



SUSTAINABLE COMMUNITIES **FROM VISION TO ACTION**

LAMONT C. HEMPEL

*Upon this gifted age, in its dark hour,
Rains from the sky a meteoric shower
Of facts...they lie unquestioned,
uncombined.*

*Wisdom enough to leech us of our ill
Is daily spun; but there exists no loom
To weave it into fabric...*

—Edna St. Vincent Millay



This booklet is about the role of healthy communities in restoring social and ecological balance in our individual lives and in our collective search for enduring forms of justice, prosperity, security, and environmental quality. It is about a vision of sustainability and its application to community.

Funding is provided by the William and Flora Hewlett Foundation. The opinions expressed are those of the author. This booklet may be reproduced for educational purposes if the author of the work is given credit. No portion may be reproduced for profit.

©1998 Claremont Graduate University

Written and designed by Lamont C. Hempel, Ph.D.

The author gratefully acknowledges the assistance of Marilyn Hempel, Kara Serrano, Jason Venetoulis, Marilee Scaff, Julian Scaff, June Gin, and Sunday Obazuaye. Copies of this publication can be obtained from the School of Politics and Economics, Claremont Graduate University, Claremont, CA 91711-6163. Readers are encouraged to obtain a copy of the companion volume, *Sustainable Communities: Guide for Grassroots Activists*, edited by Marilyn Hempel, Executive Director, Population Coalition, 1476 North Indian Hill Blvd., Claremont, CA 91711.



CONTENTS

- 2 Sustainable Community Concepts and Definitions**
 - Definitions
 - Limitations
- 4 Roots & Wings: Creating a Vision for the 21st Century**
 - Revisioning
 - Community Bequests
- 7 The Sustainability Triangle**
The Sustainability Barometer
- 8 Building Blocks**
 - Community
 - Glocal* Perspectives
 - Deliberative Democracy
 - Carrying Capacity
 - Social and Environmental Justice
 - Regenerative Design
- 20 The Four Greatest Challenges to Sustainability**
 - The Consumption Challenge
 - The Population Challenge
 - The Equity Challenge
 - The Governance Challenge
 - Campaign Finance Reform
 - Tax Shift
 - Regionalism
 - Indicator Development and Reporting
- 27 Ten Key Ingredients for Building Sustainable Communities**
- 28 Sustainability Indicators**
 - Community Profile Information
 - Economic Indicators
 - Environmental Indicators
 - Socio-Cultural Indicators
 - Mixed Indicators
 - Community-Based Survey Indicators
 - Model Indicator Projects
- 34 Ecological Footprint Analysis**
 - Carbon Footprint Worksheet

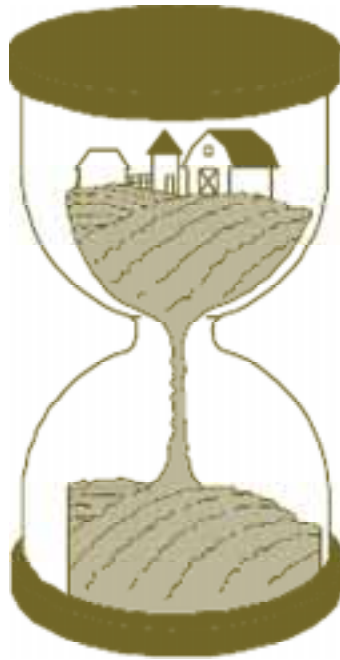


SUSTAINABLE COMMUNITY

Sustain: *to support without collapse; to keep going; to endure without failing; to maintain integrity; to uphold the process of life and death; to preserve meaningful choices.*

Sustainability *is the goal of securing life, liberty, and social well-being within the means of nature. It is about opportunity and the preservation of meaningful choice—preserving for future generations as many or more opportunities as we have.*

Sustainable communities *are, in the words of the President's Council on Sustainable Development: "healthy communities where natural and historic resources are preserved, jobs are available, sprawl is contained, neighborhoods are secure, education is lifelong, transportation and health care are accessible, and all citizens have opportunities to improve the quality of their lives."*



***"Ideas
won't keep.
Something
must
be done
about them."***

— Alfred North Whitehead



Sustainable Communities achieve and retain improvements in quality of life without diminishing the quality of life enjoyed by other communities, now and in the future. The citizens of these communities pursue economic prosperity, social equity, ecological health, and civic engagement for the purpose of securing and enriching both natural landscapes and human mindscapes.

Sustainable Communities have levels of pollution, consumption, and population size that are in keeping with regional carrying capacity; their members share an ethic of responsibility to each other and to future generations; the prices of their goods and services reflect, where practical, the full social and environmental costs of their provision and disposal; equity mitigation measures protect their poorest members from the impacts of full-cost pricing; their systems of governance, education and civic leadership encourage informed democratic deliberation; and their design of markets, transport, land use, and architecture enhances neighborhood livability and preserves ecological integrity.

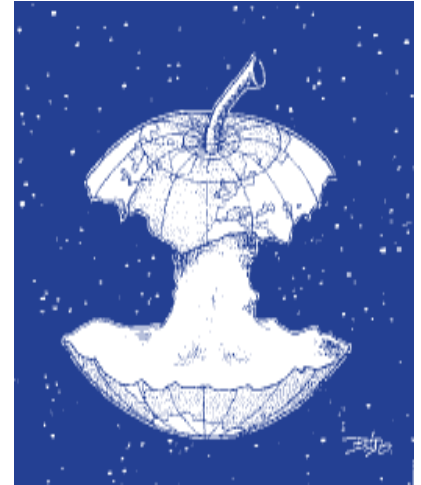
CONCEPTS AND DEFINITIONS

Limitations of the Concept. No matter what object of sustainability is measured, there is a range of time across which sustainability is not achievable. Communities that may be sustainable over the time frames of modern history — i.e., centuries — become faint punctuation marks in the eons of *geological* history. Even a sustainable Earth eventually succumbs to entropy, asteroid collisions, or other astronomical cataclysms. Nothing is permanent in a physical sense, including our solar system. Accordingly, human communities cannot be sustainable in any strict sense of the term.

Practically speaking, of course, the concept of a sustainable community fits well within the time-scale of human endeavors. But questions remain about the concept of sustainability, itself. Like the idea of progress, sustainability begs the questions: Of what? For whom? For how long? To what end? Sustainability, after all, may imply the continuation of institutions and communities that are unjust or incompatible with other important values. No decent person wants to sustain the practice of slavery. Moreover, if the essence of sustainability is merely endurance, the concept becomes intellectually bankrupt and ethically insupportable. “No moral argument can justify the continued existence of existing” (Treanor 1996).

Even ecological sustainability is problematic. For example, sustaining a healthy lake as a stable aquatic ecosystem means reversing the natural process of eutrophication that slowly turns lakes into marshes, and marshes into forests. Clearly, it is the biosphere’s ecological integrity that must be sustained, not necessarily a particular ecosystem or a specific evolutionary stage.

Part of what makes an individual life precious is the knowledge that it is unsustainable. The same is true, ultimately, of the biosphere and its collective forms of life. Science and philosophy both teach that neither living species nor the earth itself are permanent fixtures. From rainbows to breathtaking sunsets, what gives poignancy to beauty is the knowledge that it seldom lasts. What must be sustained is the biogeochemical system that generates such beauty and the human spirit that treasures it. Hence, the object of sustainability is not preservation or endurance so much as it is *wholeness*.



“We shall not cease from exploration. And the end of all our exploring will be to arrive where we started and know the place for the first time.”

—T. S. Eliot



ROOTS & WINGS: CREATING A VISION



“Vision without action is useless. But action without vision does not know where to go or why to go there. Vision is absolutely necessary to guide and motivate action. More than that, vision, when widely shared and firmly kept in sight, brings into being new systems.”

— Meadows, Meadows
and Randers, 1992



A wise parent once advised fellow parents that the most important gift they could provide for their children was a sense of roots and wings: family and community roots to sustain them in times of adversity; wings of self-reliance and curiosity to enlarge their individual capacities for discovery and achievement. The challenge was to find the appropriate balance between the two, recognizing that as wings spread, roots may wither.

Globally speaking, the wings of technology and capital mobility have largely replaced the roots of community and cultural tradition. Even the roots of family have become more tenuous. The resulting imbalances between the forces of change and the empires of continuity have made the world more unstable and, at the same time, more open to new ways of thinking.

We need a society that tends its social and biological roots with just as much care as it lavishes on its technological wings. But what vision would guide such a society? And how would it be introduced in practical terms?

REVISIONING

Conceptions of the future—whether a simple Arcadian age, George Orwell’s 1984, or some Internet-based Utopia—are shaped in large measure by how well we understand the political and economic lessons of the past, by how the technoscientific culture of the present influences our sense of what is possible and desirable, and by our need for a vision or unifying public philosophy, often born from crisis, that is capable of stimulating the human imagination and, perhaps, the will to act.

We have before us the conditions for creating fundamental change in response to problems and crises confronting our communities and our environment. Problems such as poverty, crime, pollution, and urban sprawl will not yield to science, free markets, or good government, alone. There must be some conception of a better life that makes the cost of changing worthwhile.

If serious revisioning is to be undertaken, it will almost certainly have to start with a rekindling of community-based public spirit — what Jane Mansbridge (1994) terms “the political form of altruism.” Given that there is no guiding public philosophy that commands consensus across much of the world today, there is a pressing need for new leaders and institutions that can inspire the trust and sense of civic community required for public spirit to develop. Because so many political systems have been designed around adversarial approaches and institutions,

FOR THE TWENTY-FIRST CENTURY

the development of “cooperationist” institutions has suffered badly, especially in the U.S. (Kelman, 1992).

In order to combat the mulish cynicism that impedes needed reforms in our public policies and institutions, we need a more lucid and focused vision—an orienting vision that sees ecological and community restoration as inseparable goals. Like the concepts of democracy and religious faith, it must be a vision of hope that engages our imagination and ideals, while defying narrow definition. At the same time, it must be sufficiently comprehensible and practical to mobilize grassroots action. Above all, it must be a vision in which the quality of individual human lives, the quality of the biosphere, and the quality of life *in community* are inextricably linked.

For a growing number of people, this vision is expressed in the concept of sustainable communities. Far from a bright new panacea or a clear-cut blueprint for happiness, it is more like an old torn and tattered treasure map, discovered in bits and pieces amidst the rubble of a once-proud castle. Indeed, the concept has been around for a long time, though the term is relatively new.

Like democracy and other transformative ideas, the vision of sustainable communities promises to remake the world through reflection and choice, but its potential to engage people’s hopes, imagination, and sense of responsibility may depend more on what it symbolizes than on any particular meaning or interpretation. As any member of a faith-based community knows, conceptual precision and clarity are not essential for guiding human action. More important than agreement on a specific definition is understanding the broad idea and its implications. The power of the concept is already recognized by many leaders and key institutions. As one writer put it, “In the battle of big public ideas, sustainability has won: the task of the coming years is simply to work out the details, and to narrow the gap between its theory and practice” (Campbell, 1996).

THE BEQUEST OF COMMUNITY

Sustainability is ultimately about values and forms of human organization that cohere ecologically and socially. It does not require persistence of the status quo for its validation; only a continuation of life-enhancing processes that promote harmony and a deep sense of place. By providing the milieu for this sense of place to develop, sustainable communities offer their members a collective means of hope and renewal. Like grandchildren, these communities provide a precious glimpse of social immortality that can soothe the pain of aging. Efforts to build sustainable communities can be thought of as a bequest to



***“Dreams are maps.
The visions we offer
our children shape the
future. It matters what
those visions are. Of-
ten they become self-
fulfilling prophecies.”***

— Carl Sagan





Building communities in which environmental quality, social justice, and economic vitality cohere in a sustained fashion requires a rare combination of long-range foresight and short-term adaptability.



Land of Opportunity

“Try to imagine. America has about 4.6% of the world’s population. Our country uses 39% of all the world’s newsprint, 27% of all its aluminum, 35% of all the world’s computers, 33% of all its plastic, 24% of the world’s copper, 25% of all the world’s energy, 22% of the world’s beef, and 13% of its steel. America has 1/4 of all the world’s roads servicing 1/3 of all the world’s automobiles. Impressive, huh?”

