

SUSTAINABILITY VALUES, ATTITUDES, AND BEHAVIORS: A Review of Multinational and Global Trends

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■ **Abstract** This review surveys five major efforts to identify and declare values essential to global sustainability; describes empirical trends (as measured by multinational and global-scale surveys) in values, attitudes, and behaviors related to human and economic development, the environment, and driving forces (population, affluence, technology, and entitlements); and describes empirical trends in attitudes toward contextual values that condition sustainable development (e.g., freedom and democracy, capitalism, globalization, and equality). Finally, the review identifies important barriers between attitudes and behavior; draws several conclusions regarding the value, attitudinal, and behavioral changes needed to achieve global sustainability; and suggests future research directions.

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INTRODUCTION

Most advocates of sustainable development recognize the need for changes in human values, attitudes, and behaviors in order to achieve a sustainability transition that will meet human needs and reduce hunger and poverty while maintaining the life support systems of the planet (1). *Values* are abstract ideals, such as freedom, equality, and sustainability. They often evoke emotional reactions and are typically expressed in terms of good or bad, better or worse, desirability or avoidance. Values define or direct us to goals, frame our attitudes, and provide standards against which the behavior of individuals and societies can be judged. *Attitudes* refer to the evaluation of a specific object, quality, or behavior as good or bad, positive or negative. Attitudes often derive from and reflect abstract values (2). Finally, *behavior* refers to concrete decisions and actions taken by individuals and groups, which are often rooted in underlying values and attitudes. This review focuses on individual and societal values, attitudes, and behaviors that will either support or discourage a global sustainability transition.

First, we survey a diverse set of documents and analyses that propose values important to sustainability. Next, drawing on multinational and quasi-global surveys of public opinion, we summarize public attitudes and behavior regarding environment and development, their nexus in sustainable development, and the driving forces of population, affluence/poverty/consumption, technology, and equity/entitlements. We then examine public attitudes toward key contextual values and trends (e.g., freedom, democracy, capitalism, globalization, equality, and shared responsibility), including several declared “essential to international relations” by the UN Millennium Declaration. Finally, we discuss whether there is a need for changes in global values and how to use our current understanding of values, attitudes, and behavior to support a sustainability transition.

DOCUMENTARY STATEMENTS OF SUSTAINABILITY VALUES

A U.S. National Academy of Sciences study identified four grand values that emerged in the collective aspirations of the world’s peoples following World War II: peace, freedom, development, and environment (1). After World War II,

world peace was soon threatened by the nuclear arms race. Throughout the Cold War, peace was sustained globally, but fought locally, often by proxies for the superpowers. Although warfare has diminished (3), peace is still elusive, primarily in Africa and the Middle East. Aspirations for freedom also continued after World War II in the struggle to end imperialism and totalitarian oppression and to extend the human rights of women, indigenous peoples, and minorities. The postcolonial world brought a renewed focus on economic development to provide basic necessities for the poorest two thirds of the world and higher standards of living for the wealthy third. Finally, after a quarter century, a global value for nature and the environment emerged.

While reinterpreted over time, the values of peace, freedom, development, and environment remain prominent aspirations. Sustainable development emerged out of the effort to reconcile the competing demands of development and environmental protection beginning with the 1972 Stockholm Conference on the Human Environment and the 1980 World Conservation Strategy of the International Union for the Conservation of Nature (4). Sustainable development became a formal world aspiration in 1987 with the report of the World Commission on Environment and Development entitled *Our Common Future* (also known as the Brundtland Report) (5).

Environmental protection and development are the key values of sustainable development. But within these broad descriptors, there are very different values at play. To clarify these differences, the U.S. National Academy of Sciences review of the sustainability literature began with the distinction between what advocates sought to sustain and what they sought to develop. This review identified three major values to be sustained: nature, life support systems, and community as well as a set of intermediate values for each (Table 1) (1).

The most cited value to be sustained was *life support systems*, which defines nature or the environment as a set of resources and services for the utilitarian life support of humankind. Other advocates sought to sustain nature for its intrinsic value rather than its utility for human beings, and others sought to sustain the livelihoods, groups, and places that constitute distinctive and threatened communities. Similarly, there were three major values to be developed: people, economy, and society. Much of the early literature focused on economic development, including employment, consumerism, and increasing gross national product (GNP). More recently, attention has also focused on human development, including the values of health, longer life, education, equity, and opportunity. Finally a focus on social development has emerged, emphasizing the security and well-being of nation states, regions, and institutions, as well as social capital and community ties.

Reflecting these different values, the UN General Assembly (6), Earth Charter (7), World Summit on Sustainable Development (8), and the Global Scenario Group (9) have each recently produced detailed statements of values for sustainable development. To mark the new millennium, the General Assembly of the United Nations adopted a set of fundamental values deemed essential to international relations: freedom, equality, solidarity, tolerance, respect for nature, and shared

TABLE 1 Definitions of sustainable development (1)

What is to be sustained	What is to be developed
Nature	People
Earth	Child survival
Biodiversity	Life expectancy
Ecosystems	Education
	Equity
	Equal opportunity
Life support	Economy
Ecosystem services	Wealth
Resources	Productive sectors
Environment	Consumption
Community	Society
Cultures	Institutions
Groups	Social capital
Places	States
	Regions

responsibility (Table 2). To “translate these shared values into actions,” the declaration created a set of intermediate-level and more specific goals that reflected more specific values related to peace, development, environment, human rights, hunger, poverty, Africa, and the United Nations. These in turn were elaborated with a set of 60 goals, many of which have specific targets, such as cutting poverty in half or insuring universal primary school education by 2015 (6). Monitoring by experts from the United Nations, International Monetary Fund, Organisation for Economic Co-operation and Development (OECD), and World Bank is currently under way for eight goals with 18 targets and 48 indicators to measure progress (10).

The Earth Charter Initiative originated in the call of the World Commission on Environment and Development (5) for the creation of “a universal declaration” that would “consolidate and extend relevant legal principles” creating “new norms . . . needed to maintain livelihoods and life on our shared planet” and “to guide state behavior in the transition to sustainable development.” Launched in 1994, the Initiative claims to be “the most open and participatory consultation process ever conducted in connection with an international document. Thousands of individuals and hundreds of organizations from all regions of the world, different cultures, and diverse sectors of society . . . participated” (11). The Charter presents four general-level values (community of life; ecological integrity; social and economic justice; and democracy, nonviolence, and peace). These are elaborated with 16 intermediate-level principles and an additional 61 specific-level values. Since its release in 2000, the Charter has been endorsed by over 13,000 individuals and organizations, representing millions of members, yet has thus far failed to attain its desired endorsement or adoption by the recent World Summit on Sustainable Development (8) or the UN General Assembly.

TABLE 2 Values underlying The Millennium Declaration (6)

The Millennium Declaration (which outlines 60 goals for peace; development; the environment; human rights; the vulnerable, hungry, and poor) is founded on a core set of values.

“We consider certain fundamental values to be essential to international relations in the twenty-first century. These include:

- **Freedom.** Men and women have the right to live their lives and raise their children in dignity, free from hunger and from the fear of violence, oppression or injustice. Democratic and participatory governance based on the will of the people best assures these rights.
- **Equality.** No individual and no nation must be denied the opportunity to benefit from development. The equal rights and opportunities of women and men must be assured.
- **Solidarity.** Global challenges must be managed in a way that distributes the costs and burdens fairly in accordance with basic principles of equity and social justice. Those who suffer or who benefit least deserve help from those who benefit most.
- **Tolerance.** Human beings must respect one or another, in all their diversity of belief, culture and language. Differences within and between societies should be neither feared nor repressed, but cherished as a precious asset of humanity. A culture of peace and dialogue among all civilizations should be actively promoted.
- **Respect for nature.** Prudence must be shown in the management of all living species and natural resources, in accordance with the precepts of sustainable development. Only in this way can the immeasurable riches provided to us by nature be preserved and passed on to our descendants. The current unsustainable patterns of production and consumption must be changed in the interest of our future welfare and that of our descendants.
- **Shared responsibility.** Responsibility for managing worldwide economic and social development, as well as threats to international peace and security, must be shared among the nations of the world and should be exercised multilaterally. As the most universal and most representative organization in the world, the United Nations must play the central role.”

