

2. Creating positive futures for humanity on earth

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A THEORY OF TRANSFORMATIVE SOCIETAL CHANGE

“Change,” said the Greek philosopher Heraclitus, “is the only constant.” In the two and a half millennia since he made that observation, our species has had ample time to learn that human purposive activity that fails to take this into account is unlikely to succeed. Perhaps this is why private foundations and other organizations concerned with improving society these days frequently ask grantees to articulate their “theory of change.” By this they usually mean their strategy for accomplishing the stated goals of the project, rather than a real, general theory of how social change happens (Anderson, 2005). For example, the Center for Theory of Change defines it this way: “A Theory of Change provides a roadmap to get you from here to there.”¹ While it is certainly good to have a well thought out strategy for accomplishing specific social goals, a true theory of social change is a very different and much more ambitious thing. If the goals of a social-change project are societal in scale—if they hope to implement changes as sweeping as transforming a civilization’s relationship to the rest of nature into a sustainable one—a more complete theory of social change is needed.

A successful (i.e. fully functional) theory of social change must acknowledge that social systems are always and everywhere embedded in the ecosystems that contain and support them; humans do not live on the blank white pages of textbook abstraction, but in a physical world whose growing seasons, rainfall averages, arable landscapes, and other physical phenomena shape what can and can’t, will and won’t be possible outcomes for purposive social change. Ecosystems at multiple scales, including the entire Earth ecosystem, are also subject to their own evolutionary dynamics. This means that a successful theory of social change must be grounded in an expanded evolutionary paradigm that is capable of addressing not only how organisms and ecosystems evolve and change, but also how rules, norms, institutions, and cultures evolve and change (Ostrom, 2013). This chapter discusses a broader theory of how complex systems from organisms to ecosystems, communities, states, nations, and the planet as a whole evolve and change, and how we can use this theory to design strategies to get from here to a desired there.

In biology, evolution is *the* theory of change. It applies across the board. Over time,

¹ <http://www.theoryofchange.org/what-is-theory-of-change/#4> (accessed December 12, 2019).

for all life forms, adaptive change is the only constant. But in the recent past, evolutionary theory has gone down what David Sloan Wilson has identified as some wrong paths. The emphasis on selection at the genetic level, to the exclusion of selection at other levels of organization, has hindered the development of the field and slowed integration with the social sciences. When one considers the evidence more comprehensively, it is clear that selection occurs at multiple levels, and between group selection may in some circumstances be more important than within group selection (Wilson and Wilson, 2007a).

Multilevel selection theory is relevant to any trait that affects the fitness of other individuals in addition to the individual possessing it, which includes but goes far beyond the stock example of altruism. The theory can help explain the origin and major transitions of life, the structure of animal societies and multi-species ecosystems, and human evolution—even including the rise and fall of empires and the nature of religion. (Wilson and Wilson, 2007b, p. 43)

That norms, rules, communities and cultures evolve in a way analogous to biological systems builds on the work of several other researchers (cf. Boyd and Richerson, 2005).

From a multilevel selection point of view, cultural evolution can *only* occur at the group level since communities and cultures are inherently collections of individuals. In fact, as Wilson and Wilson (2007a) point out, even complex individual organisms are really communities of multiple organisms—for example the complex internal bacterial communities that make digestion possible in many organisms. At the level of communities what has been termed the “symbotype” replaces the genotype as the carrier of information to the next generation (Wilson et al., 2014). Symbotypes occur at multiple levels of organization, from the specific rules and norms to the basic “worldviews” that guide the behavior of entire cultures. Selection likewise occurs at multiple levels, both within levels and between levels. Which level of selection dominates will vary with a number of factors, but as Ostrom’s research has shown, it is certainly possible for cooperative rules and norms (symbotypes) to evolve in complex social groups to counteract selection for selfishness within the groups.

This perspective, drawn from current work in multilevel selection theory, sheds light on the major problem facing humanity today. The problem isn’t simply the crises of climate disruption, species extinction, or growing inequality, but something larger and more general: Western civilization as currently practiced is both unsustainable ecologically and undesirable socially. It is no longer contributing to net improvement of overall human wellbeing (Costanza et al., 2013; Kubiszewski et al., 2013). The dominant Western global culture is based on a consumerist worldview and takes maximizing material consumption, as measured by GDP, as the primary path to change and improvement. To salvage Western civilization from the excesses of its success will require the articulation of alternative cultural symbotypes and selection pressure to prefer one of the alternatives that is thus generated.