— Paul Robbins, 1997

future generations, but exactly what should be bequeathed remains unclear. It is impossible to know precisely the needs of people 500 years—or perhaps even 5 days—into the future. The social and economic opportunities we bequeath will depend on the future rate of technoscientific advance, the future capacity to manage and govern, and the human spirit and foresight capacity that each generation instills in the next.

Perhaps the only thing that we can know for sure to include in our bequest is the provision of a healthy ecological life-support system. But many signs today suggest that this may be the hardest of all inheritances to secure. The troublesome combination of high fertility, political cynicism, and cultivated consumerism pervading many human societies today threatens to leave us with a world devoid of such treasures as ancient forests, pure water, clean air, and inspiring landscapes. While it is clear that many people will not rue the loss of such natural amenities, a disturbing question remains: Can humanity afford—economically, psychologically, and ethically—to reconstruct the world in ways that systematically destroy the natural heritage on which so much of human well-being, even survival, depends? Presumably, it is not biological survival of the human species that is in danger so much as it is the moral or spiritual survival of what it means to be human and to be part of a complex living community. We cannot count the ways in which human identity, imagination, and esthetic appreciation depend on the richly textured landscape of nonhuman nature. What but unbridled hubris could let us think that what we consider desirable in human nature will survive if we despoil all of nonhuman nature?

Unfortunately for hard-pressed defenders of rainforests, wildlife, open space and clean water, saving the environment may not be possible without first saving the functional integrity of human communities — what political philosophers refer to as the *polis*. We are unlikely to succeed in restoring the natural environment if we lack the knowledge and political will to restore human communities. The wings of human development are only as strong as its roots. We cannot have sustainable development without sustainable communities. And we cannot build sustainable communities without redirecting our attention to the linked problems of civic and environmental decline, and their origins in costly efforts to accommodate overconsumption and overpopulation.



*“We don’t think our way into a new life;
we live our way into a new kind of thinking.”*

— Richard Rohr

Sustainability Triangle

Quality of Individual Human Life

health, freedom, dignity, access to resources, mobility, fulfillment of individual potential

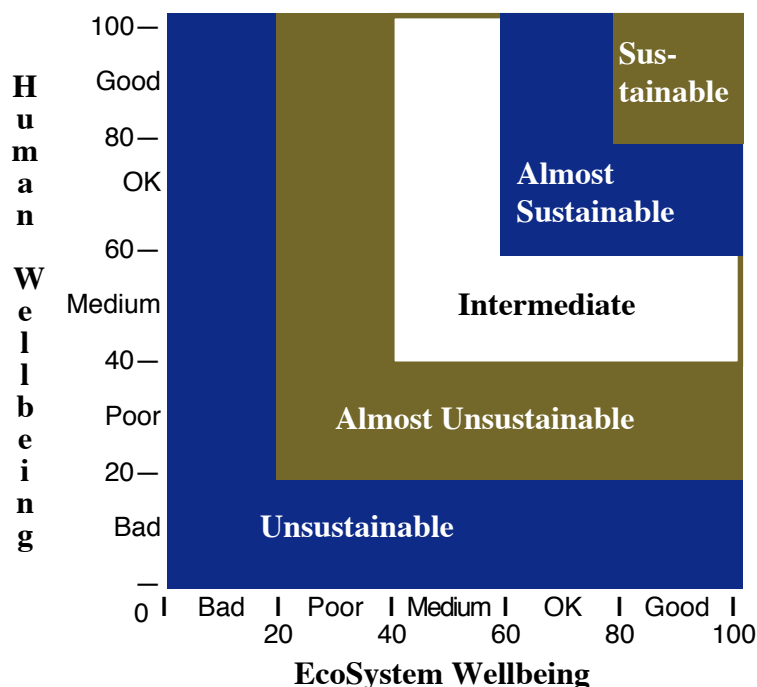
Quality of Community

sense of place, participation in governance, social equity, ethic of responsibility, voluntary associations and community service

Quality of Biosphere

biological diversity, carrying capacity, planetary life support, renewable resource base, aesthetic/spiritual engagement

Sustainability can also be conceptualized as the integration of two dimensions of well-being: the human sphere and the eco-sphere. An excellent example of this approach is Robert Prescott-Allen's **BAROMETER OF SUSTAINABILITY**:



“In the past ten or twenty or thirty years our impact has grown so much that we’re changing even those places we don’t inhabit —changing the way the weather works, changing the plants and animals that live at the poles or deep in the jungle.

...Though the U.S. population increases by only about three million people a year, through births and immigration together, each of those three million new Americans will consume on average forty or fifty times as much as a person born in the Third World.”

— Bill McKibben, 1998

For an Internet Guide to the Barometer of Sustainability, visit <http://www.iucn.org/themes/ssp/barom.htm>
(International Union for the Conservation of Nature)

BUILDING BLOCKS



***Building Blocks:
(Means of Achieving
Sustainability)***

Sense of Community

“Glocal” Thinking

**Deliberative (Small
Group) Democracy**

Carrying Capacity

**Social & Environ-
mental Justice**

**Regenerative Design
(Efficiency +
“Sufficiency”)**



Goals of Community Sustainability

Ecological Integrity

Social Well-Being

Economic Vitality

Building sustainable communities requires careful integration of environmental, social, and economic improvement strategies. These strategies create a sense of place, personal responsibility, and social well-being that together foster lasting improvements in quality of life. At least six critical building blocks are needed in order to attain such quality-of-life—beginning with a concept of community, itself.

COMMUNITY

Communities are interacting populations whose limited size and collective sense of shared responsibility and continuity facilitate the achievement of common goals and lasting relationships. While there is no assurance that these goals and relationships will be sustainable, overall quality of life is likely to rise when people take pride in community. To be sure, the definition of community used here does not extend to today’s megacities, with their tens-of-millions of transient and crowded inhabitants. However, it may apply to certain neighborhoods and groupings of neighborhoods found within such megalopoli. Human scale is very important in this regard. Real, place-based communities provide the only organized level of political interaction in which face-to-face deliberation can flourish. Furthermore, they offer the only form of biological interaction in which ecological literacy — the local knowledge needed for understanding, protecting, and preserving quality of life within a human landscape — can develop and take hold.

The value of close-knit communities in the midst of globalizing markets and giant technological networks is principally that individuals can discover a sense of connection with place in what is otherwise an overwhelmingly transient, complex and fragmented world. The re-

establishment of civic community is one of the most fundamental prerequisites for developing a sustainable society. For billions of uprooted human beings, there appears to be a diminishing sense of political engagement and social belonging outside of the increasingly fragile structure of family life. This is what makes the rediscovery of community ideals socially therapeutic, as well as politically liberating. Ecologically, there is a parallel loss of connection being experienced in much of the world that undermines many traditional values of land stewardship, communal pride of place, and a sense of interconnectedness with nature. It is important to note that while communal organization is still strong in many places, especially in the village cultures of the Third World, it is under assault from the growing forces of geographic mobility, radical individualism, and cultural assimilation or homogenization.



We are a nation of more than 35,000 townships and municipalities linked by advanced transport and communication facilities. Eighty percent of the population reside in one of 320 officially defined metropolitan areas — cities of 50,000 or more.

One cannot emphasize the promise of community without noting the political and environmental risks that it entails. Without global, national, state, and regional coordination, community empowerment may simply lead to greater political fragmentation. It may promote dangerous forms of parochialism and isolationism. In fact, some forms of community life can stunt human development almost as much as the ravages of disease and war. Many small, homogenous communities have been a source of debilitating conformity in times past. Often dominated by a single family or economic interest, some of these communities or “company towns” have allowed their citizens and natural environments to be exploited with a ruthlessness that exceeds, in per capita terms, some of the worst transgressions and costly regulatory omissions of state and national governments.

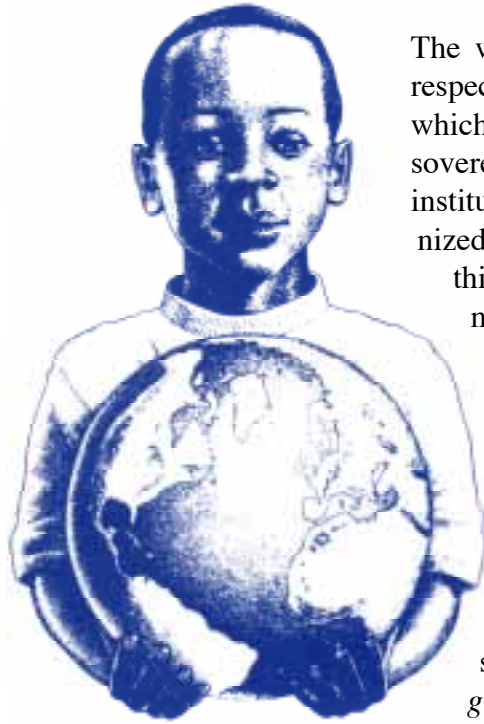
It is only by re-establishing the primacy of community in political life that the social and environmental sensibilities needed to manage the global reach of technology and capital are likely to emerge. The ease with which billions of people can now communicate and trade with one another makes the comprehensible scale and sense of place afforded by local communities indispensable for balancing the freedom of global interaction with the responsibility of civic engagement.

Communities represent the social and physical expression of interdependence. While they can be organized for both good and ill ends, their fundamental purpose is to connect individuals with each other, and collectively with the bioregion that nurtures them and the life around them. When designed to promote cooperation for mutual benefit, communities provide what Robert Putnam (1993) calls “virtuous circles” or self-reinforcing stocks of social capital: “cooperation, trust, reciprocity, civic engagement, and collective well-being.” By harnessing collective will and effort, communities do for people what ecosystems do for the rest of nature—provide a measure of stability, resilience, and positive synergy in the otherwise lonely and chaotic lives of individuals.

These urban areas represent a fundamental shift in US settlement patterns from those of a century ago, when a full three-quarters of the population lived in rural areas or communities of less than 50,000 people.

Within the next 20-25 years, the world is likely to have 500 cities with populations exceeding 1 million and at least 30 cities with populations in excess of 8 million. Progress toward sustainability in such settings will depend largely on what happens at the neighborhood and suburban level—and on improvements in regional capacity for coordinating their activities.





Securing democracy and sustainability requires knowledge-intensive systems that are attuned to global and regional economic restructuring forces, as well as to community and neighborhood-level demands for greater self-determination. By emphasizing sustainability as both a local and a global goal, we help draw attention to the web of interdependency that links individual communities within their regions and across the world.

The world is becoming indivisible as an economy and, in some respects, as a polity. It is increasingly a transboundary realm—one in which peace and prosperity can no longer be secured by territorial sovereignty. Despite this growing realization, however, our economic institutions, policies, and systems of governance continue to be organized and directed to a large extent by nation-states. The problem with this national orientation is that many of the most critical environmental and economic challenges of today are occurring at the community level or at the regional and supranational levels. From greenhouse warming and world trade to neighborhood revitalization and job creation, nationally-centered systems of governance appear increasingly inadequate to perform the essential tasks of keeping us secure, promoting our democratic spirit, and anchoring our collective identities. In order to cope successfully with the slow-motion crises of the biosphere and with tightly coupled local and global economic systems, our political institutions may have to become more *glocal* in design and operation. This is already happening in a few areas. Global changes in ecology and trade are beginning to foster a devolution of power and authority away from the nation-state and toward greater reliance on supranational, regional, and local levels of governance.

This should not imply that national governments are being recklessly weakened but merely that both global and local ends of the political spectrum are, in very limited ways, being strengthened. Future empowerment of local communities and supranational entities will only be achieved by cautiously redistributing some of the authority presently reserved by sovereign nations both up and down the lines of governance, from neighborhood councils to experiments in planetary management.

Glocal thinking about sustainability begins at the community and bioregional level—the level where complex living systems are most interdependent and vulnerable. Local watersheds, ecosystems, and microclimatic conditions are among the primary components of a bioregion, and their alteration by human activities is much easier to understand from the vantage point of local communities than from the macro perspective of global ecology.

The endpoint of glocal thinking, by contrast, is all about global interdependence. The critical recognition is that sustainability cannot be obtained in isolation. Communities that practice "beggar-thy-neighbor" policies in the pursuit of sustainability clearly misconstrue the concept. Just as the rich cannot continue to prosper indefinitely without the progress of the poor; the health of one community cannot be assured without improving the health of others.