The 2002 Johannesburg Declaration of the World Summit on Sustainable Development described three “interdependent and mutually reinforcing pillars of sustainable development—economic development, social development and environmental protection . . .” (8). This declaration was intended to address the rising concern that development had been too narrowly defined (only economic) and was obscuring the other values of human and social development.

Finally, the Global Scenario Group brought together social scientists and modelers from different regions and backgrounds to construct five archetypal scenarios for the future (Market Forces, Fortress World, Policy Reform, Eco-communalism, and the Great Transition) and to assess how a sustainable development transition would fare in each (9). Global value change is considered essential to the achievement of the Great Transition scenario. A global initiative has recently emerged to actively pursue the Great Transition as both a vision and as a movement (<http://www.gti.org>). The Great Transition Initiative has emphasized three

values deemed essential to sustainability: quality of life, human solidarity, and ecological sensibility. In a Great Transition future, the material requirements of well-being will have been met, and quality of life will be defined by fulfillment, not wealth. Human beings will connect in solidarity with the needs, hopes, and aspirations of those who live in distant places and future generations. Finally, nature will be valued as a source of all that supports humans and the entire web of life, as well as a source of endless wonder and enjoyment.

The values found in these documents come in many shapes and guises. Although values are mentioned in all of them, surprisingly little use is made of the term. Only in the Millennial Declaration is there a specific set of declared values, identified as “fundamental values.” In the Earth Charter, values appear as principles, and in the other analyses, values need to be inferred from adopted goals, targets, or even indicators. The Great Transition scenario, which posits value change as intrinsic to its success, is often unclear as to the values that need to change. Yet these different efforts are broadly consistent with a conception of values as abstract ideals that define or direct us to goals and provide standards against which the behavior of individuals and societies can be judged.

EMPIRICAL TRENDS IN SUSTAINABILITY VALUES, ATTITUDES, AND BEHAVIORS

Sustainability values are often expressed through specific attitudes and behaviors. Surprisingly, there are no survey data on public attitudes toward “sustainable development” as a holistic concept. However, empirical data related to many of the subcomponents of sustainable development do exist. Drawing on the few multinational and quasi-global surveys¹ of public opinion that have been conducted to date (Table 3), this review examines global attitudes and behavior specifically related to development and environment, their nexus in sustainable development, and the driving forces of population, affluence/poverty, technology, and entitlements.

Development

The desire for economic development is often assumed to be universal, transcending all cultural and national contexts. Although no global-scale surveys have specifically measured public attitudes toward economic development per se, the assumption seems largely supported by the data that do exist. For example, 91% of respondents from developing countries, the United States, and Germany said that

¹For simplicity, the words “global” and “worldwide” are used throughout this article to refer to survey results. Please note, however, that there has never been a truly representative global survey with either representative samples from every country in the world or in which all human beings worldwide had an equal probability of being selected. Additionally, some developing country results are taken from predominantly urban samples and are thus not fully representative.

TABLE 3 Multinational surveys

Name	Year(s)	Number of countries
One-time surveys		
Pew Global Attitudes Project	2002	43
Eurobarometer	2002	15
International Social Science Program	2000	25
Health of the Planet	1992	24
Repeated surveys		
GlobeScan International Environmental Monitor ^a	1997–2003	34
World Values Survey	1981–2002	79
Demographic and Health Surveys	1986–2002	17
Organisation for Economic Co-operation and Development	1990–2002	22

^aBefore November 2003, GlobeScan, Inc., was known as Environics International. Surveys before this time bear the older name.

it is very important (75%) or somewhat important (16%) to live in a country where there is economic prosperity (12). The level of affluence desired, how that prosperity is to be achieved, and how economic wealth should ideally be distributed within and between nations, however, are much more contentious questions. Unfortunately, global-scale surveys to date have not tried to identify public attitudes or preferences for particular levels or end states of economic development (for example, infinite growth versus steady-state economies) and provide only limited or tangential data on the ideal distribution of wealth (see the section on affluence below). We can ask, however, whether greater economic prosperity leads to greater perceived happiness. Figure 1 compares subjective assessments of happiness derived from the World Values Survey with objective measures of GNP per capita. It suggests that as countries make the transition from subsistence to industrial economies, happiness does increase. This positive relationship, however, levels off once GNP per capita reaches approximately \$14,000. This implies that infinite economic growth does not lead inexorably to greater human happiness. Instead, once a society has achieved a basic level of affluence, human happiness is probably more influenced by other noneconomic factors. In this context, it is interesting to note that the government of Bhutan, with a relatively low GNP per capita, is currently experimenting with the assessment of national policies based on subjective measures of happiness instead of traditional measures of economic prosperity (13). It is also important to note, however, that many of the unhappiest countries at the time of these surveys had recently experienced significant declines in GNP per capita owing to the collapse of the Soviet Union. Yet GNP per capita remained higher in these ex-Soviet countries than in less affluent, but happier, countries such as India and Nigeria. This suggests that relative trends in living standards influence happiness more than absolute levels of affluence, but the

relationship between economic development and subjective well-being deserves more research attention.

There are very limited data on public attitudes toward issues of human development, although there is likely near-universal support for increased child survival rates, adult life expectancies, and educational opportunity. Worldwide, all of the components of the Human Development Index have dramatically improved since World War II. Life expectancy has been extended by almost 20 years since 1950 and is projected to increase another 8–9 years by 2050. Infant mortality has dropped from 157 deaths per 1,000 births in 1950 to 56 deaths in 2000 and is projected to drop further to between 21 and 25 deaths by 2050 (14). Adult literacy has risen from just under 53% as recently as 1970 to over 79% in 2000 (35). Finally, gross domestic product (GDP) per capita (purchasing power parity, constant 1995 international dollars) rose by well over a factor of 2 between 1975 and 2002 (35). There appears, however, to be a globally pervasive sense that human well-being has more recently been deteriorating. In 2002, large majorities worldwide said that a variety of conditions had worsened over the previous five years, including the availability of well-paying jobs (58%), working conditions (59%), the spread of diseases (66%), the affordability of health care (60%), and the ability of old people to care for themselves in old age (59%) (15).

One important way to promote human development is to provide aid to poorer countries and people, either through national governments or nongovernmental organizations and charities. In the developed world, there is strong popular, but less official support for development assistance to poor countries. In 1970, the UN General Assembly resolved that each economically advanced country would dedicate 0.7% of its gross national income (GNI) to official development assistance (ODA) by the middle of the 1970s—a target that has been reaffirmed in many subsequent international agreements. As of 2004, however, only five countries had achieved this goal, and the average ODA/GNI among the industrialized countries was only 0.25%—far below the UN target (16). By contrast, over 70% of respondents from 21 developed and developing countries said they would personally support paying 1% more in taxes to help the world's poor (17). Likewise, surveys in the 13 countries of the OECD's Development Assistance Committee have found that public support for the principle of giving aid to developing countries (81% in 2003) has remained high and stable for over 20 years (18). Further, 45% said that the current (1999–2001) level of government expenditure on foreign aid in their country was too low, whereas only 10% said foreign aid was too high (18). There is also little evidence that the public in OECD countries has “donor fatigue.” Although surveys have found increasing public concerns about corruption, aid diversion, and inefficiency, these surveys also continue to show very high levels of public support for aid.

Public support for development aid is belied, however, by several factors. First, large majorities demonstrate little understanding of development aid, with most unable to identify their national aid agencies and greatly overestimating the percentage of their national budget devoted to development aid (18, 19). Second,

development aid is almost always ranked low on lists of national priorities, well below more salient concerns about (for example) unemployment, education, and health care. Third, “the overwhelming support for foreign aid is based upon the perception that it will be spent on remedying humanitarian crises,” not used for other development-related issues, such as Third World debt, trade barriers, decreasing inequality between rich and poor countries, or for geopolitical reasons (for example, U.S. aid to Israel and Egypt) (18). Thus, public support for development assistance has been characterized as “a mile wide, but an inch deep” (20).

