

## WHY WE NEED A STRATEGIC PLAN FOR ‘SPACESHIP EARTH’

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**“If you don’t know where you’re going, you’re likely to end up somewhere else.”**

– attributed to Yogi Berra

You could legitimately call it a “megathreat.” In a scholarly but readable book that should have set alarm bells ringing, literally around the world, the distinguished geoscientist Richard B. Alley warned us recently that the accumulating scientific evidence points to the likelihood, in the not too distant future, of an ecological equivalent of 9-11. Or worse.

The title of Alley’s book says it all: *The Two-Mile Time Machine: Ice Cores, Abrupt Climate Change, and Our Future* (Princeton University Press, 2000). One of the world’s leading climate researchers and chairperson of a recent National Research Council study of climate change, Alley concludes that we have been enjoying an unusually benign and stable climate pattern during the past few millennia. While our species was busy developing agriculture, industry and large-scale societies, we were blessed with a rare window of ecological opportunity; climatic turmoil has been more the rule:

Large, rapid, and widespread climate changes were common on Earth for most of the time for which we have good records...While our [more remote] ancestors were spearing woolly mammoths and painting cave walls, the climate was wobbling wildly...The climate jumped between cold and warm not over centuries, but in as little as a single year...The history of this climatic craziness is written in cave formations, ocean and lake sediments, and other places. But the record is clearest and most convincing in the ice of Greenland....These records show clearly that the Earth’s climate normally involves larger, faster, more widespread climate changes than any experienced by industrial or agricultural humans....The current stable interval is among the longest on record. Nature is thus likely to end our friendly climate, perhaps quite soon....What

should we do about this? The simple answer is that I don't know.

At the risk of sounding alarmist, the key finding of this research bears repeating. The end of our relatively benign global climate pattern could happen "in as little as a single year." And, as Alley says, we haven't a clue at present about how to prepare for it. (A similar warning, co-authored by Alley and a number of his colleagues, appeared in the prestigious journal *Science* in March of this year.)

Perhaps you might be predisposed to doubt such Cassandra-like projections. If so, consider this. Even during the past 10,000 years of relative climate stability, new evidence suggests that recurrent periods of prolonged regional "megadroughts" very likely were responsible for the sudden, mysterious disappearance of many ancient civilizations – the Akkadians, Late Uruk, the Old Kingdom in Egypt, the Harappan civilization of the Indus valley, the Classic Mayans, the Moche, the Anasazi, and others. Centuries-long climate perturbations have been common, even in the recent past. Indeed, the "Little Ice Age" that besieged Europe only a few centuries ago provides a well-documented example.

In this light, consider the fate of California. With its rich soil, salubrious climate and the longest growing season in the world, California currently provides 90% of the apricots, 87% of the grapes and avocados, 86% of the peaches, 83% of the lemons and strawberries, 80% of the artichokes and lettuce, 73% of the broccoli and 53% of the cauliflower consumed in the United States, along with about one-third of the cherries and pears and a significant percentage of the nation's oranges, wheat, rice and other crops. Overall, California's farmers produce about one-quarter of the nation's total output of fruits and vegetables. California also currently has a population of about 35 million people and is projected to grow to 50 million by 2025.

Unfortunately, California is one of the areas that has been susceptible in the past to recurrent, severe megadroughts. If (or rather when) another such megadrought occurs in this region, it will likely produce a global food crisis. In an age of international agricultural markets, many other countries besides the United States could be hit with soaring food prices and severe food shortages.

Even without drastic climate changes, the world stock of fresh water is being depleted at a rate that will soon threaten our food supply, simply because a major share of the world's agriculture depends on artificial irrigation. Drinking water and water for sanitation and industrial uses are also threatened. Even now, some 1.3 billion people (20 percent of the global population) do not have safe drinking water, and at least four million people die each year from water-borne diseases. Within the next 50 years, population growth will create the demand for a 50-100% increase in fresh water supplies, a staggering challenge.

Yet we are currently depleting many of the lakes, rivers and aquifers that serve existing populations. For instance, the great Ogallala Aquifer, an underground river in the American southwest that was once the size of Lake Huron, will be gone within 20-30 years. A recent article in the premier science journal *Nature* projects that, over the next two decades, the average supply of fresh water per person world wide will decline by about one-third. Future wars over water resources are a very real

possibility.

If, despite all of this, you're still inclined to side with Pollyanna, consider the terrorist scenario that was described by Middle-East expert Robert Baer in his new book called *Sleeping With the Devil* (Crown Publishers, 2003). Saudi Arabia, an economically vital but corrupt and politically volatile nation, has already gotten a whiff of terrorism, and if an al Qaeda-like group were to strike at the Abqaiq complex – the world's largest oil processing facility – or the oil loading terminals at Ras Tanura and Ju'aymah, the economic consequences would be nothing short of catastrophic. The equivalent of one-third of U.S. daily oil consumption could be lost for many months (or even years), and world oil prices, which recently spiked at about \$40 per barrel (it's now down to around \$25), could go as high as \$150 a barrel, or more. You can do the math.