The single strongest argument for glocalism is the need to connect local decisionmaking processes that are conducive to deliberative forms of democracy with environmental, economic, and human rights strategies that must sometimes be global, or at least regional in scope, to be truly effective. For example, if it is true that global warming will eventually require supranational policy responses, the off-setting empowerment of local communities may provide needed checks and balances to reassure citizens interested in democracy that comprehensive efforts to become more sustainable on the climate front need not imply authoritarian forms of global government. Communities that foster face-to-face interaction, informed by a sense of place and bioregional knowledge, are essential ingredients in the formation of a sustainability ethic that can simultaneously guide policy making at the local, regional, and global levels.

DELIBERATIVE DEMOCRACY

Democratic reforms are successfully sweeping much of the world, and it is difficult to imagine a reversal of this trend that would persist in the absence of widespread anarchy or public mind control. Less encouraging, however, is the fact that much of what passes for democracy has been achieved with little or no meaningful deliberation on the part of most citizens. Without greater public deliberation, democratic norms may erode into empty slogans of majority rule, aided by potentially dangerous technologies for eliciting instant opinions from an uninformed citizenry.

The problem has been that as population, territorial size, and managerial scale of democratic states has increased, the opportunities for thoughtful, face-to-face deliberation have declined. The ancient Athenian ideal of participatory democracy was long ago replaced by a complex system of representative democracy. While the evolving nature of mass representation can be described as an inevitable consequence of growth, dictated by large-scale collective security and economic development interests, the resulting diminishment of democracy is troubling. If the United States at its founding had Congressional districts the size they are today (about 600,000 people) the first Congress would have had only 5 members. While our current system may be able to accommodate continued growth for many years to come, the legitimacy of such “procedural democracies” is beginning to be questioned.

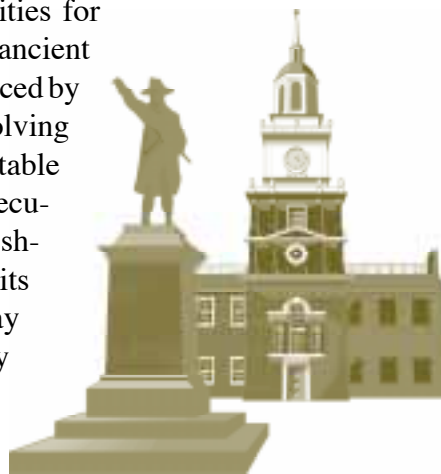
Deliberative democracy may be the only sustainable form of popular government. It insures that citizens are directly engaged in the challenging tasks of self rule through their participation in educative public discussions about policy issues and processes. The essential feature is

"Glocal" Thinking

- *Neighborhood as basic unit of planning*
- *Community as a gathering of neighborhoods*
- *Metropolitan region as the nexus of local governance*
- *Bioregion/watershed as the ecological reference system*
- *Global coordination and limited authority in areas such as trade, environment, and human rights.*

“What holds people together long enough to discover their power as citizens is their common inhabiting of a single place.”

— Daniel Kemmis



According to a 1996 survey jointly conducted by Harvard University, the Washington Post, and the Kaiser Family Foundation, two-thirds of American respondents felt that most people cannot be trusted, nearly twice the level measured in the 1960s. A similar poll conducted by Newsweek in 1995 revealed that 86 percent of those surveyed said that their trust of other people had declined during the last decade. In seeming contradiction to this finding — but perhaps fully consistent with it — a 1996 Time/CNN poll found that 77 percent of respondents said they wanted more contact with people in their community.



***Carrying Capacity:* The size of a population at a given consumption level that can be supported indefinitely within the means of nature.**

open engagement in a contest of ideas in order to make informed choices about policy or about representatives who are delegated to make policy. All true democracies are deliberative to some extent, but as the ideal of popular deliberation has given way to the pragmatic realities of deliberation by remote representatives, mediated by television, our reliance on community for political engagement has weakened.

Deliberation is best accomplished in small group settings that can be used to sample the views of ordinary citizens as they become informed about a particular policy issue. James Fishkin, a University of Texas political scientist, has pioneered a new form of public opinion polling that, in his words, “attempts to model what the public would think, if it had a better opportunity to consider the question.” Unlike the “snapshot” provided by electronic referenda or conventional public opinion polls, deliberative polls require a random sample of citizens to be scientifically surveyed both before and after they have participated in an intensive group study and assessment of a specific policy issue. Following completion of a baseline survey, using a representative sample of the citizenry, the respondents are invited to participate in a deliberative forum with a subsample of other respondents. The participants engage in a hands-on process of small group discussions, briefings, and opportunities to cross-examine experts and politicians. They are then polled again to determine if, how, and why their opinions may have shifted. The results are then communicated to the general public, ideally in the form of a televised summary of the deliberations. The basic idea is disarmingly simple: deliberate before rendering an opinion. The goal is to replace the sound-bite approach of today’s pollsters with a more thoughtful one that overcomes some of the rational ignorance and apathy that cloud modern democratic decision making.

Restoring the role of community as a forum for political deliberation by no means assures that progress toward sustainability will follow. It can, however, provide legitimacy for movements in that direction, recognizing that the politics of place — the conduct of public life in spatially defined communities — is a powerful, albeit neglected, element in the democratic pursuit of sustainability.

CARRYING CAPACITY

Spatially defined communities exist within bioregions that have limited capacities to support growth in population, consumption and waste. Because of human ingenuity and long-distance transportation technologies, many communities overcome local limitations by importing food, water, non-fuel minerals, and other resources or ecological services from far away. It is important to recognize that such efforts to redistribute carrying capacity often intensify the total human impact on the planet. Understanding this and other relationships between

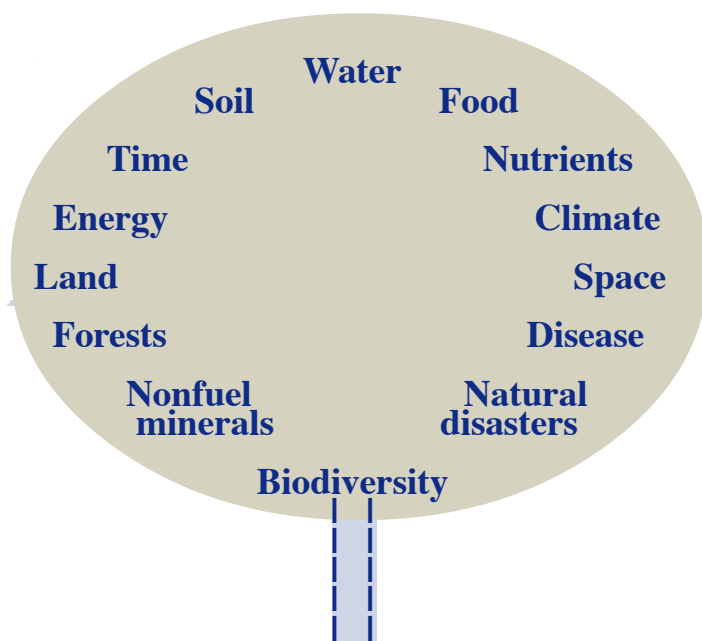
human and non-human nature is the central goal of ecological literacy programs.

Four key factors determine the regional carrying capacity for a population of human beings: (1) nature's capacity to **assimilate** or absorb our wastes and pollution impacts, (2) nature's capacity to **regenerate** that which we consume or destroy; (3) **technology**'s capacity to repair or replace (substitute for) vital resources and ecological services; and (4) the economy's capacity, through **trade**, to import carrying capacity from distant parts of the planet.

Regional carrying capacity varies widely over both time and space. Although elastic, carrying capacity is characterized at any particular moment by threshold effects that strictly limit the material inputs and outputs of communities. For example, a large estuary can serve as an effective sewage treatment plant as long as the human population nearby is relatively small. If the population grows too much, the assimilative capacity of the estuary will be overwhelmed. Likewise, trees can be selectively harvested at sustainable rates without endangering the long-term viability of forests. If cutting is reckless or excessive, however, disease, top soil erosion, and other unintended consequences may overwhelm the regenerative capacity of the forest system, leading to ruin.



FACTORS AFFECTING REGIONAL CARRYING CAPACITY



**TRADE
TECHNOLOGY
ASSIMILATIVE CAPACITY
REGENERATIVE CAPACITY**

Rules-of-Thumb for Achieving Strict Sustainability

INPUT RULE

Renewable resources: Harvest rates of resources must be within the regenerative capacity of the natural systems that produce them.

Nonrenewable resources: Rates of depletion must not exceed the rate at which ecologically sound, long-term resource substitutes are developed.

OUTPUT RULE

Waste and pollution must not exceed the assimilative capacity of the bioregion and must not degrade future absorptive capacity or any other vital ecological service.

— adapted from Sarageldin, 1993

Foregone Futures

Our society continues to invest its best minds in the pursuit of quarterly profits, legal sufficiency, military supremacy, and technological innovations that cater to instant gratification. The priorities that guide our decisions are premised on an unsustainable vision of economic growth that fails to distinguish adequately between satisfying preferences and producing satisfaction. What makes the vision unsustainable is the presence of ecological limits; what perpetuates it for the time being is excessive faith in technology and the fact that ecological limits will impinge on future generations much more than they do on the present, thus shifting the burden of adjustment and deprivation to those who are now politically powerless.

“In our every deliberation we must consider the impact of our decisions on the next seven generations.”

— translated from the Great Law of the Iroquois Confederation



SOCIAL & ENVIRONMENTAL JUSTICE

Without a commitment to the goals of equality and justice, no vision of sustainable communities can claim enough legitimacy to secure adequate support from the diverse peoples that make up our country. Even more problematic, however, is the required commitment to future generations of Americans and to people from other countries. The needs of the here-and-now usually take precedence over the needs of the "there-and-future."

In a sustainable community, justice and equality extend to “potential” human beings yet to be born. These ethical principles also apply to members of other communities—both domestic and foreign, human and nonhuman—who are victims or beneficiaries of the regional carrying capacity that we import and export in the pursuit of economic growth.

Many people argue that the goals of justice and equality require that a community continually grow in size and in wealth, thus affording a larger economic “pie” to be shared by the members. Presumably, their definition of a sustainable community would be one that preserves its quality of life by continually substituting imported resources and technological know-how for ecological goods and services that have to be sacrificed during the process of growth. While they are correct that technology and world trade can add elasticity to regional carrying capacity—making the assimilative and regenerative properties of nature expandable within limits—they tend to ignore the enormous difficulty of substituting human-made capital for natural capital in a way that is *globally* sustainable.

The problem, in part, is that economic trade and technology have unintended consequences that frequently cause a net reduction in available carrying capacity. In addition, many of the environmental resources and services we take for granted, such as the radiation filtering services provided by the ozone layer, may be impossible to replace artificially. The same may be true of topsoil, which we are losing at a rate 20-30 times faster than new soil is being formed, and other species, which are being extinguished at a rate nearly 1 million times faster than they are being replaced by evolution.

The ethical dilemma suggested by our unsustainable behavior is how to balance the “rights” and interests of future generations against those of today’s deserving poor. There are no easy answers. We share one earth but not one world. In fact, it would be more accurate to say that what we share is the life support system that makes possible our efforts to redistribute common wealth. But as Douglas Lummis notes, “Common wealth is not something achieved by economic development but by the political ordering of a community.... The *problem* of

the problem of inequality lies not in poverty, but in excess.”

From a sustainable community perspective, the leading threat to future (and perhaps present) quality of life is "Affluenza"—the addiction to work-and-spend consumerism. Yes, poverty is a critical problem menacing tens-of-thousands of communities, but consumption-driven economic growth is not the answer. If we truly want to deal effectively with questions of social and environmental justice, we will have to confront poverty, racial discrimination and sex discrimination through bottom-up politics, instead of trickle-down economics. We will also have to confront violence in our communities, including the cultural acceptance of violence in sports and entertainment, and the easy availability of deadly weapons. Finally, we will have to discover a sustainable notion of wealth — such as Helen and Scott Nearing’s “the fewness of wants” — and promote that kind of wealth across space and time, perhaps extending to the seventh generation, as proclaimed by the elders of the Iroquois Confederation.