Environment

Compared to the very limited data on attitudes toward economic and human development, research on global environmental attitudes is somewhat more substantial. Several surveys have measured attitudes regarding the intrinsic value of nature, global environmental concerns, the trade-offs between environmental protection and economic growth, government policies, and individual and household behaviors.

Recent surveys suggest that large majorities worldwide reject the notion that humans should dominate nature and instead favor a more equal relationship. For example, the 2000 World Values Survey found that 76% of respondents across 27 countries said that human beings should “coexist with nature,” whereas only 19% said they should “master nature.” Overwhelming majorities of Europeans, Japanese, and North Americans said that human beings should coexist with nature, ranging from 85% in the United States to 96% in Japan. By contrast, only in Jordan, Vietnam, Tanzania, and the Philippines did more than 40% say that human beings should master nature (21).

Likewise, a survey of 11 developed and 23 developing countries in 2000 found that 83% of respondents expressed fair to high levels of concern about the environment. Further, large majorities selected the strongest response possible (very serious) for seven of eight environmental problems assessed, including local issues, such as water and air pollution, to global problems, such as ozone depletion and climate change (see Figure 2) (22). In two recent studies, 52% of respondents worldwide agreed that “protecting the environment should be given priority” over “economic growth and creating jobs,” and 74% of respondents in France, Britain, Germany, Japan, Italy, Canada and the United States prioritized environmental protection over economic growth, even if some jobs were lost (21, 23). Finally, in 1995, a large majority (62%) worldwide said they “would agree to an increase in taxes if the extra money were used to prevent environmental damage,” whereas 33% said they would oppose them (24).

Environmental behaviors have received less, although still significant, popular support. Among 20 developed and developing countries, 36% of respondents stated that they had avoided a product or brand for environmental reasons, 27% had refused packaging, and 25% had gathered environmental information (25). There are no global survey data regarding energy consumption, but among Europeans,

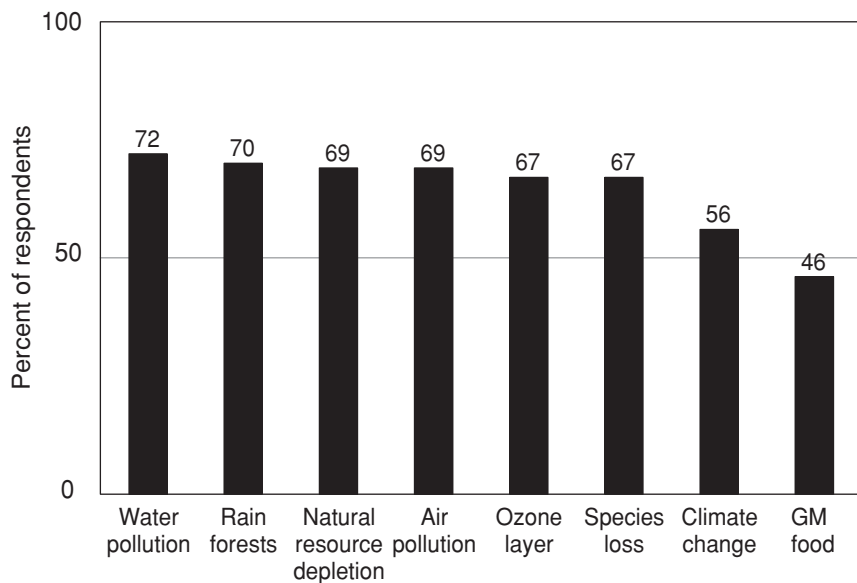


Figure 2 Percent of global public calling environmental issues a “very serious problem” (data from Reference 22, and figure reprinted from Reference 59). Abbreviation: GM, genetically modified.

large majorities said they had reduced or intended to reduce their use of heating, air conditioning, lighting, and domestic electrical appliances (26). Worldwide, 44% of respondents in high-income countries were very willing to pay 10% more for an environmentally friendly car, compared to 41% from low-income countries and 29% from middle-income countries (25) (based on the subsample of respondents who owned or had regular use of a car). These findings clearly mark the emergence of a global market for more energy-efficient, less-polluting automobiles. Nonetheless, most people appear to oppose higher gasoline prices. Among high-income countries, only 28% of respondents were very willing to pay 10% more for gasoline if the money was used to reduce air pollution, compared to 23% in medium-income countries and 36% in low-income countries (25).

Positive attitudes toward environmental protection and individual behavior, however, do not necessarily translate into political action. In 1995, only 13% of respondents worldwide reported having donated to an environmental organization, attended a meeting, or signed a petition for the environment in the prior 12 months, with more doing so in high-income countries than in low-income countries (24). Finally, only 10% worldwide reported having written a letter or made a telephone call to express their concern about an environmental issue in the past year, 18% had based a vote on green issues, and 11% belonged to or supported an environmental group (22).

Drivers of Development and Environment

Many analyses of the human impact on life support systems make use of the $I = PAT$ identity (27). In this framework, environmental impact (I) is a function of population (P), affluence (A), and technology (T). Although most analysts recognize that these three variables are not independent from one another and are themselves influenced by other factors, the $I = PAT$ identity remains a useful framework for characterizing aggregate trends (28, 29). A similar approach has also been applied to human development ($D = PAE$), in which development (D) is considered a function of population (P), affluence (A), and entitlements and equity (E) (30). The following summarizes empirical trends in attitudes and behavior related to population; affluence, poverty, and consumerism; science and technology; and equity and entitlements.

Global population continues to grow, but the rate of growth continues to decline almost everywhere. Recurrent Demographic and Health Surveys have found that the ideal number of children desired is declining worldwide. Globally, attitudes toward family planning and contraception are very positive, with 67% worldwide and large majorities in 38 out of 40 countries agreeing that birth control and family planning have been a change for the better (12). These attitudes are reflected in the behavior of more than 62% of married women of reproductive age currently using contraception and by large increases in contraceptive use over the past decade in all developing regions (31). Notwithstanding these positive attitudes toward contraception, however, some estimate that 20% to 25% of births in the developing world are unwanted, indicating that access to or the use of contraceptives remains limited in some areas (32). Importantly, however, Africa remains an exception to many of these findings. Ideal family size remains significantly higher in western and middle Africa (5.2) than elsewhere in the developing world (2.9), and support for family planning is much lower in sub-Saharan Africa (44%) than in the rest of the developing world (74%) (33). Consistent with these attitudes, sub-Saharan Africa exhibits lower percentages of married women using birth control as well as lower rates of growth in contraceptive use than the rest of the developing world (34).

Meanwhile, aggregate affluence has risen dramatically worldwide with gross domestic product (GDP) per capita (purchasing power parity, constant 1995 international dollars) more than doubling between 1975 and 2002 (35). The rising tide, however, has not lifted all boats. In 2001, more than 1.1 billion people lived on less than \$1 per day, and 2.7 billion people lived on less than \$2 per day—with little overall change from 1990. The World Bank projects these numbers to decline dramatically by 2015, to 622 million living on less than \$1 and 1.9 billion living on less than \$2 per day, but sub-Saharan Africa is again an exception. There the number of people living on less than \$1 per day rose from an estimated 227 million in 1990 to 313 million in 2001 and is projected to increase further to 340 million by 2015 (36).

Likewise, despite the global gains in GDP per capita, 65% of respondents worldwide in 1995 said that more people were living in poverty than 10 years prior.

Regarding the root causes of poverty, 63% blamed unfair treatment by society, whereas 26% blamed the laziness of the poor themselves. The only locations where majorities blamed poverty on the laziness and lack of will power of the poor were the United States (61%), Puerto Rico (72%), Japan (57%), China (59%), Taiwan (69%), and the Philippines (63%) (Figure 3) (22). Worldwide, 68% said their own government was doing too little to help people in poverty within their own country, whereas only 4% said their government was doing too much. At the national level, only in the United States (33%) and the Philippines (21%) did significant proportions say their own government was doing too much to help people in poverty (22).