How might this happen? One way to think about this comes from the work of Paul Ray and Sherry Anderson, who have been surveying Americans and categorizing them into alternative worldviews (Ray and Anderson, 2000; Ray, 2008). They have grouped Americans into three broad symbotypes: (1) Modernists (M)—the dominant worldview of markets and economic growth—46 percent of the population in 2000; (2) Traditionalists (T)—a nostalgic appeal to earlier (often more religious) times—26 percent of the population in 2000; and (3) Cultural Creatives (CC)—a worldview based

on sustainability, equity, and sufficiency—28 percent of the population in 2000. CCs are disenchanted with owning more stuff, materialism, status display and the glaring social inequities of race (Ray and Anderson, 2000). These percentages have been changing rapidly. In 1965 CCs were a mere three percent, Ms 50 percent, and Ts 47 percent of the population. We thus have a measure of how fast basic cultural symbotypes have been changing in the US, and a “theory of change” that may help understand historical behavior and forecast how and when a major cultural transformation might occur.

For example, we might hypothesize that if recent rates of change of cultural symbotypes continue, at some point in the not too distant future the fraction of the population that is motivated by the CC worldview will come to dominate and (assuming a democracy) will begin to change goals, rules, policies in ways that more directly support the CC symbotype. One might call this combination of worldview, institutions, and technologies at multiple levels of organization a “socio-ecological regime” and conclude that a useful theory of change would need to explain the growth, development, decline and transformation of alternative regimes (Beddoe et al., 2009). One hypothesis is that socio-ecological regimes change when “tipping points” are reached, often requiring a financial, political, or environmental crisis as a trigger.

However, like other evolutionary processes, cultural evolution is prone to path dependence, multiple equilibria, lock-in, societal addiction, and traps (Costanza, 1987; Arthur, 1988; Costanza et al., 1993, 2017). Many historical civilizations have collapsed due to their inability to escape these processes (Tainter, 1988; Costanza et al., 2007; Diamond, 2006). For example, the ancient Maya developed elaborate trade networks, elites, and cities that lost resilience to recurring drought cycles and eventually collapsed (Diamond, 2006; Heckbert et al., 2014).

Societies, like individuals, can get trapped in patterns of behavior (social traps or “societal addictions”) that provide short-term rewards but are detrimental and unsustainable in the long run. Current examples include societal addiction to inequitable overconsumption fueled by fossil energy and a “growth at all costs” economic model. We might learn how to overcome these societal addictions from successful therapies at the individual level (Costanza et al., 2017). In particular, Motivational Interviewing (MI) is one of the most effective therapies. It is based on engaging addicts in a positive discussion of their goals, motives, and futures. One analogy to MI at the societal level is a modified version of scenario planning (SP) extended to engage the entire community (CSP) in thinking about goals and alternative futures via public opinion surveys and forums. Both MI and CSP are about exploring alternative futures in positive, non-confrontational ways and building commitment or consensus about preferred futures. Effective therapies for societal addictions may be possible, but, as we learn from MI, they will require a rebalancing of effort away from only pointing out the dire consequences of current behavior (without denying those consequences) and toward building a shared vision of a positive future and the means to get there.

A major part of the research and action agenda for ecological economics is thus about better understanding cultural evolution, including the roadblocks to positive societal change, and how to overcome them. This may require “societal therapy” based on first building a shared vision of the future we all want.

One unique feature of cultural evolution compared to biological evolution is that it is “reflexive” in the sense that goals and foresight can affect the process.

To a certain extent, we can design the future that we want by creating new cultural variants for evolution to act upon and by modifying the goals that drive cultural selection. If our societal goals shift from maximizing growth of the market economy to maximizing sustainable human wellbeing, different institutions will be better adapted to achieve these goals. As we learn more about the process of cultural evolution, we can better anticipate the required changes and can more efficiently design new institutional variants for selection to work on. (Beddoe et al., 2009, p. 2488)

This can radically speed up the change process in socially desired directions. The rapid rise of *homo sapiens* is a result of our species' ability to rapidly change behavior through cultural rather than biological evolution. What the Maya and other collapsed civilizations evidently lacked was the ability to envision radically different worldviews, institutions, and technologies—new cultural regimes and symbotypes—in response to changing conditions or the ability to make timely, smooth, intentional, and appropriate transitions. If this feature of cultural evolution can be improved, it may help to avoid lock-in, evolutionary dead-ends, and societal collapse.