REGENERATIVE DESIGN

According to John Lyle (1994), author of a major book on regenerative design, “A regenerative system provides for continuous replacement, through its own functional processes, of the energy and materials used in its operation.” The term “regenerative” refers to the capacity for renewal. Regenerative design means nature-compatible design—the integrative planning of our food, water, energy, shelter, and waste processing systems in such a way as to minimize interference with renewal of the landscape in which they are embedded.

Sustainable communities encourage regenerative design practices through decisions about the quantity, direction, timing, and mitigation requirements of development. Architects have been increasingly vocal about incorporating sustainability ideas into their designs. They argue that a community should coexist with nature in a “healthy, supportive, diverse and sustainable condition” (McDonough 1992) and that it should have a well-defined edge, as well as a location, size, and character that permit the close integration of housing, jobs, attractive

“We should strive for sufficient per capita wealth, efficiently maintained and allocated, and equitably distributed, for the maximum number of people that can be sustained over time.”

—Herman Daly

REGENERATIVE DESIGN involves a shift from linear to cyclical flows of energy and material throughput. The object is to model human development on the operation of natural systems, combining the goals of efficiency and “sufficiency” in one environmentally-friendly package.

The winning combination:

Efficiency + Sufficiency



DESIGN GOALS

Pedestrian-friendly

Reduced traffic congestion

Curbing of sprawl

Mixed-use development

**Densification without
crowding**

"For half a century America has had one dominant vision of how its metropolitan areas ought to grow and develop. It is best described as unlimited low-density sprawl. This vision encompasses personal and social goods—a home in the suburbs, a car, good schools, responsive local government—that most Americans cherish. Most metropolitan areas have successfully realized the vision. Yet this achievement has contributed to unexpected growth-related dilemmas that threaten the long-run viability of American society, something the American public and most leaders have yet to realize."

— Anthony Downs, 1994



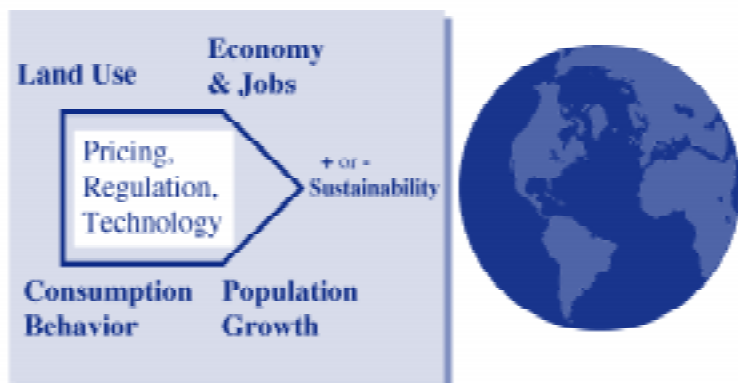
open space, cultural and recreational amenities, and facilities essential to the daily needs of citizens (Calthorpe et al. 1991).

The obvious difficulty with many regenerative design approaches is that so much of the landscape is already “built out” or settled in ways that appear irreversible and that reflect unsustainable choices made in the past. The freedom to select a different course of development or alternative lifestyle is often constrained by the path-dependent outcomes of what has come before — that is to say early design choices have entrained subsequent development and have made it difficult to embark in a new direction.

In view of the momentum of past development mistakes, many urban designers point to the importance of infrastructure decisions—especially the allocation of sewer, water, and roads — as fundamental to the success of both new development and redevelopment of existing areas. For many, the design of transportation systems is of paramount importance. David Engwicht (1993), for example, argues that we can sustainably “reclaim” our cities and towns by redesigning transportation on the basis of exchange instead of movement; and place instead of destination. The principal challenge becomes one of reducing dependence on private automobiles. To that end, design for sustainability usually favors increased density and greater reliance on mixed land uses, both of which encourage walking and greater reliance on public transit. Sustainable communities will tend to be compact communities, partly to encourage the unfettered process of ecological renewal in the local landscape and partly to encourage human interactions that promote diversity, a good jobs-housing balance, and participatory democracy.

Design that promotes sustainability strives to balance affordable housing needs with those of effective growth containment. By encouraging infill-development with mixed uses and pedestrian-oriented “reurbanization,” it is possible to direct growth to where it will have the least deleterious impacts and, at the same time, help to energize neighborhoods and communities.

Key Sustainability Factors

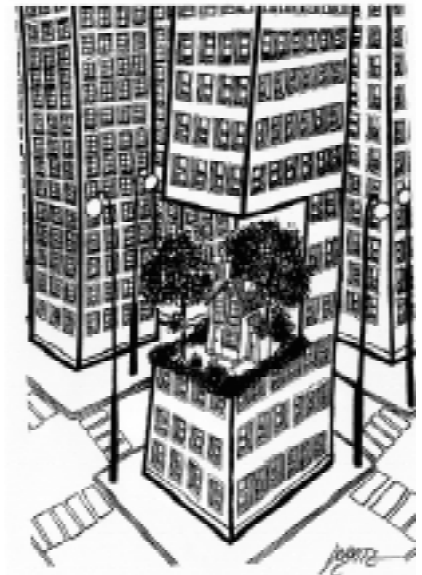


URBAN ARCHITECTURE WITH AN ATTITUDE

"Americans sense that something is wrong with the places where we live and work and go about our daily business. We hear this unhappiness expressed in phrases like "no sense of place" and "the loss of community." We drive up and down the gruesome, tragic suburban boulevards of commerce, and we're overwhelmed at the fantastic, awesome, stupefying ugliness of absolutely everything in sight — the fry pits, the big-box stores, the office units, the lube joints, the carpet warehouses, the parking lagoons, the jive plastic townhouse clusters, the uproar of signs, the highway itself clogged with cars — as though the whole thing had been designed by some diabolical force bent on making human beings miserable."

"I believe that we have entered a kind of slow-motion cultural meltdown, owing largely to our living habits, though many ordinary Americans wouldn't agree. They may or may not be doing all right in the changing economy, but they have personal and psychological investments in going about business as usual. Many Americans have chosen to live in suburbia out of historic antipathy for life in the city and particularly a fear of the underclass that has come to dwell there. They would sooner move to the dark side of the moon than consider city life."

—James Howard Kuntsler, 1996



The Ultimate Design Challenge

"In the coming interval of a few decades, human society will need to house, nurture, educate, and employ as many more people as already live on earth."

—Jesse Ausubel

Nearly two-thirds of our urban population live in suburbs. About 4 million live in gated communities designed for protection from crime and various impositions of urban life. Although most signs point to more "urban forts" and suburban sprawl in our future, these trends are not destiny. Sustainability-minded communities are unlikely to emerge as "no-growth" enclaves, where wealth and isolation determine quality of life. Successful communities will recognize that present settlement patterns are not only unsustainable but socially debilitating. The political question they must face is not how to keep "dollars in and people out" but how much growth to accommodate for the sake of humanity and how much humanity to accommodate for the sake of growth. The ideology of growth says accommodate! accommodate! The ethic of sustainability requires a much more measured response.

Infrastructure Report Card

A crumbling infrastructure cannot support a sustainable society. According to the American Society of Civil Engineers (ASCE), more than \$1 trillion of investment is needed for repairs and improvements nationwide to protect our health, safety, and environment. Panels of engineering experts graded the overall condition of the nation's infrastructure in 1998, rating community drinking water facilities and dams a "D," wastewater treatment a "D+," public school buildings an "F," mass transit a "C," roads and hazardous waste facilities a "D-," and airports, solid waste, and bridges a "C-." The engineers noted no overall improvement in the past ten years and warned that the condition of many facilities was getting worse.

— Report Card for America's Infrastructure (ASCE, 1998)

WHAT ON EARTH CAN I DO?

Personal Action Guide for Sustainable Living

The “Big Five”

- Consider having fewer children, or none. There is probably no single greater impact you can have on the biosphere than choosing to limit the number of children you bring into the world.
- Reduce your carbon footprint by conserving energy through efficiency improvements and promoting greater use of renewable energy sources.
- Choose a sustainable diet: eat less meat (reduce the heavy impacts of livestock on land, water, and greenhouse gas emissions) and promote sustainable agriculture.
- Conserve freshwater and promote efforts to keep it clean and publically available.
- Educate yourself about ways to preserve wild places and the diverse creatures that share our world.

In Community

- Get to know the place where you live as a *bioregion*, rather than as just a settlement or political jurisdiction. For example, where does your water originate? What are your local food sources? How has the landscape changed over time?
- Meet your native plants and animals—appreciate the roles they play in your health and welfare.
- Support policies that curb unnecessary road-building, urban sprawl, loss of open space and destruction of native habitat.
- With your income, instead of buying more, bigger or fancier things, reward yourself with less stuff and a simpler life that allows more freedom, and more time for family, friends and building community.

In the Home

- In summer, close curtains to keep sun/heat out. Rely on fans more than air conditioning.
- In winter, open curtains during the day to let sun in. Put on a sweater instead of turning up the heat; use an extra blanket on the bed.
- Heat, cool & light only those rooms in use.
- Use energy efficient lighting, such as compact fluorescent bulbs. They initially cost more, but last many times longer.
- Save water—turn it off! Repair dripping faucets; install low-flow devices on taps, showers and toilets.
- Recycle. More importantly, buy recycled (“close the loop”).
- Use alternatives to toxic cleaners, such as vinegar and baking soda.
- Avoid processed foods; eat in a way that benefits your health.
- Eat lower on the food chain—especially eat less far-traveled beef and seafood.
- Check into household solar, utility-based wind, and other renewable energy systems.
- Extra insulation saves money.

When Shopping

- Ask yourself, “*Do I really want to keep this forever?*” Every purchase planned, needed and cared for.
- Take your own shopping bag.
- Avoid products designed to be used once and thrown away.
- Avoid excessively packaged products.
- Demand recycled-content products, such as recycled paper products.
- Support local farmers. Buy locally grown and organically grown produce.

Transport

- Support public transportation initiatives and funding.
- Reduce individual use of your car—walk, bicycle, use public transport, carpool.

- Live near your work and/or activities.
- Buy a car with low fuel consumption. Rent on those rare occasions when you need something bigger or more powerful.
- Recycle your engine oil. Never pour it down the drain or on the ground.

In the Garden

- Plant trees, particularly native trees.
- Grow (preferably native) plants that are appropriate for your place and climate.
- Grow some of your own fruit, herbs and vegetables. Green is the basis of life.
- Start a compost pile and/or a worm bin. Compost is great fertilizer and mulch.
- Mulch to reduce water needs; install an irrigation system that puts water where needed.
- Avoid chemicals, herbicides and insecticides. Use natural nontoxic alternatives. Host helpful insects.

At Work

- Start an office conservation committee; practice energy efficiency, recycling and buying recycled.
- Work toward a paperless office: use email.
- Encourage your employer to carry out an energy audit, and implement the recommendations.
- Ensure your office air-conditioning and heating are set at realistic comfort levels.
- Install timers to turn off lights and heat (or air) after a certain time at night.
- Consider whether a business trip involving distance travel is really necessary, or if the business can be conducted by electronic means.

Population

- Every child planned, wanted and loved.
- If you want a large family, adopt.
- Don't put pressure on your children to have grandchildren for you.
- Love other people's children; become a mentor, tutor or coach.
- Promote population and environmental education in your schools. Encourage schools to invite speakers and show films on sustainability issues.
- Support family planning: urge your legislators to fund family planning programs in your community and abroad.
- Elect officials who support family planning, environmental protection and conservation.
- Talk about population and sustainability issues—engage in social discourse that explores complex issues, avoids stereotyping and extremism, and searches for solutions.

Principles for Action

- The planet Earth does not grow.
- Without population stabilization, there can be no sustainable future. Human population and lifestyle consumption must not exceed nature's carrying capacity.
- Recognize the moral and civil obligation to care for other people and other forms of life.
- Humankind must maintain ecological processes that keep the planet fit for life; protect and encourage biodiversity; and not use resources beyond sustainable rates.
- Halt dependence on oil and coal, transition off of gas, and switch to renewable energy sources.
- Cultivate a culture of *sufficiency* to accompany an economy based on efficiency.
- Economic growth cannot be the only aim of development. Economic incentives should be provided for sustainable behaviors.
- Citizens should be truthfully informed, and then empowered, so they can make decisions for genuine progress.
- Secure as many opportunities for future generations as we have.

by Monty and Marilyn Hempel

THE FOUR GREATEST CHALLENGES TO SUSTAINABILITY



ANNUAL U.S. CONSUMPTION (per person)

ENERGY

60 barrels of oil equivalent

WATER

552,000 gallons
(over 1,500 gallons/day)

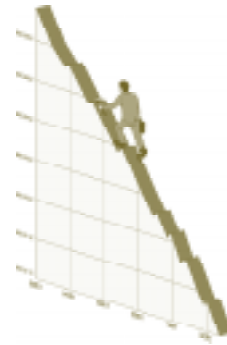
SOLID WASTE

2,500 lbs.