Global surveys also paint a complicated and contradictory picture of attitudes toward consumption. On the one hand, majorities around the world agree that, at the societal level, material and status-related consumption are threats to human cultures and the environment. Worldwide, 54% thought “less emphasis on money and material possessions” would be a good thing, whereas only 21% thought this would be a bad thing (22). Further, large majorities agreed that gaining more time for leisure activities or family life is their biggest goal in life (37). More broadly, 45% worldwide saw consumerism and commercialism as threats to their own culture. On the other hand, 65% of respondents said that spending money on themselves and their families represents one of life’s greatest pleasures. Respondents from low-GDP countries were much more likely to agree (74%) than those from high-GDP countries (58%), which reflects differences in material needs (37). Likewise, attitudes toward status consumerism appear to vary greatly, with large majorities of Europeans (78%) and North Americans (76%), smaller majorities of Latin Americans and Asians (54% to 59%), and relatively few Africans (19%, Nigeria only) disagreeing with the idea that other people’s admiration for one’s possessions is important (37). Thus, there appear to be strong cultural norms against appearing materialistic in many Western societies, despite the high levels of material consumption in these countries relative to the rest of the world. At the same time, however, status or conspicuous consumption has long been posited as a significant driving force in at least some consumer behavior, especially in affluent societies (38).

Successful deployment of new and more efficient technologies is an important component of most sustainability strategies, even though it is often difficult to assess all of the environmental and public health consequences in advance. Overall, the global public has very positive attitudes toward science and technology. The 1995 World Values Survey asked respondents, “In the long run, do you think the scientific advances we are making will help or harm mankind?” Worldwide, 56% of respondents thought science will help mankind, whereas 26% thought it will harm mankind. Further, 67% said an increased emphasis on technological development would be a good thing, whereas only 9% said it would be bad (24). Likewise, large majorities worldwide believed that the benefits of modern technology outweigh the risks (25). The support for technology, however, was significantly higher in countries with low GDPs (69%) than in high-GDP

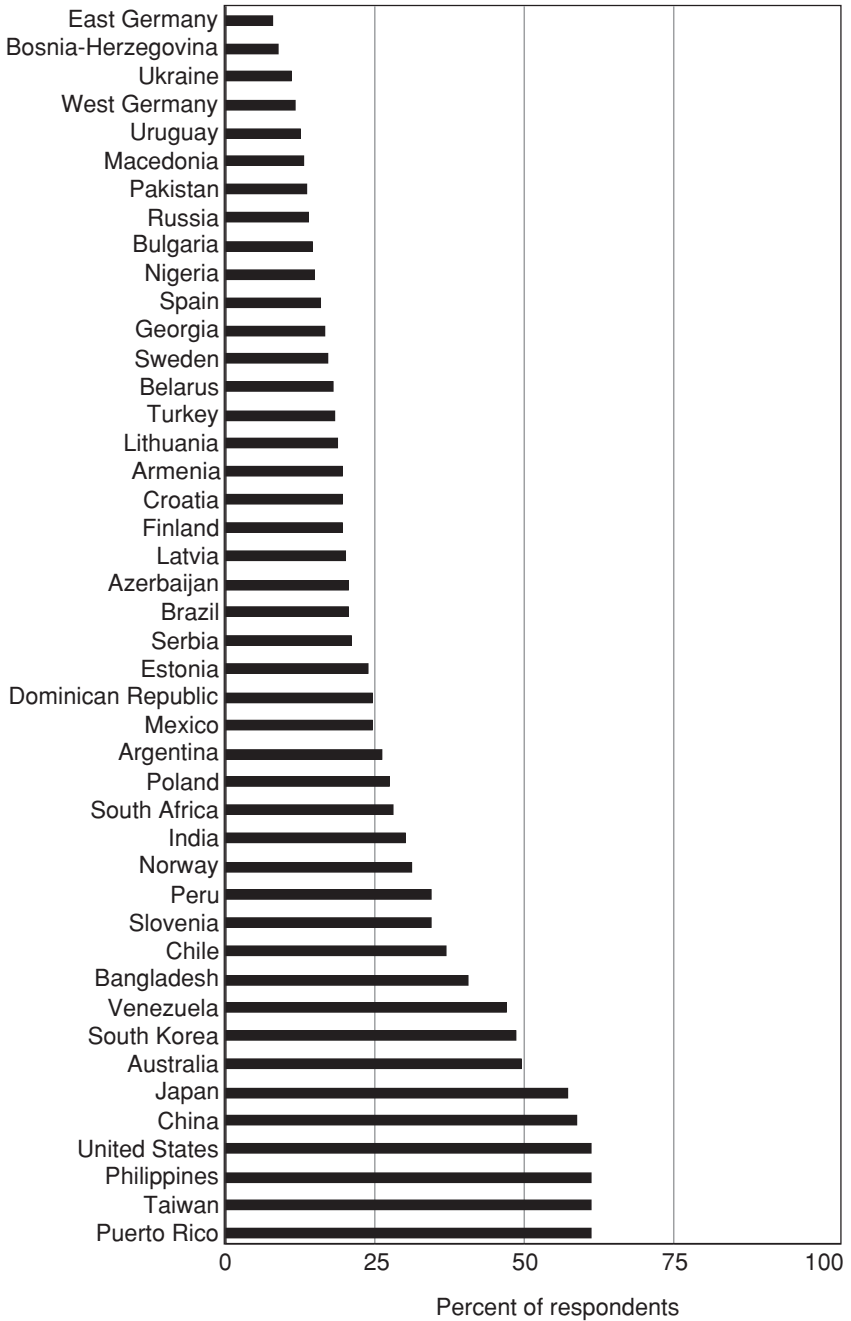


Figure 3 Percent blaming poverty on the laziness and lack of willpower of the poor (data from Reference 24, figure reprinted from Reference 59).

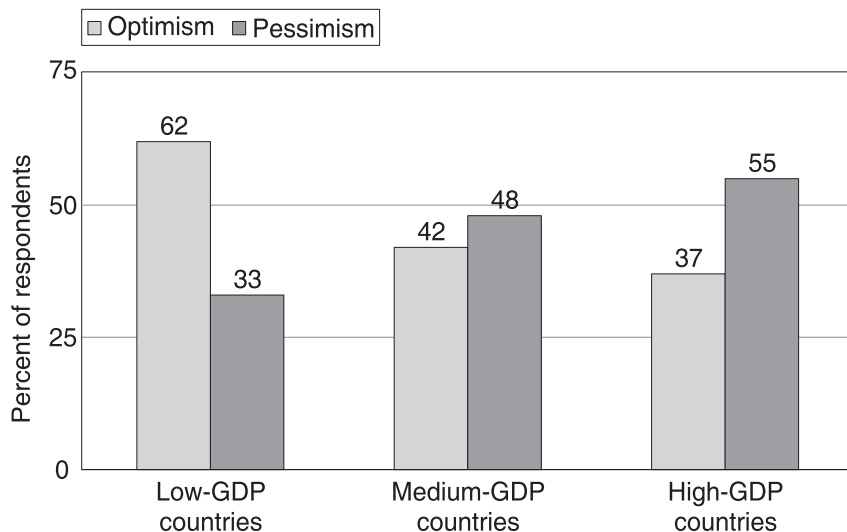


Figure 4 Optimism and pessimism regarding the ability of technology to solve environmental problems. Source: data from Reference 22, figure modified and reprinted from Reference 59.

countries (56%), indicating more skepticism among people in technologically advanced societies. Further, this survey found dramatic differences in technological optimism between richer and poorer countries. Asked whether “new technologies will resolve most of our environmental challenges, requiring only minor changes in human thinking and individual behavior” 62% of respondents from low-GDP countries agreed, whereas 55% from high-GDP countries disagreed (see Figure 4). Reactions to specific technologies also varied widely. Renewable energy technologies generally received positive responses, but nuclear power, chemical pesticides, and biotechnology were viewed with much greater degrees of skepticism and hostility (22, 23, 25, 26, 39).