Biological evolution has no foresight and can only act on and select from the alternatives in place at any point in time. Humans are rapidly improving their ability to build complex models, simulations, and designs of future possibilities. Such models are useful for exploring and pushing past entrenched understanding of various challenges, from climate change to nutrient dynamics. However, to fully leverage the adaptive learning capacity such models and projections can provide, engagement with stakeholder communities is essential. Over time the ability to pre-select the preferred alternatives from a much wider range of possibilities emerges.

Scenario planning is one technique that can be used to accomplish this task at larger community, national, and even global scales. Scenario planning creates an ability to discuss and develop consensus about what social groups want (Peterson et al., 2003). Predicting the future is impossible. But what we can do is lay out a series of plausible scenarios, which help to better understand future possibilities and the uncertainties surrounding them. Scenario planning differs from forecasting, projections, and predictions, in that it explores *plausible* rather than *probable* futures, and lays out the choices facing society in whole systems terms. One can think of these in evolutionary terms as alternative symbotypes for selection, but in hypothetical rather than real versions.

Scenario Planning to Build a Shared Vision

“Scenario” is a term with multiple meanings. Scenario exercises vary in their objectives and hence in their characteristics (Biggs et al., 2007). In this chapter, we define scenario analysis or scenario planning as a structured process of exploring and evaluating the future. Scenarios are essentially stories that consider how alternative futures, typically related to a particular focal issue (O'Brien, 2000), may unfold from combinations of highly influential and uncertain drivers, and their interactions with more certain driving forces. Scenario planning differs from forecasting, projections, and predictions, in that it explores plausible rather than probable futures (Peterson et al., 2003). Although aspects of the future worlds depicted by scenarios may come to eventuate, these worlds are often best viewed as caricatures of reality from which we can learn.

Scenarios are best suited to exploring situations of high uncertainty and low controllability (Peterson et al., 2003). In these situations, scenarios can help to illuminate

Table 2.1 A selection of previous scenario planning exercises with the scenarios arranged in order of decreasing quality of life

<i>Scenario exercise</i>	<i>Overall quality of life of the scenario</i>			
	<i>Most desirable (highest quality of life)</i>	<i>Intermediate (based on cooperation)</i>	<i>Intermediate (based on individuals and markets)</i>	<i>Least desirable (lowest quality of life)</i>
South Africa (Mont Fleur) 1992	Flight of the flamingos	Icarus	Lame duck	Ostrich
Costanza (2000) Special Report on Emissions Scenarios (SRES)	Ecotopia 'B2 world' (local stewardship)	Big government 'B1 world' (global sustainability)	Star Trek 'A1 world' (world markets)	Mad Max 'A2 world' (national enterprise)
Millennium Assessment	Adapting mosaic	Global orchestration	TechnoGarden	Order from strength
Great transition initiative	Great transition	Policy reform	Market forces	Fortress world
New Zealand	Independent Aotearoa	Living on no. 8 wire	New frontiers	Fruits for a few
Great Barrier Reef	Best of both worlds	Treading water	Free riding	Trashing the commons

the consequences of these uncontrollable forces and to formulate robust responses. Importantly, scenarios can help to reveal policy and value changes that may be required and key branching points at which such changes can most affect outcomes (Gallopín, 2002).

Scenarios have been developed for a range of applications from global to local scales, including corporate strategy (Wack, 1985), political transition (Kahane, 1992, 2004), and community-based natural resource management (Wollenberg et al., 2000; Evans et al., 2006). Table 2.1 shows a range of previous scenario planning exercises that have been carried out at the global, national, and, regional scales. In the following, we explore one of these exercises—the Great Transition Initiative. An interesting feature of all these exercises is that their scenarios fall along a spectrum of “quality of life” or human well-being and we have grouped the scenarios in this way in Table 2.1.

