al. Organic agriculture and the global food supply. *Renewable Agriculture and Food Systems*, 22, 86-108 (2007)
 23. Milanovic, B. *The Haves and the Have-Nots: A Brief and Idiosyncratic History of Global Inequality* (Perseus Books Group, Kindle Edition 2010)
 24. Salisbury, D. Spinach power gets a major boost. *Research News@Vanderbilt* [online] (2012). news.vanderbilt.edu/2012/09/spinach-power-a-major-boost.
 25. Crompton, T & Kasser, T. *Meeting Environmental Challenges: the Role of Human Identity* 18-22 (WWF-UK, 2009)