Finally, equity and entitlements strongly influence human development, particularly for the poor. For example, as global population and affluence have grown, income inequality between rich and poor countries has also increased over time, with the notable exceptions of East and Southeast Asia (40). Inequality within countries has also grown in many rich and poor countries. Similarly, access to entitlements—the bundle of income, natural resources, familial and social connections, and societal assistance that are key determinants of hunger and poverty (41)—has recently declined with the emergence of market-oriented economies in Eastern and Central Europe, Russia, and China; the rising costs of entitlement programs in the industrialized countries, including access to and quality of health care, education, housing, and employment; and International Monetary

Fund–recommended structural adjustment programs in developing countries. Unfortunately, there are no comparative data on global attitudes toward specific entitlements; however, there is much concern that living conditions for the elderly, unemployed, and the sick and injured are deteriorating, as discussed above.

In 2002, large majorities said that the gap between rich and poor in their country had gotten worse over the previous five years. This was true across geographic regions and levels of economic development, with majorities ranging from 66% in Asia, 72% in North America, and 88% in eastern Europe (excepting Ukraine) stating that the gap had gotten worse (12). Nonetheless, 48% of respondents from 13 countries preferred a “competitive society, where wealth is distributed according to one’s achievement,” whereas 34% preferred an “egalitarian society, where the gap between rich and poor is small, regardless of achievement.” Interestingly, two of the largest and most rapidly industrializing countries in the world had opposing views of this issue, with 75% of respondents in China preferring a competitive society, whereas 60% of respondents in India preferred an egalitarian society (Figure 5) (21). More broadly, 47% of respondents from 72 countries preferred “larger income differences as incentives for individual effort,” whereas 33% preferred that “incomes should be made more equal” (21). These results suggest that, despite public perceptions of growing economic inequality, many accept it as an important incentive in a more individualistic and competitive economic system. These global results, however, are limited to just a few variables and gloss over many countries that strongly prefer more egalitarian distributions of wealth (such as India). Much more research is needed to understand how important income equality and equal economic opportunity are considered globally, either as ends or as means to achieve other sustainability goals.

GLOBAL ATTITUDES TOWARD CONTEXTUAL VALUES AND TRENDS

The section Documentary Statements of Sustainability Values, above, described five international efforts to identify values that will support sustainable development. A sustainability transition, however, will take place within the context of broader values and trends, such as freedom, democracy, equality and globalization. These contextual values will also shape people’s willingness and ability to adopt sustainability values, attitudes, and behaviors.

Freedom and Democracy

The Millennium Declaration uses a broad definition of freedom, stating that: “Men and women have the right to live their lives and raise their children in dignity, free from hunger and the fear of violence, oppression or injustice. Democratic and participatory governance based on the will of the people best assures these rights” (6). Although these may be self-evident values to many, there are no

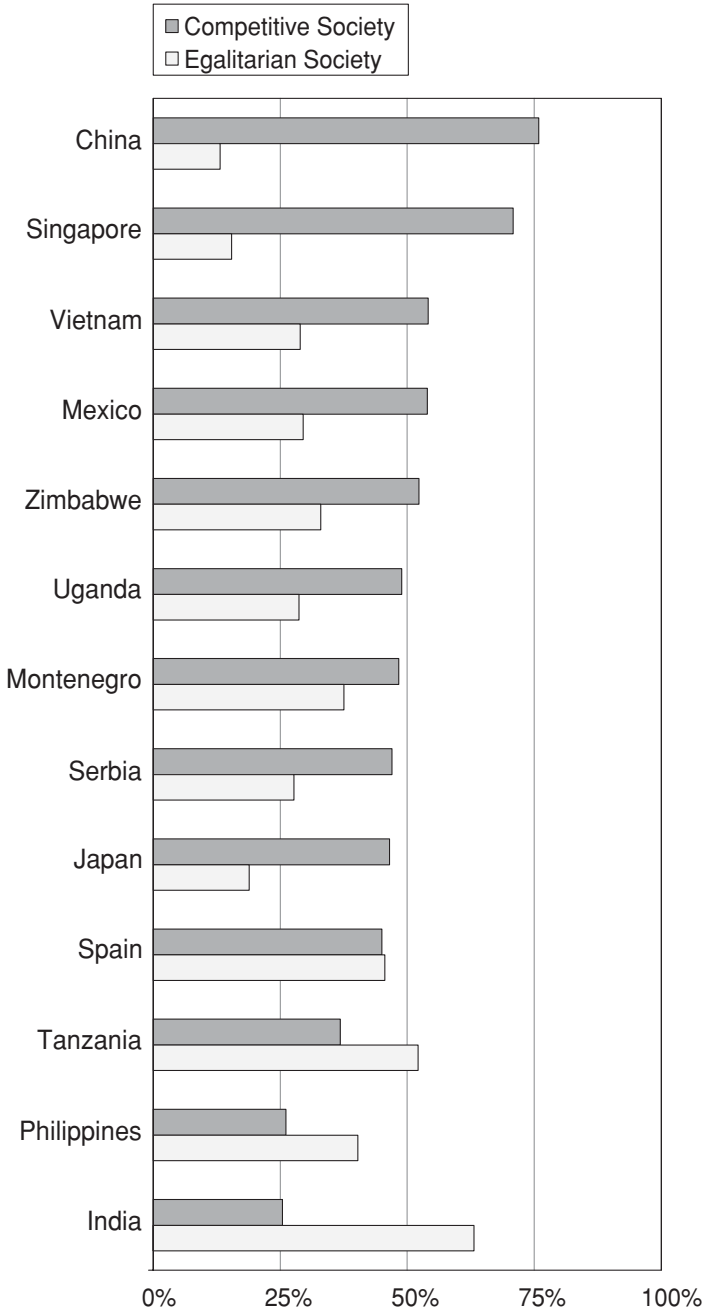


Figure 5 Multinational preferences for a competitive versus egalitarian preferences. Source: data from Reference 22, figure reprinted from Reference 59.

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global-scale survey data on public attitudes toward these declared rights. With the fall of the Berlin Wall and the breakup of the former Soviet Union, however, political freedoms and democratic political systems have spread worldwide, although a number of communist and authoritarian regimes still exist (Figure 6). Among 34 developing countries worldwide, very large majorities of respondents said it was important for them to live in a country with free elections (86%), free speech (87%), freedom of religion (91%), and freedom of the press (80%) (15). Likewise, global attitudes toward democracy are strongly positive. By the year 2000, 88% of respondents worldwide agreed that "Democracy may have problems, but it's better than any other form of government" (42). Likewise, 91% of the global public thought that "having a democratic political system" was important in their own country. Further, democracy is not seen as an exclusively Western system, inappropriate for other cultural contexts. For example, 67% of respondents from 14 African, Asian, and Middle Eastern countries said that "democracy is not just for the West and can work well here," with large majorities in almost all countries (12).

Although large majorities worldwide think highly of democratic systems of government, the world public is evenly split when asked, "if you had to choose between a good democracy or a strong economy, which would you say is more important?" The Pew survey found that only 48% preferred a strong democracy, whereas 45% preferred a strong economy. In particular, very large majorities in the postcommunist states of the Soviet Union, such as Russia and the Ukraine (81%), chose a strong economy over a good democracy, suggesting that democracy still has relatively shallow roots in these societies (12). In addition, large majorities were dissatisfied with democratic development in postcommunist countries such as Russia (84%). In 2000, only 46% of respondents worldwide were satisfied with the way that democracy was developing in their country (21).

These results demonstrate that the world has entered "a democratic age," where democratic ideals and institutions are the preferred form of political organization and decision making. Democracy, however, is still weakly rooted in a number of newly democratic societies, including the former Soviet bloc, and is potentially fragile in a number of societies where corruption, unemployment, and civil strife are common. Further, although large majorities prefer democracy as an abstract ideal, many are also dissatisfied with democratic development in their countries and particularly with their principal democratic institutions.