The Great Transition Initiative (GTI) is an ongoing effort with its beginnings in the 1990s (Gallopín et al., 1997). The scenarios have changed name and number over time, but the current set involves four major scenarios: fortress world, market forces, policy reform, and great transition (Raskin et al., 2002).

The **fortress world scenario** is a variant of a broader class of barbarization scenarios, in the hierarchy of the Global Scenario Group (Gallopín et al., 1997). Barbarization scenarios envision the grim possibility that the social, economic, and moral underpinnings of civilization deteriorate, as emerging problems overwhelm the coping capacity of both markets and policy reforms.

The **market forces scenario** is a story of a market-driven world in the twenty-first century in which demographic, economic, environmental, and technological trends unfold without major surprise relative to unfolding trends. Continuity, globalization, and convergence are key characteristics of world development—institutions gradually adjust without major ruptures, international economic integration proceeds apace, and the socio-economic patterns of poor regions converge slowly toward the development model of the rich regions.

The **policy reform scenario** envisions the emergence of strong political will for taking harmonized and rapid action to ensure a successful transition to a more equitable and environmentally resilient future. It explores the requirements for simultaneously achieving social and environmental sustainability goals under high economic growth conditions similar to those of market forces.

The **great transition scenario** explores visionary solutions to the sustainability challenge, including new socio-economic arrangements and fundamental changes in values. This scenario depicts a transition to a society that preserves natural systems, provides high levels of welfare through material sufficiency and equitable distribution, and enjoys a strong sense of local solidarity.

An interactive website allows users to visualize and explore the scenarios. The descriptions of these scenarios in the published books and websites are the most extensive of the scenario studies mentioned here, and probably the most extensive of any existing scenario exercise. The status and trends of over 40 variables are plotted for each scenario, including several variables related to ecosystem services (i.e. CO₂ emissions, water use, and forested area) and an overall quality of development index that is similar in structure to the Genuine Progress Indicator (GPI) and other indices of societal wellbeing.

THE SDGs AS AN IMPORTANT FIRST STEP

The Sustainable Development Goals (SDGs) agreed in the UN 2030 Agenda for Sustainable Development (UN, 2015) are a major step forward in creating a global shared vision of the future we all want. They represent the first time in human history that all countries have agreed on a detailed set of goals focused on overall societal wellbeing, rather than merely growth of GDP and material consumption. They address some of the systemic barriers to sustainable development and contain coverage of, and balance between, the three dimensions of sustainable development—social, economic, and environmental—and their institutional/governance aspects. In addition, the SDGs apply to all countries, not just developing nations. The SDG process provides an opportunity to trigger systemic change to build a sustainable future in an increasingly interconnected world. However, with 17 goals, 169 targets, and over 300 indicators proposed, the SDGs provide diluted guidance at best. This is to be expected, given the complex political process that led to the SDGs. The SDG process so far has merely opened the door.

There is still much additional work needed to elaborate (1) the complex interconnections between the goals; (2) the means–ends continuum toward an overarching goal; and (3) a “narrative of change” to describe the societal shifts and policy reforms necessary to achieve the SDGs and how this could actually happen within existing socio-economic and geopolitical circumstances (Costanza et al., 2014, 2018; Ostrom, 2013). The SDGs need an overarching goal with clear metrics of progress toward that goal that are geared to integrate

the sub-goals (Costanza et al., 2014). They also need a more detailed elaboration of what the world would look like if the SDGs were actually achieved. What would people's lives be like in the SDG world and how would they be different and better than they are now?

The SDG world shares many (if not most) attributes with the great transition scenario discussed earlier. How can we build on this confluence to engage the global public in building the shared vision of the world we all want to overcome our addiction to the growth at all costs paradigm?

RESEARCH AND ACTION AGENDA

Based on the above, we can identify three major research and action areas for ecological economics:

1. How does cultural evolution work? How do we explain the growth, development, decline and transformation of alternative socio-ecological regimes, including the roadblocks to positive societal change?
2. What are the potential ways to overcome roadblocks to positive societal change including “societal therapy”?
3. How can shared visions of the future be created at multiple time and space scales?

How do We Explain the Growth, Development, Decline, and Transformation of Alternative Socio-ecological Regimes, Including the Roadblocks to Positive Societal Change?