LAND CONSUMPTION

Between 1970 and 1990, the population of the city of Los Angeles increased by 45%, while its *land consumption* for development and housing increased by nearly 300%. In Chicago, the residential population grew by only 4% during this same period, but land consumption grew more than 10 times faster (46%). Similarly, Kansas City's population grew by less than 30% between 1960 and 1990, yet its land consumption increased by 110%.

The Consumption Challenge
The Population Challenge
The Equity Challenge
The Governance Challenge



THE CONSUMPTION CHALLENGE

US communities account for nearly a quarter of the world's current fossil fuel consumption and a third of the world's paper and paper-board consumption. A child born today in the US, over the course of an average lifetime, consumes more than 1.5 million pounds of minerals, 4,000 barrels of oil, 54,000 pounds of plant matter, and 64,000 pounds of animal products, while at the same time generating over 3 million pounds of atmospheric wastes, 23 million pounds of liquid wastes, and 3 million pounds of solid wastes (Charles Hall et al., 1994).

This combination of direct personal consumption and indirect agricultural and industrial consumption entails enormous environmental costs, both direct and indirect, in the form of air and water pollution, fossil fuel depletion, and other impacts related to resource extraction, processing, and transportation. Modern agriculture consumes huge amounts of environmentally costly water, fertilizer, and pesticides, while displacing millions of rural farmers in developing countries, many of whom turn to ecologically sensitive forests and frontier areas in search of marginally productive land.

Although some scientists have argued that the world's soil could support 15 billion vegetarians, they would presumably have to be vegetarians who refused to own cars, spacious houses, or televisions displaying advertising that effectively encouraged growth of material consumption.

Much of our overconsumption is either cultivated or legislated. For example, mass advertising creates inordinate desires for what are called "status goods" or "positional goods." Some government policies produce a similar effect. Building a house requires compliance with planning and zoning regulations, building codes, and local health and safety laws that virtually preclude simple structures that rely on a bare minimum of scarce resources to provide shelter. While these otherwise laudable and necessary regulations help to maximize safety, size, and comfort in one's home, they create zones of ecological

sacrifice elsewhere in order to provide the requisite timber, plastics, metals, and waste depositories. Reinforcing the entire process is a barrage of beguiling images of fame and fortune in our movies, television shows, and magazines that are intended to cultivate additional wants and then to transform them into felt needs. In much of the world, quality is still confused with quantity. More is seen as better, and even lifestyles of instant gratification seem to require too much waiting.

THE POPULATION CHALLENGE

Perhaps the single greatest challenge in building sustainable communities will be to stabilize human population. Today's 5.9 billion human beings represent a one-thousand-fold increase over the estimated population of 100 centuries ago. Nearly 3 billion of these people have been added in just the last 40 years, largely as a result of declining mortality rates. Although birth rates are dropping, the world will add another billion people during the next 12 years—about 3 persons per second. Consider that this century began with only 1.6 billion people. Looking at the United States, some demographers believe that we may grow from 270 million today to as much as 700-800 million by the end of the next century, although many believe that a population of less than 500 million is more probable.

It is remarkable that our species, which appeared only within the last one-thousandth of our planet's history, is growing so rapidly that it threatens literally millions of other species with extinction. Clearly, it also threatens our own future, at least in terms of quality of life, the potential for self-governance, and the promise of community.

The idea of sustainable communities reminds us that it is not only the *biological* carrying capacity that is in danger of being exhausted by human population pressure but the *social* and *political* "carrying capacity," as well. Projecting present trends into the future leaves little room for optimism. Long before we run out of resources and vital ecological services, quality of life thresholds may be breached and incentives for mass migration may transform the remaining biological, social, and cultural diversity of the earth into one giant homogenous expanse of human artifact. The prospects for widespread democratic reform in such a world are very poor. The concept of community becomes chimerical.

We must be careful not to permit nationalism, racism, and economic protectionism to find expression in the solutions to overpopulation. Population agendas that allow this expression are far more likely to foster polarization than stabilization. Responding to the problem of population growth will require cultural sensitivity and a clear recognition that current patterns of unsustainability are affected by per capita consumption rates as much or more than by total fertility rates.

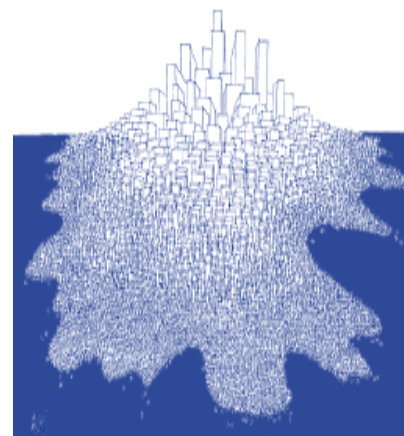


US Population

1950: 152 million

1998: 270 million

2025: 335 million (est.)



“More people will live in cities by 2025 than occupied the whole planet 10 years ago.”

—World Resources Institute



"Unlike plagues of the dark ages or contemporary diseases we do not yet understand, the modern plague of overpopulation is soluble by means we have discovered and with resources we possess. What is lacking is not sufficient knowledge of the solution but universal consciousness of the gravity of the problem and education of the billions who are its victims."

—Martin Luther King, Jr.

"When inequality becomes too great, the idea of community becomes impossible."

—Raymond Aron

Ten Reasons for Stabilizing Human Population

1. Reduce scale and rate of environmental destruction
2. Reduce consumption of nonrenewable resources and unsustainable yields of renewable resources
3. Reduce pressure on community (congestion, sprawl, pollution, public health threats, poverty, and violence)
4. Preserve greenspace, wildlife habitat, and rural life styles
5. Preserve opportunities for participatory and deliberative democracy
6. Reduce bureaucracy, social regulation, and litigation
7. Reduce growth-induced taxes, debt, and infrastructure costs
8. Reduce competition for space, jobs, and social services
9. Promote maintenance of existing infrastructure over expansion and new construction
10. Enhance quality of life for future generations

THE EQUITY CHALLENGE

The basic fairness of any society can be seen in its practices and policies to limit inequality. Unfortunately, our society is not functioning well in this respect.

Over the past 25 years, the real incomes of the richest fifth of American families with children under the age of 18 increased by about 30 percent, while those in the poorest fifth declined by approximately 20 percent. Between the late 1970s and the mid-1990s, the before-tax income gap between the highest 20 percent and the middle 20 percent of families also increased, so much so that 40 states had higher income gaps by 1995 than any state had in the late 1970s (Center on Budget and Policy Priorities 1997).

The growing gap in income and in wealth between the rich and poor is resulting in perverse incentives to close the gap at the expense of the environment. Developing farmland to provide affordable housing is a familiar example. Even if the standard of living for the poorest of the poor begins to improve, their experience of relative deprivation (falling further behind even as their incomes grow) may intensify pressures for unsustainable development.

The problem is compounded in developing countries. Residents of many Third World communities, their appetites for status goods and

services whetted by the spread of global communications technology and mass media advertising, aspire to consume at western levels that are almost universally regarded by today's youth as indicators of personal importance and success. The great wealth of the industrialized countries, and the fact that so much of it was purchased at the expense of nature, is seized on by developing countries to justify the rapid exploitation of their own natural resources, and to excuse as temporary the inclination to ignore the environmental costs of conventional development. The self-destructive psychology of the situation is evident in the words of an African observer attending the 1992 Earth Summit: "We'll never catch up to America if we seriously worry about trees and elephants and greenhouse gases."

Unfortunately, "catching up to America" could become the ultimate roadblock for achieving the goals of sustainable community. In a world where 60 percent of humanity holds only 6 percent of the wealth, finding ways to limit inequality has to become part of our sustainability vision.

Confronting poverty, racial discrimination and sex discrimination are a big part of what is needed to combat problems of equity. Another part involves the equity implications of relying on market-based solutions to solve social and environmental problems. Because most sustainability strategies call for internalizing social costs (for example, paying for some of the hidden costs of driving — air pollution and climate change — by doubling the tax on gasoline), it will be important to devise equity mitigation measures to accompany such pricing strategies. The idea is to protect those at the bottom of the income distribution, for whom such increases represent a far greater burden in terms of ability to pay.

Imagine what might happen if our society devoted even five percent of its public administrators and social scientists to the cause of devising innovative strategies for equity mitigation. Perhaps we would all have to stop hiding behind the expression, "What about the poor?" every time we selfishly oppose some proposal to internalize the costs of unsustainability in the price of oil, water, land, or any of the priceless ecological services we take for granted.

THE GOVERNANCE CHALLENGE

Governance is the deliberative mechanism or process we use to make authoritative political choices about our future. It involves far more than government, especially in democratic societies. The challenge, simply stated, is whether community-based democratic governance can thrive in a world of fast-moving science, unforgiving technology, and global economic integration. Those who think communities can become sustainable through skillful design, volunteerism, and the "greening of consciousness," and then somehow operate politically



Our goal should not be perfect equality, but limited inequality. Where large gaps in income, wealth, technology, or coercive power permit one community to impose its will on another, the struggle for sustainability is lost. Acknowledging our interdependence is the first step in becoming more sustainable.



“We shouldn’t discount the possibility of inventions in governance and in the structure of markets themselves. After all, the United States is such an invention.”

— Peter Ordeshook, 1992



on automatic pilot, commit a grave error. Good governance is a precondition for building sustainable communities; not a result.

There are many imposing hurdles facing those who seek to create a more just, efficient, and community-based system of governance. Surmounting the enormous obstacles to reform will require that we pay less attention to the diversionary “joysticks” of incremental policy manipulation and firmly grasp the fundamental “levers” of social and political change. Among the most important of these levers are campaign finance reform, tax policy, regionalism, and the design and public reporting of new economic and sustainability indicators.

1. CAMPAIGN FINANCE REFORM

No matter how innovative and politically engaged the citizens of a particular community may be, their capacity to govern is nested within a much larger federal system of representative government. The widely perceived erosion of legitimacy now taking place in that system may, if unchecked, act like a paralytic poison within the body politic. Continued progress toward sustainability depends on campaign reforms that will renew democracy and permit genuine competition of ideas and viewpoints in public deliberation.

The difficulty of adopting and enforcing meaningful reforms in campaign finance are well known to any astute political observer. Legal influence-peddling has rapidly expanded under the pressures that candidates face in financing expensive television ads. In the 1996 election, candidates for President and for Congress collectively spent an estimated \$1.6 billion on their campaigns. The cost of a successful campaign in the Senate averaged more than \$4 million per seat. Because of the infusion of “soft money” raised by political parties and the use of campaign ads cleverly disguised as independent “issue advocacy,” these amounts understate the actual funding and influence in campaign politics today.

By ruling that campaign spending is a form of free speech, the Supreme Court (*Buckley v. Valeo*, 1976) sharply limited the remedies available for reducing the influence of money in politics. Despite this constraint, however, important options remain for giving free television time to viable candidates, restricting soft money contributions, ending the practice of “stealth” campaign advertising through issue advocacy, and greatly expanding the provisions for public financing of elections.

Without comprehensive campaign reform, it is hard to imagine in a federal system how the deliberative democracy needed to build sustainable communities can itself endure.



2. TAX SHIFT

The revenue that supports public spending is drawn heavily from taxes on activities that a sustainable society needs to encourage —productive work, investment, and savings. A growing number of Americans are intrigued by the possibilities of shifting some of the present tax on income and payroll to forms of consumption that degrade or threaten our quality of life. Since much of this destructive consumption is heavily subsidized, it behooves us to replace some of the income and payroll taxes that target sustainable behaviors and activities with taxes that will reduce some of the unwanted social and environmental externalities of our present way of life.