Capitalism

Worldwide, 58% of respondents agreed with the statement "most people are better off in a free market economy, even though some people are rich and some are poor." Strong majorities agreed in almost all countries, with a few notable exceptions (e.g., Argentina, Japan, and Bulgaria) (12). Likewise, 63% of respondents agreed with the statement "the free enterprise system and free market economy is the best system on which to base the future of the world" (43). Further,

39% said “private ownership of business and industry should be increased,” versus 27% who said instead that “government ownership of business and industry should be increased” (21). Additionally, 61% agreed that “Competition is good. It stimulates people to work hard and develop new ideas,” whereas 13% said instead that “Competition is harmful, it brings out the worst in people.” As mentioned above, 48% of respondents in 13 countries preferred a “competitive society, where wealth is distributed according to one’s achievement,” whereas 34% preferred an “egalitarian society where the gap between rich and poor is small, regardless of achievement.” All of these results indicate that a strong preference has emerged worldwide for free markets, which will in all likelihood be the primary economic system within which global sustainability must be achieved.

Globalization

Globalization “in its simplest sense . . . refers to the widening, deepening and speeding up of global interconnectedness . . .” (44). Trade, a major form of such interconnectedness, has grown at more than twice the rate of the economy since 1950, and 20% of the world’s goods and services pass over a border. Trade in money and capital moves almost instantly and is 100 times the volume of world trade. Ideas, images, songs, and words outpace the flow of products and penetrate many different linguistic, cultural, and political barriers. People and jobs also move rapidly, and the rate of increase in refugees has been even more rapid than that of world trade. Further, as people and products move more rapidly, they bring along infectious diseases of people, crops, and livestock as well as other invasive biota (1).

In 2002, 57% worldwide thought that globalization is “a good thing,” only 17% said it is “a bad thing,” and 25% said they didn’t know (15). Likewise, large majorities worldwide thought that globalization defined either as “increased trade between countries in goods, services and investment” (62%) or “the worldwide flow of information, culture and technology” (72%) were positive things for themselves and their family’s interests (43). But globalization is a catchall term that includes a number of different trends occurring simultaneously, sometimes synergistically and sometimes in opposition to one another. These include not only economic globalization through the integration of world markets and capital flows, but also the growth in communications technologies worldwide (e.g., cell phones and computers), the global reach of cultural products (including movies, television, and music), and the emergence of global networks of nongovernmental organizations (such as those devoted to the advancement of human rights, environmental protection, and even antiglobalization itself). How are each of these trends viewed by the global public?

Very large majorities worldwide thought that faster international communication and greater travel (87%); a world more connected by greater economic trade and faster communications (84%); international trade and business ties (83%); foreign products (78%); and foreign movies, TV, and music (73%) are good things for their own countries. More personally, over 76% of respondents thought that

growing trade and business ties as well as foreign movies, TV, and music are good things for themselves and their families (15).

Regarding the recent past, the Pew study (15) also found that of those respondents who said the availability of good-paying jobs had gotten better over the past five years, more than 60% credited globalization, whereas of those who said availability had gotten worse, only 32% blamed globalization. Likewise, of those who thought that working conditions had worsened or that the gap between rich and poor had grown wider over the past five years, only 28% and 30%, respectively, blamed globalization (15).

By contrast, GlobeScan found that future expectations of globalization were more mixed. Worldwide, majorities or pluralities said that globalization will make the following things better: human rights (57%); the economy in my country (56%); economic development in poor countries (51%); workers rights, working conditions, and wages in the world (47%); peace and stability in the world (47%); and economic equality among people in the world (45%). Conversely, pluralities said that future globalization will make the following things worse: environmental quality (47%), the number of jobs in my country (46%), and poverty and homelessness in the world (45%). Further, majorities worldwide agreed that “when it comes to globalization, there is too much focus on increasing trade and investment and not enough on protecting human rights and the environment (72%),” agreed that globalization threatens their unique culture (49%), and believed that poor countries will not benefit as much from globalization as rich countries (50%) (43). These results demonstrate that worldwide attitudes toward globalization are divided and are as diverse as the subcomponent trends making up globalization as a whole. Although the global public generally views both past and current globalization as a good thing, they are much more skeptical about its potential future impacts on unique cultures, the environment, peace, economic equality, employment, and global poverty.

Equality

The Millennium Declaration states: “No individual and no nation must be denied the opportunity to benefit from development. The equal rights and opportunities of women and men must be assured” (6). At the most general level, 66% of respondents worldwide said eliminating inequality was a requirement of a “just society,” with clear majorities in 28 of 32 countries (42). Unfortunately, no global-scale survey data exist on public attitudes toward the principle of equal economic opportunity for either individuals or nations, with the exception of limited data on the principle of equal opportunity for women (see below). The Millennium Declaration also skirts the issue of the growing gap between rich and poor, both within and between nations. Many argue that narrowing this gap is central to sustainable development, both as an intrinsic goal in itself and a means to support the achievement of many other values and goals [e.g., peace and social cohesion (9, 11)].

But how much worldwide public support is there for the principle of more equal distribution of wealth? And what are the preferred means to accomplish it? As described above, the limited data suggest that, although large majorities worldwide believe the gap between rich and poor is widening, many also prefer competitive economic systems that produce income inequalities while rewarding individual incentive over more egalitarian systems. Again, however, very little global-scale data exist on egalitarian attitudes or on the preferred balance between individualistic and egalitarian social systems. This is a particularly important area for more research, as some national-level studies have found positive correlations between egalitarian worldviews and environmental risk perception, policy preferences, and sustainability-related behaviors (45, 46).

The Millennium Declaration also emphasizes the importance of equal rights and opportunity for both men and women. Greater gender equality is evident in the declining gap between male and female literacy, which fell steadily from 20% in 1970 to 11% in 2000, and parallel trends in the gap between male and female primary school enrollment (16% in 1970, 5% in 2000). Although there are only limited data on global attitudes toward gender equality, they seem to support these trends. In 2000, only 24% worldwide agreed that “a university education is more important for a boy than for a girl,” whereas 72% disagreed (21). These results suggest great progress has been made in changing attitudes toward the principle of equal educational opportunity for women. Regarding gender roles, 68% worldwide thought that a marriage in which “the husband and wife both have jobs and both take care of the house and children” was more satisfying than one in which “the husband provides for the family and the wife takes care of the house and children.” At the regional level, only in the Middle East did a majority of respondents (52%) prefer a sharp differentiation in gender roles and responsibilities. Likewise, only 38% worldwide agreed with the statement that “when jobs are scarce, men should have more right to a job than women,” whereas 50% disagreed (15). These limited results suggest substantial progress has been made in changing attitudes toward several important dimensions of gender equality.

Conversely, although women have achieved great gains in voting rights around the world, they still remain quite underrepresented as political leaders, even in democratically elected governments (47). In part, this reflects attitudes about the leadership abilities of women. For example, in 2000, 49% worldwide agreed with the statement that “on the whole, men make better political leaders than women do,” including 42% of all women (21). Again, this attitude was especially prevalent in the Middle East. These results suggest that there are still strong biases in many countries against the political empowerment of women, including, in some cases, by women themselves.

Shared Responsibility

The Millennium Declaration states that, “Responsibility for managing worldwide economic and social development, as well as threats to international peace and

security, must be shared among the nations of the world and should be exercised multilaterally. As the most universal and most representative organization in the world, the United Nations must play the central role” (6).

There are no global-scale data on public attitudes toward the value of shared responsibility and only limited data on multilateralism as a preferred means to achieve this goal. There are, however, data on public attitudes toward the United Nations and other multilateral organizations. Overall, several global-scale surveys have found strong public trust, confidence in, and evaluations of the United Nations. Public reaction to other multilateral institutions such as the World Trade Organization, the World Bank, and the International Monetary Fund, however, has been more mixed.

The Voice of the People survey found that worldwide 55% of respondents trusted the United Nations “to operate in society’s best interests,” whereas 34% did not (17). Further, 64% of respondents worldwide said the United Nations was having a good influence on the way things were going in their own country (15). By contrast, surveys have found lesser global trust in the World Trade Organization (44%) and the World Bank (43%), whereas the International Monetary Fund was distrusted by a slight plurality (41%) (17). Nonetheless, 58% of respondents worldwide said these international institutions were also having a good influence on the way things were going in their own country, with pluralities or majorities in all countries sampled except in Argentina, Brazil, Turkey, and Jordan, where strong majorities rated these organizations negatively (15).