This line of research overlaps significantly with the agenda of cultural evolution. The evolutionary, whole systems perspective has been a key part of the ecological economics research agenda from the beginning (Costanza, 1991). But our understanding of these processes is rapidly improving, based on studies from a number of perspectives. For example, the study of “integrated history” from a broader systems perspective (Costanza et al., 2007) may provide some interesting and practical answers to this question. Approaches can range from the analysis of massive databases about the behavior and evolution of historical civilizations to integrated modeling studies of the same. For example, Heckbert et al. (2014) modeled the growth, development, and decline of the ancient Maya civilization. The model created can then be used to study what policy or worldview changes might have allowed the transformation of the Maya while avoiding collapse. We have much to learn from a deeper analysis of cultural evolution and this understanding can lead to better understanding of the next question.

What are the Potential Ways to Overcome Roadblocks to Positive Societal Change?

Scientists (including economists) often operate on the assumption that once a problem has been adequately understood and a solution provided, society will adopt the solution and move forward. Unfortunately, as we have described above, the roadblocks to change are often not lack of knowledge about the solutions, but lock-in and “addiction” to the current system. Overcoming this addiction, like overcoming individual addictions, requires much more than simply pointing out the problems and their logical solutions. At

the societal level, making the transition to a sustainable and desirable future will not be easy and will require a more nuanced conversation and consensus-building about societal goals and tradeoffs than has so far been the case. This is a largely an unexplored area of research and action. There is ample room for creative design and testing of a range of societal therapies. Scaling up what works at the individual level may be one important path to more effective societal therapies that will allow humans to build a sustainable and desirable future together. A key first step in these kinds of therapies is creating a truly shared vision of the world we want. How to do this is the next question.

How can Shared Visions be Created at Multiple Time and Space Scales?

Creating a truly shared vision is one of the most powerful ways to motivate change in complex organizations at multiple scales. The SDG process discussed above is a historic step in creating a shared global vision. A major question is: How can we build on the SDG process to engage the global public in building this shared vision? We now have the technology to make this process feasible at multiple time and space scales. The internet now allows real-time communication with almost everyone on the planet! We are certainly not using this technology effectively for the purposes of building shared visions, but we could. We could use it to carry out massive public opinion surveys about alternative futures (cf. Chambers et al., 2019), or deliberative processes involving broad swathes of the population to build and refine the vision. We can also more fully engage the arts and film community to create visions of the world in formats people can relate to. Imagine, for example, a blockbuster film with the same set of characters interacting in four alternative futures. These kinds of stories are the missing element in allowing people to think about alternative futures and build consensus on the future we want.

CONCLUSIONS

While multiple futures are possible and plausible, the goal of a “sociotecture” (societal design) of intentional change would be to design futures that are both sustainable and desirable, recognizing evolutionary dynamics. The goal of a theory of intentional change is to bring to bear an integrated understanding of cultural and biological evolution to allow the transitions to desired ends to be made in positive, adaptive ways. A cultural evolutionary theory of change is to the design of intentional futures as a theory of structural statics is to architecture—a necessary understanding that allows the construction of viable alternatives. Elinor Ostrom’s design principles (Wilson et al., 2013) are one way of thinking about how to create sustainable and desirable futures. They point the way to a sociotecture of intentional change and help us think about the design of rules, norms, and institutions for managing the commons that will be both sustainable and desirable.

Making the transition to the world we want will not be easy. In many ways we are locked-in, trapped, and in a very real sense “addicted” to the current regime. Growing knowledge of how to overcome individual addictions may help here (Miller and Rollnick, 2002; Carroll et al., 2006; Costanza et al., 2017). We know that directly confronting addicts with their problems in an effort to scare them into changing leads to denial and is often counterproductive.

And yet this is exactly what we are doing at the societal level with issues like climate change and the negative effects of GDP growth. At the individual level, developing a positive vision of a better life is often the most effective first step in what we have to recognize as ongoing therapy. This is what scenario planning and envisioning can provide at the societal level. In cultural evolutionary terms, we can produce positive hypothetical symbotypes to speed and direct the process. So, we need not only a science and theory of intentional change, but also a sociotecture and therapy integrated with it to develop and test alternative models and visions of the world we want and to help us get there. It is impossible to predict the future, but we can help guide and model the evolutionary process to create the future we want. This is a fundamental research and action agenda for ecological economics.