And this is only one of many alarming scenarios involving weapons of mass destruction that have now become commonplace – and credible. Anyone who is inclined to dismiss or ignore such warnings can justly be accused of being in denial, like those who paid no attention to the warning signs of a growing terrorist threat before 9-11. Even our halting efforts to provide “homeland security” seem short-sighted and parochial when measured against the full scope of the threats that we may face.

So what can be done to prepare for such megathreats? The answer, in a nutshell, is that there is no way we can predict for certain what major catastrophes might happen, much less where, or when. Despite the futurist, even utopian forecasts that regularly appear on the best-seller lists, nobody really knows what the world will look like even in 10 or 20 years, and the year 2100 is even more imponderable. As the writer Barbara Holland wryly commented in an article about our perennial hunger for prophets: “The term ‘foreseeable future’ is an oxymoron.”

This is precisely why the world community urgently needs to develop a “strategic plan” for the planet Earth. (I have borrowed the late economist Kenneth Boulding's term, “spaceship Earth,” for the title of this essay, because it underscores our profound dependence on an immensely complex, yet fragile, global system – ecological, technological, economic and political – that we cannot take for granted.)

Strategic planning is a ubiquitous practice in private industry these days. Many, if not most, major business firms routinely develop a formal strategic plan (often with the help of outside consultants), which may then be updated every few years as conditions change. Typically, these plans define the organizational goals and various implementation steps for a business firm (and its various “units”) during the next five to ten-years. In the past, these plans were customarily built on a single “forecast,” a more or less rigorously developed projection of likely future conditions in the industry, and in the marketplace. (As a hedge, these forecasts often include a “high,” “middle,” and “low” projection, but all of these variants are typically derived from the same basic assumptions and tend to promote, rather than challenge, the mid-range alternative.)

This approach seemed perfectly reasonable in an era of economic and political stability, when

past trends were likely to continue unimpeded for the next several years. Thus, a clothing manufacturer might use population and economic growth projections as a basis for forecasting future growth in the company's sales. Or an airport might use local demographic trends and overall growth in the air travel industry to estimate the need for expanded terminal facilities, or a new runway.

Sometimes the forecasting approach still works reasonably well, but more often these days a strategic plan may be blind-sided by a growing array of unforeseeable (or at least unforeseen) events, from new technologies to the rise of overseas competitors, unstable oil prices, unexpected demographic shifts and, not least, terrorist attacks. This is why the relatively new technique of "scenario-based planning" has become increasingly popular. First used in private industry by the Royal Dutch Shell Corporation as a way of hedging against the sometimes wild swings in oil prices that began to occur during the so-called "oil shocks" of the 1970s, scenario-based planning has become an increasingly popular, and powerful planning tool in the business world.

One of the most assiduous – and most successful – practitioners of scenario-based planning these days is the U.S. military. We have recently seen this in action in the Iraq war. Multiple threat analyses, contingent force requirements and war-gaming (ranging from table-top computerized exercises to simulations on the ground) are an integral and routine part of the *modus operandi* for our armed forces. Yet, as the war in Iraq showed, even the most rigorous use of scenario-based planning may not be enough to anticipate all of the contingencies. As one of the senior American generals remarked to a reporter, our forces on the ground were surprised by Iraqi actions that had not been anticipated in the army's preliminary war games.

This example underscores the fact that the assumptions used to define various forecasts, or scenarios, are very often the critical "drivers" in the planning process, for better or worse. So it is vital to explore systematically even what might seem to be the most unlikely scenarios and think creatively about how to respond to them. To quote the popular slogan, "the future is not what it used to be." A scenario-based strategic plan gives priority to being able to cope with future uncertainties, rather than pretending to be able to predict what will happen – often a form of self-deception that can be all the more seductive because it purports to be "rigorous." Indeed, knee-jerk forecasting can be a formula for failure in turbulent times like these. Scenario-based planning does not come with any money-back guarantee, of course, but it certainly improves your odds against "the house."

Some neo-isolationists may still cling to the notion that the rest of the world is not their concern. Global thinking, they claim, smacks of altruism and one-world idealism. But this attitude is at once ill-informed and naive. Globalization means "interdependence," for better or worse, and we can no longer afford the luxury of ignoring it. The latest evidence of this, perhaps, is our close call with the SARS epidemic. By focusing systematically on the full range of potential threats and their varying global impacts, we will be able to understand more clearly how we might be affected, and why it is in our collective self-interest to care and to mobilize resources, or at least contingency plans, for dealing them.