Finally, the 2000 World Values Survey asked whether national governments, the United Nations, or national governments coordinated by the United Nations should make policy decisions regarding several critical problems. Overall, pluralities preferred that the United Nations coordinate national policy making for human rights, refugees, aid to developing countries, and international peacekeeping (Figure 7).

A strong plurality (46%), however, preferred that national governments alone make policy decisions regarding environmental protection (21). Significantly, there was a distinct split between developed and developing countries regarding this issue. Developed countries strongly preferred UN coordination, whereas developing countries strongly preferred national control. This may reflect the desire of developing countries to maintain control over natural resources, especially within postcolonial countries, or concern that global policy making led by the United Nations may restrict national economic development. This is a critical issue because sustainable development must also address global environmental problems (e.g., climate change, overfishing) that require international coordination.

Social Change

The 2000 World Values Survey asked respondents to choose between three types of social change: “(1) The entire way our society is organized must be radically changed by revolutionary action; (2) Our society must be gradually improved by reforms; and, (3) Our present society must be valiantly defended against all

subversive forces” (21). Worldwide, 63% chose gradual reform, 12% preferred radical change, and 16% said the status quo should be defended. At the national level, a plurality preferred radical change only in Vietnam, whereas pluralities preferred a staunch defense of current society only in Jordan and Tanzania (21). These results demonstrate a progressive attitude toward social change in most of the world. Although suggestive, this is only a single question, cast at an abstract level. Global opinions about social change might well be different if examined within particular domains with important sustainability implications, such as the need to move beyond fossil fuel–based economies, addressing the AIDS epidemic, and equal educational access for women and minorities. It is also possible that the phrasing of the question itself influenced the results, as some arguably may desire radical change, but not via revolutionary action, which can connote violent means.

IMPLICATIONS FOR SUSTAINABILITY

Most advocates of sustainable development recognize the need for changes in human values, attitudes, and behaviors in order to achieve a sustainability transition. The degree of change needed, however, depends on how one defines and envisions the goals of sustainability. For example, three different sets of benchmark goals are (a) the short-term (2015) goals of the Millennial Declaration, (b) the two-generation goals (2050) of the Sustainability Transition, and (c) the long-term (beyond 2050) goals of the Great Transition. These three visions of sustainable development articulate widespread views, concrete goals, and specific indicators, yet provide different temporal perspectives and pose different challenges.

Values, Attitudes, and Behaviors Needed for the Millennial Goals

A major short-term benchmark for sustainable development is the set of millennial goals adopted by the UN General Assembly in September 2000. In all, some 60 goals addressed peace, development, environment, human rights, hunger, poverty, Africa, and the United Nations. Many of these contained specific targets such as cutting poverty in half or insuring universal primary school education by 2015, and for eight of the major goals, progress is currently monitored by international agencies. In 2003, they concluded that at existing rates of progress many countries will fall short of these goals, particularly in Africa. Yet the goals seemed attainable by collective action both by the world community and by national governments. A 2002 estimate of the additional financial resources required to meet the Millennium Development Goals was in the range of US\$40–\$70 billion per year. This represents roughly a doubling of official aid flows over 2000 levels but would still be less than the UN goal of 0.7% of GNP for industrialized countries (48).

The values as reflected in surveyed public attitudes for such aid disbursements are in place, although public attitudes indicate low salience and poor understanding of aid amounts and issues. Thus, it is a collective (societal, not individual) gap

between attitudes and behavior that needs to be bridged, rather than fundamental value change, in order to meet this short-term benchmark.

Values, Attitudes, and Behaviors Needed for a Sustainability Transition

In 1995, the U.S. National Academy of Sciences (NAS) began to map a strategy for the emerging field of sustainability science in support of sustainable development. The NAS focused on a two-generation time horizon to address the needs of a global population with 50% more people than there are today. They proposed that a minimal sustainability transition would be one in which “the world provides the energy, materials, and information to feed, nurture, house, educate, and employ the many more people of 2050—while reducing hunger and poverty and preserving the basic life support systems of the planet” (1). The NAS then defined a set of specific, concrete goals, drawing upon the existing agreements and goals of global conferences, world summits, and international environmental treaties and assessments. The NAS anticipated many of the subsequent UN Millennium Declaration goals. Less sanguine than the United Nations, however, the NAS determined it would take at least a generation to reach the 2015 goals of the Millennium Declaration and another generation to achieve the Declaration’s goals to reduce hunger and poverty.

With the assistance of the Global Scenario Group, the NAS then conducted a scenario analysis of their proposed Sustainability Transition, focusing specifically on hunger and the emission of greenhouse gasses (1). The analysis concluded that a sustainability transition is possible without positing either a social revolution or a technological miracle. But it is just barely possible, and the technological and social requirements to move from business as usual without changing lifestyles, values, or economic systems are daunting. Most daunting of all is the governmental commitment and political will required to achieve it.

Again, one can argue that the values needed to achieve the Sustainability Transition are already in place, but it is the gap between attitudes and behavior, both individual and collective, that needs to be bridged. Such gaps are especially noteworthy in the persistence of hunger in Africa and the rapid growth in energy and materials consumption by developed countries and the megacities of newly industrializing countries. It is difficult to see how this can be reversed without some significant change, not only in the attitude-behavior gap, but also in individual lifestyles. But here again, some of the values that will support such a lifestyle change, such as worldwide respect for nature, are already widely held, although not currently prioritized over other competing values.

Values, Attitudes, and Behaviors Needed for the Great Transition

The Great Transition scenario posits a world beyond 2050 in which the quality of human knowledge, creativity and self-realization are the measure of development,

not the quantity of goods and services. While providing material sufficiency for all, it embraces equality, empowerment, and deep respect for the intrinsic values of nature. The Great Transition scenario specifically declares value change as a major tool and requirement for attaining a sustainable world, which would also require changes in lifestyles and in economic and social institutions. The Great Transition Initiative has since suggested that the requisite values are the quality of life, human solidarity, and ecological sensibility (49).

To what extent are the value changes necessary to achieve the Great Transition underway? As noted above, there is support for the minimal goals of the Millennium Declaration and the Sustainability Transition yet only weak evidence of a global rejection of consumerism and mixed support of equity. Likewise, the limited data available do not provide coherent views as to what constitutes quality of life. There appears to be strong global support for economic prosperity in the abstract and widespread pleasure in material consumption for oneself and one's family yet only moderate support for the concept of less emphasis on money and material possessions. There are, however, strong and positive environmental attitudes worldwide and considerable support for the values of accountability, democracy, and participation.

Moreover, many contextual values can potentially either support or discourage a Great Transition. For example the values of individualism identified by the Great Transition scenario (freedom, self-realization, creativity, and empowerment), although important for quality of life, can also lead to a self-satisfying consumerism. Likewise, the values of collectivism (community, solidarity, cohesion, and cooperation) support the Great Transition, but also underlie much pernicious nationalism and ethnic conflict, which both restrict the circle of inclusion and define an us-versus-them. In all, significant change in human values and priorities will be required to achieve the Great Transition.

Overall, existing global values and attitudes appear sufficient for the achievement of the Millennium Goals, although the collective attitude-behavior gaps need to be bridged. By contrast, existing global values and attitudes will require some limited change to achieve the Sustainability Transition scenario and will likely need significant change to achieve the Great Transition.

Acting on Values, Attitudes, and Behaviors

This review leads to three conclusions regarding how to use our current understanding of values, attitudes, and behavior to support sustainable development: accelerating action, bridging barriers, and choosing values.