REFERENCES

- Anderson, A. 2005. An introduction to theory of change. *Evaluation Exchange*, 11:12–19.
- Arthur, W. B. 1988. Self-reinforcing mechanisms in economics. In P. W. Anderson, K. Arrow, & D. Pines (Eds.), *The economy as an evolving complex system*. Redwood City, CA: Addison-Wesley, Chapter 1.
- Beddoe, R., Costanza, R., Farley, J., Garza, E., Kent, J., Kubiszewski, I., Martinez, L., McCowen, T., Murphy, K., Myers, N., Ogden, Z., Stapleton, K., & Woodward, J. 2009. Overcoming systemic roadblocks to sustainability: the evolutionary redesign of worldviews, institutions, and technologies. *Proceedings of the National Academy of Sciences of the United States of America*, 106:2483–2489.
- Biggs, R., Raudsepp-Hearne, C., Atkinson-Palombo, C., Bohensky, E., Boyd, E., Cundill, G., Fox, H., Ingram, S., Kok, K., Spehar, S., Tengö, M., Timmer, D., & Zurek, M. 2007. Linking futures across scales: a dialog on multiscale scenarios. *Ecology and Society*, 12:17.
- Boyd, R., & Richerson, P. J. 2005. *The origin and evolution of cultures*. New York: Oxford University Press.
- Carroll, K. M., Ball, S. A., Nich, C., Martino, S., Frankforter, T. L., Farentinos, C., Kunkel, L. E., Mikulich-Gilbertson, S. K., Morgenstern, J., Obert, J. L., Polcin, D., Snead, N., & Woody, G. E. for the National Institute on Drug Abuse Clinical Trials Network. 2006. Motivational interviewing to improve treatment engagement and outcome in individuals seeking treatment for substance abuse: a multisite effectiveness study. *Drug and Alcohol Dependence*, 81:301–312.
- Chambers, I., Costanza, R., Zingus, L., Cork, S., Hernandez, M., Sofiullah, A., Htwe, T. Z., Kenny, D., Atkins, P., Kasser, T., Kubiszewski, I., Liao, Y., Maung, A. C., Yuan, K., Finnigan, D., & Harte, S. 2019. A public opinion survey of four future scenarios for Australia in 2050. *Futures* (in press).
- Costanza, R. 1987. Social traps and environmental policy. *Bioscience*, 37:407–412.
- Costanza, R. 2000. Visions of alternative (unpredictable) futures and their use in policy analysis. *Conservation Ecology*, 4(1):5.
- Costanza, R. (Ed.) 1991. *Ecological economics: the science and management of sustainability*. New York: Columbia University Press.
- Costanza, R., Wainger, L., Folke, C., & Maler, K. G. 1993. Modeling complex ecological economic systems: toward an evolutionary, dynamic understanding of people and nature. *Bioscience*, 43:545–555.
- Costanza, R., Graumlich, L., Steffen, W., Crumley, C., Dearing, J., Hibbard, K., Leemans, R., Redman, C., & Schimel, D. 2007. Sustainability or collapse: what can we learn from integrating the history of humans and the rest of nature? *Ambio*, 36, 522–527.
- Costanza, R., Alperovitz, G., Daly, H., Farley, J., Franco, C., Jackson, T., Kubiszewski, I., Schor, J., & Victor, P. 2013. *Building a sustainable and desirable economy-in-society-in-nature*. Canberra: ANU Press. <http://epress.anu.edu.au/titles/building-a-sustainable-and-desirable-economy-in-society-in-nature> (accessed December 23, 2019).