Such a revenue-neutral tax shift could include the imposition of new or additional taxes on polluting, smoking, driving, drinking, logging of old-growth forests, strip mining, sprawling urbanization, high-impact farming, wasteful irrigating, overfishing, fossil-fuel-guzzling cars, toxics-laden manufacturing, and dozens of other unhealthy and unsustainable products and activities. Although even gradual shifts of this kind would be very controversial, the present tax structure is sure to remain even more controversial.

In an era in which so much public time and attention is focused on the size of the tax bite, we need to be thinking about the appropriate targets of taxation, including what types of taxes contribute to the aims of sustainability. Is it really desirable to impose a combined tax on middle income families amounting to nearly one-third of their take-home pay, but collect from zero to a few pennies-on-the-dollar for the consumption of pesticides, nonrenewable energy, vanishing ground water, or old-growth timber? How about the failure to tax production of air, water, and soil pollutants? And how should we reconcile payroll taxes, which generate 36% of federal revenue, with the income tax exemptions and other subsidies, estimated at \$111 billion a year (Roodman 1996), that the federal government provides for driving, servicing, regulating, and parking private motor vehicles?

Tax shifting is certain to produce big winners and losers during the transition. The total cost of not shifting, however, is likely to be far larger—in terms of sustainability, economic wealth and social equity.

3. REGIONALISM

Because the strong interdependence of communities is not adequately reflected in most regional coordination mechanisms and intergovernmental cooperation agreements, there is a growing need to address many sustainability issues at the metropolitan level. The basic notion is that progress toward sustainable communities cannot be achieved without a regional vision and institutional framework to facilitate it. This does not mean regional government, per se. It does, however, suggest a more integrated system of governance to manage and, where appropriate, to enhance the powerful regional and globalizing forces that are shaping our future. A major challenge will be to reconcile the

“...the current system taxes heavily that which should be encouraged — enterprise and human labor. Meanwhile, it taxes lightly or even subsidizes the use of natural resources that humanity needs to husband and conserve. Employers pay a heavy fine, in the form of Social Security taxes, workers’ compensation, and the rest, when they hire somebody. But they get big write-offs when they help to drain the world’s natural resources.”

—Cobb, Halstead, and Rowe, 1995





Sustainable communities are gatherings of neighborhoods that manage to develop regional perspectives.

Metropolitan regions are large enough to address most urban problems ecologically and small enough to resolve them politically. In many cases they provide the optimal scale for integrated planning and infrastructure design. They provide a hopeful means for creating a sustainable community of communities.

In rural areas, watershed councils and similar forms of regional coordination may prove to be especially useful for this purpose.

governance of growth (in people, consumption, and land use) with the development of sustained economic opportunities.

Many of the costs and benefits of growth can only be addressed through regional and sub-regional cooperation. For example, growth management on a city-by-city basis often diverts or redistributes population to areas that are even more vulnerable and less prepared for it. Similarly, cutthroat competition among communities for commercial tax revenues may bring temporary benefits to one community at the cost of long-term economic security for the region. A community-based regional approach to governance may encourage more sustainable development patterns. Regional approaches expose the folly of growth strategies that promote one community's improvement at the expense of other communities. They serve to limit parochialism and the short-sighted development patterns that threaten quality of life and strain local capacity for representation, coordination and cooperation.

Regional approaches now underway include such familiar measures as area-wide privatization or nonprofitization, functional transfers between government units, intermunicipal service agreements, and regional special purpose governments, as well as more unusual innovations, such as regional multi-purpose districts (e.g., Minneapolis-St. Paul, Portland), two-tiered metropolitan federations (e.g., Toronto), and city-county consolidations (e.g., San Francisco).



4. INDICATOR DEVELOPMENT & REPORTING

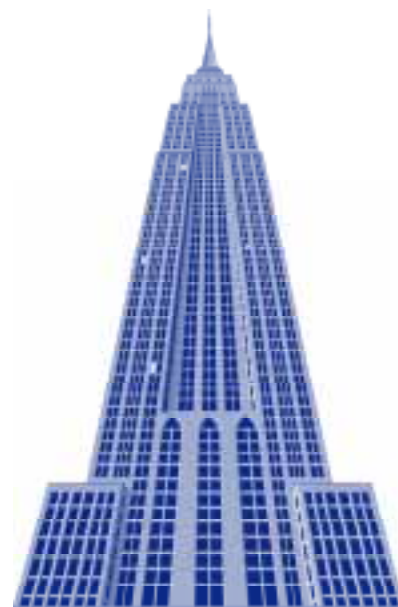
Indicators are like magnifying glasses that make visible the hidden and complex interactions that we call change. They convey information about the condition of our world, its inhabitants, and the trends that drive our economies, socio- cultural systems, and relationships with nature.

Just like a physician diagnosing a fever by measuring the patient's body temperature, the indicators a society uses to measure the economy (GNP, for example) or educational performance (grades), or any of a thousand other trends and activities, serve to inform our understanding and decisions. The problem is that we tend to have very selective

indicators that measure the gnat population around the lightbulb while missing the elephant in the doorway. We have monitored the status of the stock market with dizzying precision but almost missed the destruction of the ozone layer due to chlorofluorocarbons.

Good governance depends to a great extent on the choice of reliable “vital sign” indicators that can be tracked over time, periodically reported to the public, and used to evaluate the effectiveness, efficiency, equity, and sustainability of practices and policies. The choice of key indicators is doubly important at the neighborhood and community level, because it is here that the collective “pulse” and “bloodpressure” of humanity can be separated from the background noise of large and geographically diverse populations. The central challenge in this regard is to improve governance —without expanding bureaucratic government—by constructing indicators that truly inform the public about the condition of their communities.

A summary of sustainability indicators and practical applications is provided in the next section.



TEN KEY INGREDIENTS FOR BUILDING SUSTAINABLE COMMUNITIES

1. Clear Visions, Goals, and Action Plans

CLEAR VISIONS

2. Compatible Social, Environmental, & Economic Objectives

COMPATIBLE GOALS

3. Committed Leaders who Empower Others

GOOD LEADERS

4. Ability to Measure, Communicate, Account for Progress

example: regional sustainability indicator reports

MEASURABLE PROGRESS

5. Tools to Integrate and Envision Complex Information

example: Geographic Information Systems (GIS)

GOOD TOOLS

6. Regional Coordination of Local Efforts

COORDINATORS

7. Partnerships Based on Shared Power & Responsibility

PARTNERSHIPS

8. Action Driven by Public Education and Involvement

INVOLVEMENT

9. Build on Small Successes

SMALL SUCCESSES

10. Flexible/Adaptive Strategies and Implementation Plans

ADAPTIVE MANAGEMENT

—Adapted from *Top 10 Watershed Lessons Learned*, EPA Office of Wetlands, Oceans, & Watersheds

SUSTAINABILITY INDICATORS

The indicators a society chooses to report to itself about itself are surprisingly powerful. They reflect collective values and inform collective decisions. A nation that keeps a watchful eye on its salmon runs or the safety of its streets makes different choices than does a nation that is only paying attention to its GNP. The idea of citizens choosing their own indicators is something new under the sun—something intensely democratic.

—Donella Meadows



Indicators of community sustainability are measures of change in the activities and forces that shape human settlements and their interactions with non-human nature. They are essentially integrative measures of economic, social, and ecological health that are designed to gauge a community's systemic balance and resilience over long periods of time. Each indicator must be periodically monitored for changes in direction and intensity. Taken together, they *indicate* community assets, liabilities, and regional capacity to meet present and future needs in ways that do not sacrifice quality of life or important opportunities for future generations.

Examples of indicators (see Table 1) include the ratio of job growth to population growth, pounds of solid waste landfilled per person, high school graduation rates, and voter turnout in off-year elections. No single indicator is adequate to measure a community's sustainability and many indicators have to be tailored to unique settings and circumstances in order to become useful and reliable. Despite these limitations, a carefully selected battery of indicators can reveal much about a community's movement toward or away from the goals of a persistently healthy, liveable community.

Many indicators used in monitoring community sustainability can be questioned in terms of their accessibility or appropriateness. Some require expensive forms of data collection or interpretation by experts, and others just don't seem to fit the common definitions of what sustainable community means. In general, it is better to be inclusive and recognize that many indicators only take on meaning for sustainability when combined with other indicators. As for accessibility, some of the simplest indicators can be the most profound. Consider, for example, the "popsicle access" indicator. This indicator involves a rough estimate of how many children over the age of five can safely walk to purchase a popsicle within five minutes of their home. Implied in this simple indicator are issues of crime, traffic safety, animal control, pedestrian and bicycle route design, distribution of "mom-and-pop" convenience stores, urban density, and many other considerations of community welfare and design.

More sophisticated indicators can be used to measure everything from local institutional capacity (e.g., annual tax capacity per household to support public services) to noise exposure (e.g., number of children exposed to air and ground traffic noise levels above 50 decibels between 8 p.m. and 8 a.m.). Other unusual indicators, some technical and some tricky to interpret, include the "greenspace-blackspace ratio" (ratio of park land and open space to paved area), the closely related "impervious surface area" (areas impermeable to rainfall that contribute to runoff), "smart schools" (schools with high-speed internet access), "living wage jobs" (percentage of workers making at least

50% more than minimum wage level), “litigiousness” (lawsuits filed annually per 1,000 residents), and the “ten-ten income ratio” (ratio of dollar incomes of top 10% of households to bottom 10%).

Using advanced information technologies—especially geographic information systems (GIS)—these indicators can be overlaid, mapped and compared within and across regions to provide powerful ways to visualize the complex interactions that influence a community’s overall sustainability index or “scorecard.” Using color-keyed maps of trends and conditions monitored at the neighborhood, community and regional levels, GIS offers a practical means for analyzing how the human and natural landscapes are changing over time, and why. The recent introduction of simple yet highly sophisticated desktop GIS computer software promises to make this capability available and affordable to even the smallest local governments, school districts, and community organizations.

Perhaps the most critical constraint on the development and use of sustainability indicators involves the role of ordinary citizens in their selection and interpretation. Deliberative democracy is, in many eyes, both a means and an end of the sustainable community movement. If deliberative democracy is conducive to the process of sustainability, and vice versa, it is important that citizens participate in the selection of indicators that will be used to evaluate their community and region. Although such involvement will sometimes lead to the inclusion of indicators that so-called “experts” regard as unscientific, irrelevant, or unreliable, to exclude such grass-roots involvement may reveal, as clearly as any indicator, a basic cause of unsustainability—lack of civic engagement.



GDP: An Overused and Misused Indicator

For those who believe that economic growth is the root of happiness, Gross National Product (GNP) and Gross Domestic Product (GDP) indicate that our collective quality of life has more than doubled since 1950. But an alternative indicator — the Genuine Progress Indicator (GPI), which assigns costs to such things as crime, family breakdown, underemployment, and the loss of species and prime farmland— reveals a very different pattern: a positive advance from 1950 to 1970, followed by a steady decline since then.

“Specifically, the GPI reveals that much of what we now call growth or GDP is really just one of three things in disguise: fixing blunders and social decay from the past, borrowing resources from the future, or shifting functions from the traditional realm of the household and community to the realm of the monetized economy.”

—Cobb, Halstead, and Rowe, 1995

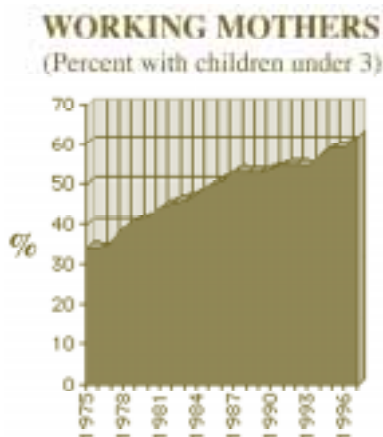
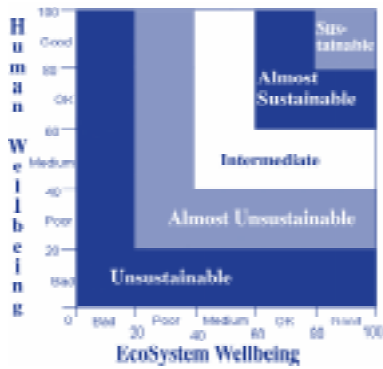


Table 1
SELECTED INDICATORS

COMMUNITY PROFILE (BASELINE) INFORMATION

Demographic: population, ethnicity, age distribution, etc.