To take one specific example, we are quite unprepared for the recurrence of a major volcano

eruption like the one at Krakatoa (then an island near Sumatra and Java) in 1883, which set off killer tidal waves that destroyed coastal communities even hundreds of miles away, or the eruption of Mt. Tambora in the Philippines in 1815, which wreaked havoc with global climate conditions for many months thereafter. (A new best-selling book by Simon Winchester, *Krakatoa*, details these impacts.) Recently, Mt. Rainier, a revered local landmark in the heavily urbanized Seattle-Tacoma, Washington, area, has been identified as a likely candidate for a catastrophic future eruption. Not only might there be extensive local destruction and major loss of life if this were to occur but most likely there would also be serious “ripple effects” in the U.S. and global economies. The Pacific Northwest is an engine of economic growth in this country, and its seaport is a major gateway for trade with the Pacific Rim.

So what might a strategic plan for spaceship Earth look like? Among other things, a scenario-based strategic plan would “concentrate our minds” (like the metaphorical prisoner who will be executed in the morning) on how to prepare for the near-certainty of major long-term disruptions, even if the time, place and exact character may not be known. It would put a “structure” around the inherent uncertainties in the current environment. It would compel us to engage in systematic thinking about various possible futures. It would help in identifying what may be the most important “drivers” of future conditions. It would allow us to weigh the risks and assess the possible consequences of following different paths into the future, rather than making a “best guess” forecast about what the path will be. It could also stimulate creative thinking and innovative problem-solving – “thinking outside the box” as the cliché goes. But most important, the likely result would be a plan that is modulated to conserve options and hedge against the many future risks. Finally, it would be at once cautious – avoiding massive, irrevocable commitments – and prudently bold, inspiring new initiatives to create flexibility and adaptability under a variety of future conditions. It should also go for the “sweet spot”– strategies that are robust across various future eventualities.

A model, perhaps, can be found in the story of Joseph in the Old Testament. Joseph, who was sold into slavery in Egypt, ultimately rose to power in the Pharaoh’s court by foreseeing a great famine and persuading the Pharaoh to build up a grain reserve, which enabled the population to survive the hard times. In our own day, the growing world-wide shortage of fresh water resources is one of several obvious survival threats with a global reach. And, happily, there are major steps that can be taken now to address this growing crisis and mitigate its effects. In the process, we may also be able to create the means for coping with future megadroughts and major climate disruptions, when (not if) they occur.

Possible steps for addressing this problem range from a wholesale shift to “micro-irrigation” in global agriculture (which now uses two-thirds of our available fresh water resources and wastes some 60% of it!) to massive water desalinization programs in vulnerable, or water-short areas like California and Ethiopia (and indeed, in some presently parched but fertile areas that could be brought under cultivation). Non-polluting wind and solar power technologies are becoming increasingly competitive economically, and if these were to be coupled to larger, more efficient desalinization plants in a deliberate, perhaps subsidized program of “sustainable” water resource development, the long-term benefits could be manifold. A new global water development program might become the modern equivalent of Joseph’s granary in ancient Egypt. Clearly there is a vital role for the private sector in such

a program. But, if the pattern with other new technologies (from railroads to the Internet) is any guide, the winning formula is likely to be a public-private partnership in which the “consumers” are also full participants.

Cynics will say it is unlikely that our fractionated world community would be willing to agree upon and implement a global strategic plan. How do you get people to set aside their parochial self-interests and look beyond their short-term time horizon? There are four possible “countermeasures” for addressing this problem: (1) marshal the growing scientific evidence that major calamities have been very common in our past history and are equally likely in the future; (2) carefully document our many interdependencies; (3) provide broad education both to elites and the general public about the brutal realities of the threats we face and the consequences for ourselves and our children of being unprepared; and (4) be creative about finding ways to link short-term economic and political interests with long-term coping strategies, rather than trying to induce people to make sacrifices now for uncertain future threats. (The water development strategies that were mentioned above provide an example; they could serve to address pressing current and well-known future needs while, at the same time, creating a degree of independence in coping with longer-term climatological disruptions.)

The conventional wisdom has it that uncertainty about the future increases as we look further down the road. But this is not always the case. Like death and taxes, the accumulating evidence about our evolutionary history, from paleo-anthropology to archaeology, ancient history and climatology, indicates that the odds of catastrophic, life-threatening upheavals are very high over the long term, and they could even happen tomorrow. Adaptability has often proved to be a valuable survival strategy in the natural world, but it is also well to remember that 99% of all the species that have ever evolved are now extinct, and there have been several mass extinctions along the way. So the overall odds are not good. On the other hand, we are also the very first species that has evolved the capacity to envision the future and plan ahead. Maybe we can beat the odds.