- Costanza, R., McGlade, J., Lovins, H., & Kubiszewski, I. 2014. An overarching goal for the UN Sustainable Development Goals. *Solutions*, 5(4):13–16.
- Costanza, R., Atkins, P., Bolton, M., Cork, S., Grigg, N., Kasser, T., & Kubiszewski, I. 2017. Overcoming societal addictions: what can we learn from individual therapies? *Ecological Economics*, 131:543–550.
- Costanza, R., Caniglia, E., Fioramonti, L., Kubiszewski, I., Henry, L., Lovins, H., McGlade, J., Mortensen, L. F., Philipsen, Pickett, K., Ragnarsdóttir, K. V., Roberts, D., Sutton, P., Trebeck, K., Wallis, S., Ward, J., Weatherhead, M., & Wilkinson, R. 2018. Toward a sustainable wellbeing economy. *Solutions*, 9(2):April. www.thesolutionsjournal.com/article/toward-sustainable-wellbeing-economy/ (accessed December 23, 2019/)
- Diamond, J. 2006. *Collapse: how societies choose to fail or succeed*. New York: Viking Adult.
- Evans, K., Velarde, S. J., Prieto, R., Rao, S. N., Sertzen, S., Dávila, K., Cronkleton, P., & de Jong, W. 2006. *Field guide for the future: four ways for communities to think ahead*. Nairobi, Kenya: Center for International Forestry Research (CIFOR), ASB, World Agroforestry Centre.
- Gallopín, G. C. 2002. Planning for resilience: scenarios, surprises and branch points. In L. Gunderson, & C. S. Holling (Eds.), *Panarchy: understanding transformations in human and natural systems*. Washington, DC: Island Press, pp. 361–392.
- Gallopín, G., Hammond, A., Raskin, P., & Swart, R. 1997. Branch Points: Global Scenarios and Human Choice. PoleStar Series Report No. 7. Stockholm Environment Institute, Stockholm.
- Heckbert, S., Costanza, R., & Parrott, L. 2014. Achieving sustainable societies: lessons from modelling the ancient Maya. *Solutions*, 5(5):55–64.
- Kahane, A. 1992. The Mont Fleur scenarios: what will South Africa be like in the year 2002? *Deeper News*, 7:1–5.
- Kahane, A. 2004. *Solving tough problems: an open way of talking, listening, and creating new realities*. San Francisco: Berrett-Koehler.
- Kubiszewski, I., Costanza, R., Franco, C., Lawn, P., Talberth, J., Jackson, T., & Aylmer, C. 2013. Beyond GDP: measuring and achieving global genuine progress. *Ecological Economics*, 93:57–68.
- Miller, W. R., & Rollnick, S. 2002. *Motivational interviewing: preparing people for change*. New York: Guilford Press.
- O'Brien, P. 2000. *Scenario planning: a strategic tool*. Canberra: Bureau of Rural Sciences.
- Ostrom, E. 2013. Do institutions for collective action evolve? *Journal of Bioeconomics*, doi:10.1007/s10818-013-9154-8.
- Peterson, G. D., Cumming, G. S., & Carpenter, S. R. 2003. Scenario planning: a tool for conservation in an uncertain world. *Conservation Biology*, 17:358–366.
- Raskin, P., Banuri, T., Gallopín, G., Gutman, P., Hammond, A., Kates, R., & Swart, R. 2002. *Great transition: the promise and lure of the times ahead*. Boston: Stockholm Environment Institute.
- Ray, P. H. 2008. The Potential for a New, Emerging Culture in the U.S. Report on the 2008 American Values Survey. Institute for the Emerging Wisdom Culture, Wisdom University.
- Ray, P. H., & Anderson, S. R. 2000. *The cultural creatives: how 50 million people are changing the world*. New York: Three Rivers Press.
- Tainter, J. A. 1988. *The collapse of complex societies*. Cambridge: Cambridge University Press.
- UN 2015. *Transforming our world: The 2030 agenda for sustainable development*. New York: United Nations.
- Wack, P. 1985. Scenarios: uncharted waters ahead. *Harvard Business Review*, 63:72–89.
- Wilson, D. S., & Wilson, E. O. 2007a. Rethinking the theoretical foundation of sociobiology. *Quarterly Review of Biology*, 82:327–348.
- Wilson, D. S., & Wilson, E. O. 2007b. Survival of the selfless. *New Scientist*, 196:42–46.
- Wilson, D. S., Ostrom, E., & Cox, M. E. 2013. Generalizing the core design principles for the efficacy of groups. *Journal of Economic Behavior & Organization*, 90:S21–S32.
- Wilson, D. S., Hayes, S. C., Biglan, A., & Embry, D. D. 2014. Evolving the future: toward a science of intentional change. *Behavioral and Brain Science*, 37:395–416.
- Wollenberg, E., Edmunds, D., & Buck, L. 2000. Using scenarios to make decisions about the future: anticipatory learning for the adaptive co-management of community forests. *Landscape and Urban Planning*, 47:65–77.