Land: land area, topography, natural hazards, habitat, watersheds

Citizen/Consumer lifestyle: cost of living, cultural values

Business: manufacturers, self-employed businesses, commercial space

Physical Infrastructure: utilities (water, sewer, energy, solid waste), transportation

Social infrastructure: government, schools, places of worship, parks & recreation, arts, civic groups & service clubs

SAMPLE INDICATORS, BY SECTOR

ECONOMIC

Commercial vacancy rate

Annual ratio of business startups to business failures

Ratio of manufacturing to service jobs

Net job growth

Skilled and unskilled labor force unemployment rates

Percentage of labor force working for the top five employers

Average and median income levels

Ratio of income to debt (per cap. personal income/municipal debt)

ENVIRONMENTAL

Bad air days (days/year with PSI levels greater than 100)

Water consumption rate (water withdrawal as percentage of supply)

Solid waste landfilled (pounds of garbage per person per year)

Years of remaining landfill space at current rates of solid waste generation

Carbon dioxide emissions per person

Number of environmental education programs/projects in schools

Ecological footprint (both household and community)

Annual Audubon bird count

Toxics releases (emissions in pounds per person)

Average fecal coliform bacteria count for local stream monitoring stations

Indoor air quality (sample radon levels)

SOCIAL

Graduation rate by ethnicity

Percentage of high school graduates going on to higher education

City financial support of arts organization, annually, per person

Annual donations to United Way, per person

Voter turnout in municipal, off-year elections

Library circulation rates

Number of active neighborhood watch groups

Violent crime rates per 10,000 residents

Reported cases of child abuse or neglect per 1,000 people under 18

DUI arrests per 10,000 residents

Ratio of richest 10% of households to poorest 10% (dollar ratio of income)

Percentage of children living in poverty

Packs of cigarettes sold per person per year

Percent of population covered by health insurance

Percent of two-year olds who are adequately immunized

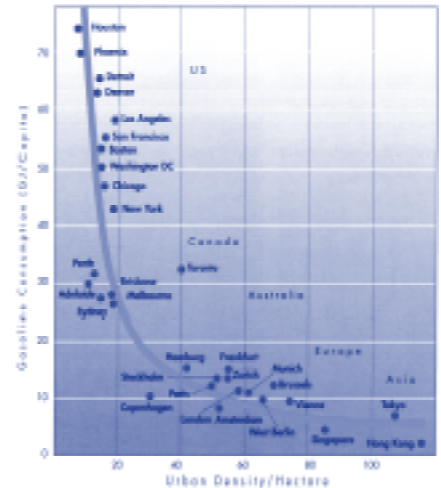
Child care spaces available as percentage of estimated demand

MIXED (Cross-Cutting and Combined)

Ratio of job growth to population growth
Livable-wage-job creation rate (proportion of jobs paying at least 10% above poverty level, or at least 50% more than hourly minimum wage)
Ratio of emissions-to-manufacturing jobs (E/J)
Ratio of city street and highway miles to miles of transit service
Population density of residentially zoned land
Greenspace to blackspace ratio (park & open space/paved surface area)
Per person consumption levels for energy, water, beef, plastics, etc.
Dollar value of infrastructure needing major repairs or replacement
Percent of households able to afford median priced home
Average peak-hour congestion level on major local roads
Percentage of schools with high-speed internet connections

Community Survey-Based Indicators:

Satisfaction with city/county government services
Perceived quality of government leadership and responsiveness
Community group participation (hours per month per person)
Youth participating in community service
Percentage of residents who know the name of one next-door neighbor
Community volunteerism by age group
Proportion expecting good times ahead for local economy/region
Population with regular internet access at home, school, or work
Perception of education quality, crime, traffic congestion, job security, environmental quality, and arts and entertainment opportunities



For readers wanting to learn about the many other communities and projects underway, excellent information is now available on the internet at the following World-Wide Web addresses (a sample of the more than 400 sustainability sites now available):

- **Redefining Progress**
<http://www.rprogress.org>
- **US EPA**
<http://www.epa.gov/region03/greenkit>
- **US DOE Center for Excellence for Sustainable Development**
<http://www.sustainable.doe.gov>
- **Hart Environmental Data**
<http://www.subjectmatters.com/indicators>
- **Sustainable Communities Network**
<http://www.sustainable.org>
- **International Council for Local Environmental Initiatives (ICLEI)**
<http://www.iclei.org>

In characterizing sustainability indicator projects, it is helpful to distinguish among ongoing efforts in terms of their geographic scope — municipal, county, regional, or statewide. Table 2 on the next page provides a sample of activity now underway in the US, with emphasis on efforts taking place in western states. The thirty projects selected here are among approximately 150 projects known to be using sustainability indicators. Although nearly 700 sustainability projects in all have been identified by Public Research Incorporated, and more are in the planning stages, we have limited our focus to projects that promote the use or development of indicators. Projects of this kind appear to offer promising insights into the state of our communities and their residents' progress (or lack of it) in achieving more sustainable lifestyles.

As you can quickly see, a wide range of communities have projects underway. The projects follow diverse pathways and designs, including the rural watershed approach taken by Willapa, Washington, the City of Austin's Green Building Program, which uses a sustainability matrix to assess proposed development, and the Sierra Business Council's "wealth index," which combines measures of social capital, natural capital, and financial capital.



Table 2

SAMPLE OF 30 SUSTAINABILITY INDICATOR PROJECTS CITY, COUNTY, REGIONAL, & STATE

PLACE, PROGRAM & SCOPE		INDICATORS BY TYPE						PROFILE INFORMATION						
Name	Scope (1)	Total	Envir.	Social	Econ.	Mixed	Population	Pop. Change (2)	Density (3)	Edu. (4)	Income (5)	Poverty (6)	Crime (7)	Home Owners (8)
Albuquerque, NM <i>Sustainable Albuquerque 1996</i>	L	61	20	25	7	9	398,492	19.7%	3,014	28.4%	\$27,555	10.3%	10,284	57.3%
Austin, TX <i>Sustainable Communities Initiative 1996</i>	L	18	7	5	6	*	492,329	42.3%	2,260	34.4%	\$14,295	17.9%	11,295	40.6%
Boulder County, CO <i>Boulder County's Report Card 1996</i>	C	54	26	10	4	14	238,196*	25.6%	321	42.1%	\$17,359	5.6%	4,212	63.2%
Chesapeake, MD <i>Measuring Our Progress 1991</i>	R	40	34	2	1	3	57,170	65%	266	17.6	\$17,251	5.2%	2,507	85%
Columbia-Pacific, OR & WA <i>Community Sustainability Indicators</i>	R	11	4	3	4	-	34,097	4.9%	41	16.7%	\$25,135	10%	2964	70.6%
Eau Claire County, WI <i>Indicators of Comm. Sustainability 1996</i>	C	237	91	69	52	24	86,638	9.9%	136	20.9%	\$25,886	9.4%	4282	64.5%
Florida <i>Florida Benchmarking 1992</i>	S	135	19	93	21	2	13,482,716	38.3%	250	18.3%	\$27,483	9%	8547	67.2%
Greenville Cnty, SC <i>Community Indicators 1993</i>	C	61	4	45	11	1	327,558	13.8%	414	21%	\$13,918	11.7%	6,270	66.2%
Hamilton Cnty, TN <i>Life in H. C.(Chattanooga) 1994</i>	C	81	16	53	12	1	152,888	-9.8%	1,291	18.2%	\$22,917	14.4%	12,665	54.2%
Honolulu, Hawaii <i>Ke Ala Hoku Project 1995</i>	S	60	33	11	16	+	371,320	45.2%	4,485	27.7%	\$37,191	5.5%	5759	47%
Jacksonville, FL <i>Quality of Life Indicators 1985</i>	L	77	15	53	9	-	661,177	22.2%	871	17.9%	\$13,661	9.9%	10,591	62.1%
Juneau, AL <i>Capital Profile</i>	L	51	7	8	35	1	28,364	45.2%	11	30.7%	\$47,824	3.7%	3,708	58.2%
Kansas, MO <i>Vital Signs 1993</i>	R	112	5	61	44	2	431,553	-3.7%	1,385	22%	\$13,799	15.3%	13,198	56.9%
King County, WA <i>KC Bench Marks 1995</i>	C	32	5	17	6	5	1,557,537	22.7%	733	32.8	\$18,587	5%	8,040	58.8 %
Minnesota <i>Minnesota's Milestones 1991</i>	S	73	17	40	17	1	4,468,165	9.6%	56	21.8%	\$14,389	7.3%	4,496	71.8%
Olympia, WA <i>State of the Community 1991</i>	R	47	22	11	8	3+	36,787	34%	2,285	33.1%	\$27,785	8.4%	7463	52%

PLACE, PROGRAM & SCOPE		INDICATORS BY TYPE					PROFILE INFORMATION							
Name	Scope (1)	Total	Envir.	Social	Econ.	Mixed	Population	Pop. Change (2)	Density (3)	Edu. (4)	Income (5)	Poverty (6)	Crime (7)	Home Owners (8)
Oregon Benchmarks	S	92	17	41	27	7	2,971,567 (445,458)	12.9% (21%)	31 (3752)	20.6% (25.9%)	\$27,250 (\$29,592)	8.7% (9.7%)	5,755 (11,182)	63.1% (53%)
Pasadena, CA	L	39	5	29	5	-	132,605	12.3%	5765	36.3%	\$35,103	11.1%	7,081	46.3%
Phoenix, AZ	L	18	3	11	2	2	1,012,230	28.2%	2411	19.9%	\$29,291	10.5%	9,958	59.1%
Pierce County, WA	C	30	23	31	26	-	619,648	27.6%	370	17.5%	\$13,439	8.7%	6,981	60.3%
Portland- Multnomah County, OR	C	85	4	77	2	2	600,811	6.8%	1380	23.7%	\$14,462	8.9%	9,697	55.3%
Pueblo, CO	L	24	3	17	4	-	98,552	-3.1%	2745	13.8%	\$20,501	8%	7,775	64.8%
San Francisco, CA	L	650	380	120	69	81+	728,291	7.8%	15,609	35%	\$33,414	9.7%	9,384	34.5%
San Jose, CA	L	16	13	1	1	1	801,331	7.4%	4,678	25.3%	\$46,206	6.5%	5,364	61.3%
San Mateo, CA	C	29	9	15	3	2	86,538	11.5%	7,093	30.2%	\$42,894	3.9%	4,557	53.2%
Santa Monica, CA	L	18	13	4	1	+	87,064	-1.4%	10,490	43.4%	\$35,9971	5.7%	11,720	62.2%
Seattle, WA	R	40	14	19	6	1	519,918	5.2%	6,193	37.9%	\$29,358	8.4%	12,248	48.9%
Silicon Valley, CA	R	36	7	15	14	-	801,331*	27.3%	4,678	25.3%	\$46,206	6.5%	5,364	61.3%
Sierra Nevada	R	46	15	17	14	-	42,839*	33.8%	299	16.3%	\$31,570	5.6%	n/a	60.3%
Willapa Bay, WA	R	42	14	8	20	+	19,352*	13.3%	20	11.3%	\$10,952	17.2%	3,965	71.9%

NOTES

(1) **L** = Local community; **C** = County; **R** = Regional; **S** = Statewide; (2) percentage change in population 1980-1992; (3) population per square mile.; (4) percentage over age 25 with bachelors degree; (5) median household income in dollars; (6) percentage of families below poverty line; (7) known crimes per 100,000 population.; (8) percentage of owner-occupied housing; (+) = innovative applications of combined indicators.

Profile data is taken from *US Census County and City Data Book, 1994*, unless otherwise noted. Information for this chart was compiled with the generous assistance of Jason Venetoulis, June Gin, and Sunday Obazuaye.

ECOLOGICAL FOOTPRINTS

Ecological Footprint: a measure of the load placed on the biosphere by a given population. Footprints are proportional to a community's combined population and per capita consumption levels. They are calculated in terms of the area of land and water appropriated for energy and resource consumption, and for waste disposal.



For Further Reading: Mathis Wackernagel and William Rees, *Our Ecological Footprint: Reducing Human Impact on the Earth* (Philadelphia, PA: New Society Publishers, 1996).



We leave footprints when we walk in the snow, on sand, and across wet, muddy, or soft surfaces. Less visible, but much more important, are the *ecological* footprints we leave when our activities alter the environment.

Because of increasing consumption, pollution, and population growth, human beings are leaving bigger and bigger “footprints” on the planet. Footprints are environmental impact zones, measured as land and water area that is used to support human lifestyles and development activities. As our appetite for resources grows, along with our need for landfills and other waste “sinks” (places to absorb waste and pollution), our footprints also grow. An expanding footprint signals that more and more areas of our natural environment are being sacrificed to provide for human needs and wants.

Footprint Analysis was developed by William Rees and Mathis Wackernagel as an indicator of the combined ecological effects of per capita consumption and population growth. An ecological footprint measures how much of nature’s carrying capacity we use to feed, house, clothe, and otherwise maintain ourselves. Footprint analysis starts with the simple observation that all consumption of energy and materials, and all discharge of wastes, require a finite amount of land or water area for resource production and waste disposal. This area can be estimated for a community, nation, or individual household using information about how much food, energy, water, and other resources are used by a given population, and how much of that is turned into waste that ends up on land or in the water.

Footprints represent the appropriated carrying capacity of the planet needed to support a particular lifestyle. They are measured as the area of *productive* land and water required for a given population to exist at a given consumption level. Footprint analysis divides productive land and water into six categories: arable, pasture, energy-related, forested, sea area, and built-up (developed). For example, when someone drives to a hamburger stand for dinner, they are using energy lands for fossil fuel extraction; forest land to absorb (sequester) the CO₂ their vehicle emits; arable land for the lettuce, tomatoes, and bread they eat; large areas of pasture land to raise the beef (and arable land to raise grain to feed cattle); more forest land to package their burger, fries, and drink; and built-up land in the form of paved roads, parking lots, and building sites that is set aside for the physical development of fast-food outlets.

Footprints are always bigger than the land physically occupied by the people who make them. The collective footprint of the 9.5 million people of sprawling Los Angeles County is at least 40 times larger than the county itself—larger than the entire land area of California.

London's footprint has been estimated to be more than 120 times larger than the metropolitan area. Vancouver, B.C. appropriates a land area more than 170 times larger than the city's surface area. The average footprint of an American is about 25 acres, while the footprint of someone from Mexico will be about one-fourth that size.

Modified versions of the ecological footprint are being developed for measuring particular sources or types of impacts. One variation could be called the *hoofprint*—the appropriated carrying capacity required for beef consumption. Ecological hoofprints are much larger than other food-related footprints. It takes approximately 600 gallons of water and 1.25 pounds of grain to produce a quarter pound of beef. Each pound of pasture-fed beef that is consumed requires about 1.6 acres of grazing and energy land area. For grain-fed beef, the arable land requirements and associated energy land areas are greater. Not captured in the hoofprint calculation are factors such as the top soil eroded by cattle ranching, the energy for cooking the beef, and the methane emissions—powerful greenhouse gases—generated by cattle.

Another variation is the *carbon footprint*, which is based largely on consumption of fossil fuels. For example, when driving a car or truck, each gallon of gasoline burned forms about 20 pounds of carbon dioxide as exhaust. Depending on fuel efficiency and miles traveled, a gasoline-powered vehicle can easily generate its own weight in carbon dioxide *each* year.

As an exercise in footprint analysis, you can calculate your own household carbon footprint using the worksheet on the following page.

COMPARISON OF ECOLOGICAL FOOTPRINTS

For Selected Countries

Country	1997 Population (in millions)	Footprint (acres/person)	Deficit* (acres/person)
Bangladesh	126	1	0.5
Brazil	167	8	(+9)
Canada	30	19	(+5)
China	1,250	3	1
Germany	82	13	8
India	970	2	1
Japan	126	11	6
Mexico	97	6	3
Nigeria	118	4	2
Russian Federation	146	15	6
United States	268	25	9
World	5,850	7	2

*Amount by which footprint exceeds locally available productive land and water area. Numbers in parentheses (+) indicate presently unused ecological capacity inside borders. Source: Wackernagel et al., *Ecological Footprint of Nations*, 1997.



FOOTPRINTS:

"An area-based estimate of the [global] natural capital requirements of any defined population."

—Rees and Wackernagel

FINGERPRINTS:

Fingerprints measure the portion of productive land and water area that is appropriated by a given population for purposes of trade, investment, or speculation rather than direct consumption. It accounts for trans-boundary capital flows from one population that induce added consumption and waste generation in another.

FOGHORNS & CANARIES:

Critical load indicators, early warning systems, and sentinel species that alert us to ecological systems that may be overstressed or on the verge of collapse.

CARBON FOOTPRINT

As an exercise in footprint analysis, you can calculate your own household carbon footprint — the area of land needed to grow additional trees to “sequester” (absorb) the carbon you produce this year. The worksheet produced below is derived from American Forests “Carbon Debt Calculator.”

INSTRUCTIONS FOR CALCULATING CARBON FOOTPRINT:

Estimate your annual emissions in pounds by using the multipliers presented below. If estimating for a typical week, multiply by 52 (or one month X 12). Add up your total pounds of emissions, then divide by 16,000 to get your footprint in acres.

Since tree density and sequestration rates vary greatly, figure an average of **3** healthy trees added to one-eighth acre to offset the emissions of each ton (2,000 lbs.) of carbon dioxide. In other words, assume that **1** acre with **24** trees offsets **8** tons of annual emissions. If planted as dense forest, the acreage required would obviously be much smaller than if planted in suburban residential areas. Remember, trees provide only temporary storage of carbon, since they give back much of the carbon to the atmosphere when they are burned or allowed to decay.

To compute personal gasoline consumption, you may find it easier to divide the total number of miles you drive each year by your vehicle's average fuel economy (miles per gallon). Note that use of a car air conditioner may add thousands of pounds to your emissions total. For home energy consumption, use your monthly utility bills. Note that your electricity may be generated by energy sources with little or no carbon content (e.g., hydropower). The emissions factor used in this worksheet is an average. For estimating trash and recycling, assume about 7 lbs. per standard grocery bag, 13 lbs. for a 10-gallon container, and 40 lbs. for a large trash bag.

ANNUAL HOUSEHOLD TRAVEL BEHAVIOR

Gasoline consumption	<input type="text"/>	gallons X 19.5 lbs. per gallon =	<input type="text"/>
City bus	<input type="text"/>	miles X 0.7 lbs. per mile =	<input type="text"/>
Intercity bus travel	<input type="text"/>	miles X 0.2 lbs. per mile =	<input type="text"/>
Subway or train	<input type="text"/>	miles X 0.6 lbs. per mile =	<input type="text"/>
Taxi	<input type="text"/>	miles X 1.5 lbs. per mile =	<input type="text"/>

ANNUAL HOUSEHOLD ENERGY USE

Electricity	<input type="text"/>	kilowatt-hours X 1.5 lbs. per kWh =	<input type="text"/>
Natural Gas	<input type="text"/>	therms X 11 lbs. per therm =	<input type="text"/>
Oil	<input type="text"/>	gallons X 22 lbs. per gallon =	<input type="text"/>
Propane, bottled gas	<input type="text"/>	gallons X 13 lbs. per gallon =	<input type="text"/>

ANNUAL HOUSEHOLD SOLID WASTE













Trash	<input type="text"/>	pounds X 3 lbs. CO ₂ per pound =	<input type="text"/>
Recycled solid waste	<input type="text"/>	pounds X 2 lbs. CO ₂ per pound =	<input type="text"/>

TOTAL

Divide total pounds by 16,000 to get carbon footprint in acres:

Sustainable Communities

GOALS TO GUIDE ACTION

-  **Community-based regionalism**
-  **A strong sense of trust and reciprocal obligation among residents**
-  **An ethic of stewardship on behalf of future generations**
-  **Democratic participation and informed deliberation**
-  **Growth management based on social and environmental carrying capacity**
-  **Prices that reflect full social and environmental costs of goods and services**
-  **Equity mitigation measures that reduce the regressive impacts of honest pricing**
-  **A commitment to social justice, tempered by humility in defining it**
-  **Economic security that balances local self-reliance with global interdependence**
-  **Design that enhances adaptability, livability, and access to nature & public space**
-  **Educational reform that promotes constructive critical thinking & *glocal* learning**
-  **Institutional reform that promotes equality in the competition of ideas**



Selected References

Brundtland Commission (World Commission on Environment and Development). 1987. *Our Common Future*. New York: Oxford University Press.

Campbell, Scott. 1996. "Green Cities, Growing Cities, Just Cities?—Urban Planning and the Contradictions of Sustainable Development." *Journal of the American Planning Association* 62,3: 296-311.

City of Santa Monica. *Sustainable City Progress Report* (December 1996).

Cohen, Joel. 1995. *How Many People Can the Earth Support?* New York: W.W. Norton.

Common, Michael. 1995. *Sustainability and Policy: Limits to Economics*. Cambridge University Press.

Downs, Anthony. 1994. *New Visions for Metropolitan America*. The Brookings Institution and Lincoln Institute of Land Policy.

Engwicht, David. 1993. *Reclaiming Our Cities and Towns: Better Living With Less Traffic*. Gabriola Island, BC: New Society Publishers.

Hart, Stuart L. 1997. "Beyond Greening: Strategies for a Sustainable World," *Harvard Business Review* 75,1 (January-February).

Hawken, Paul. 1993. *The Ecology of Commerce: A Declaration of Sustainability*. New York, NY: Harper Business.

Hempel, Lamont C. 1996. *Environmental Governance: The Global Challenge*. Washington, DC: Island Press.

Ophuls, William. 1996. "Unsustainable Liberty, Sustainable Freedom." In *Building Sustainable Societies: A Blueprint for a Post-Industrial World*. Dennis Pirages, ed. Armonk, NY: M.E. Sharpe.

Orfield, Myron. 1997. *Metropolitics: A Regional Agenda for Community and Stability*. Washington, DC: Brookings Institution/Cambridge: Lincoln Land Institute.

Pirages, Dennis. 1996. *Building Sustainable Societies: A Blueprint for a Post-Industrial World*. New York: M.E. Sharpe.

Platt, Rutherford H., Rowan A. Rowntree, Pamela C. Muick, eds. 1996. *The Ecological City: Preserving and Restoring Urban Biodiversity*. Amherst, MA: University of Massachusetts Press.

President's Council on Sustainable Development. 1996. *Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future*. Washington, DC: US Government Printing Office.

Putnam, Robert D. 1995. "Tuning In, Tuning Out: The Strange Disappearance of Social Capital in America." *PS: Political Science and Politics* (December): 664-683.

Rees, William E. 1990. "Economics, Ecology and the Role of Environmental Assessment in Achieving Sustainable Development." In Jacobs, P. and Sadler, B., eds., *Sustainable Development and Environmental Assessment: Perspectives on Planning for a Common Future*. Ottawa: CEARC-FEARO.

Register, Richard. 1987. *Eco-City Berkeley: Building Cities for a Healthy Future*. Berkeley, CA: North Atlantic Books.

Roodman, David. 1996. "Paying the Piper" *Worldwatch Paper* 133, Washington, DC: Worldwatch Institute (December).

Roseland, Mark. 1994. "Sustainable Communities: An Examination of the Literature." In *Sustainable Communities Resource Package*. Toronto: Ontario Round Table on the Environment and the Economy (April 1995).

Serageldin, Ismail. 1995. "Sustainability and the Wealth of Nations: First Steps in an Ongoing Journey (Draft)." Paper presented at the Third Annual World Bank Conference on Environmentally Sustainable Development. Washington, DC.

Treanor, Paul. 1996. "Why Sustainability is Wrong." Electronic publication available at webinter.nl.net/users/Paul.Treanor/sustainability.html.

Urban Sustainability Learning Group. 1996. *Staying in the Game: Exploring Options for Urban Sustainability*. A Project of the Tides Foundation. Available from the Center for Neighborhood Technology, Chicago, IL.

Van der Ryn, Sym and Peter Calthorpe. 1986. *Sustainable Communities: A New Design Synthesis for Cities, Suburbs and Towns*. San Francisco: Sierra Club Books.

Wackernagel, Mathis, and William Rees. 1996. *Our Ecological Footprint: Reducing Human Impact on the Earth*. Philadelphia: New Society Publishers.

The future is not some place we are going to but one we are creating. The paths to it are not found but made, and the activity of making them changes both the maker and the destination.

– John Schaar