ACCELERATING ACTION Many requisite values and attitudes are already in place to meet the Millennium Goals, but action, especially collective action, lags behind. Large, long-term trends (economic, demographic, political) are often the underlying drivers of policy action, but responses to these trends tend to be relatively slow, incremental, and piecemeal. There are also, however, many noteworthy examples

of nonlinear, abrupt, and accelerated action in response to particular events. For example, the discovery of the ozone hole, the *Exxon Valdez* oil spill, the Three Mile Island nuclear accident, and the 9/11 terrorist attacks are all examples of powerful, focusing, and galvanizing events that led to abrupt shifts in national and international policies, priorities, and actions. Even long-term, broad social movements, e.g., Civil Rights in the United States, were greatly catalyzed by defining moments such as the "I have a dream" speech of Martin Luther King, Jr., and televised images of dogs and water cannons attacking peaceful marchers in Birmingham, Alabama.

These accelerations in collective action often derive from at least four conditions: public values and attitudes, vivid imagery (focusing events), ready institutions and organizations, and available solutions (50). The U.S. Civil Rights Movement, for example, was galvanized by dramatic televised images of overt racism, which offended widely held values of justice, fairness, and equality. The movement was spearheaded by variety of organizations, especially African-American churches and individual leaders (such as Martin Luther King, Jr.), that skillfully forced long-ignored issues of race relations onto the national agenda. Finally, structural solutions were relatively quickly constructed and passed by government, including the repeal of Jim Crow laws, the Civil Rights Act (1964), and the Voting Rights Act (1965). Another example is the relatively quick international adoption and implementation of the Montreal Protocol on Substances that Deplete the Ozone Layer (1987). Global publics already had strong values and attitudes favoring the protection of human and environmental health. The discovery of ozone depletion and perhaps more importantly, the identification of the ozone "hole" provided a vivid image and metaphor that carried strongly negative connotative meanings. Chlorofluorocarbons (CFCs) were quickly identified as the cause. Further, a broad set of health, environmental, and industry nongovernmental organizations were already poised and ready to respond to the crisis. Finally, the companies that produced CFCs were able to develop substitutes quickly and were positioned to take advantage of a regulatory environment that phased CFCs out of production and created a new market in the alternatives. These and many other examples demonstrate that social, political, and economic change, although often slow and incremental, can occasionally experience rapid accelerations (51, 52).

An acceleration of individual action for sustainability is also important. Again, history suggests that long-term trends in individual behavior occasionally experience dramatic change. Smoking, drunk driving, seat belts, and littering are all examples of individual behaviors that have undergone relatively rapid changes, at least in some countries. These changes in individual behavior both contribute to and respond to structural change. Growing public pressures contributed to the adoption of stricter laws, penalties, and enforcement measures related to these individual behaviors. In turn, the implementation of these structural changes led to significant reductions in smoking, drunk driving, and littering as well as significant increases in seat belt use. Structural and individual behavioral changes are both crucial and often mutually supportive, creating positive feedback and accelerating the rate of social change. For example, in response to public safety concerns

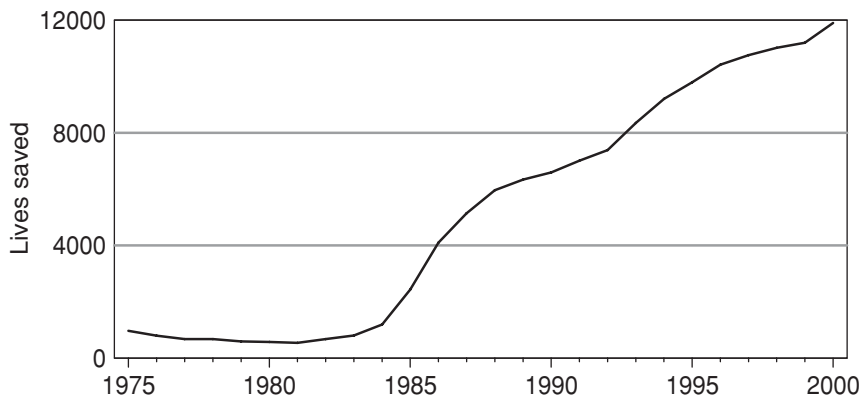


Figure 8 Estimated number of lives saved each year by use of safety belts, 1975–2000 (60).

in 1984, many U.S. states started requiring automobile passengers to wear seat belts, leading to a dramatic increase in the number of lives saved in auto accidents (Figure 8).

It appears the world could be nearing such a takeoff for sustainable development. Many requisite public values and attitudes are already in place. Thousands of nongovernmental organizations are dedicated or partially focused on various aspects of sustainable development, global summits dedicated to the subject have been held, and sustainability has become an important agenda item for many governments and industries, including corporations, cities, states and provinces, individual countries, multilateral organizations, and the United Nations. Further, many of the solutions are already at hand. Sustainability, however, still lacks a defining, vivid image or particular focusing event. Of course, sustainability encompasses many diverse problems, each of which may or may not have a defining, compelling image. For example, ozone depletion does, whereas global climate change still does not. The global issues of famine, poverty, genocide, workers rights, and gender equality all receive episodic attention from the global media as new crises erupt but are soon displaced by other stories. Further, the term “sustainability” lacks either a strong negative or positive image, and some argue that the term itself is problematic. The Great Transition scenario, however, represents at least one attempt to articulate a partly utopian and partly pragmatic vision of a better world to inspire and motivate individual and collective behavioral change.

BRIDGING BARRIERS Widely shared sustainability values and attitudes are a necessary but insufficient condition for the achievement of sustainability goals. Values and attitudes, despite their importance, often do not translate directly into actual behavior, and many research studies have identified critical gaps and barriers between expressed values or attitudes and actual behaviors, at both the

individual and the collective levels (53–55). There are a number of critical gaps or barriers that obstruct the translation of abstract values and attitudes into concrete actions. These include at least three types of barriers. First are the existence, direction, and strength of particular values and attitudes. For example, despite a remarkable global public consensus regarding the value of environmental protection, the current human-nature relationship is clearly unsustainable. In this case, global environmental values exist and are heading in the right direction but remain low priorities relative to other values (e.g., economic growth).

A second type of barrier to sustainable behaviors can be found at the level of the individual. Individuals often lack the time, money, access, literacy, knowledge, skills, power, or perceived efficacy to translate their values into action. Clearly, if one does not know about modern contraception, it is much more difficult to translate the desire for fewer children into action. Alternatively, one may wish to buy organic produce to satisfy the values of personal or environmental health yet be unable to afford to pay higher prices for these products. Likewise, one may desire increased accountability in government yet feel powerless to effect changes in the larger system. Finally, mere habit and routine are important barriers in the lives of many individuals; it takes time and energy to overcome bad habits, even habits as simple as leaving the lights on in an unoccupied room.

A third type of barrier between values, attitudes, and behaviors is structural, including laws, regulations, perverse subsidies, infrastructure, available technology, social norms and expectations, as well as the broader social, economic, and political context (e.g., the price of oil, interest rates, currency exchange rates). For example, one may wish to use mass transit, such as high-speed rail as an alternative to the automobile, but if the infrastructure is not available, this value cannot be implemented. As described above, structural barriers, including laws, available technology, and social norms, may constrain individuals who wish to use contraception or family planning services to reduce fertility. Finally, macroeconomic contextual factors, including oil prices and interest rates, can have large impacts on sustainability behaviors. For example, as oil and gasoline prices rise, consumer demand for more fuel-efficient vehicles increases.

Thus, each particular sustainability behavior may confront a unique set of barriers between values, attitudes, and behaviors. Further, even the same behavior (e.g., contraceptive use) may confront different barriers across society, space, and scale, with different values or individual and structural barriers operating in developed versus developing countries or secular versus religious societies or at different levels of decision making (e.g., individuals versus legislatures). Achieving consensus goals, like those of the Millennium Declaration, will require a focus on the barriers operating in any specific situation as well as barriers that seem to obstruct sustainability across multiple contexts (e.g., gender equality).

CHOOSING VALUES Finally, we live in a world of limited resources, including time, energy, money, and attention. In this context, human beings are forced to

choose, consciously or unconsciously, between competing values. Individuals and societies may unanimously support abstract values, such as economic growth, security, freedom, and environmental protection in isolation, but in the realm of concrete decision making, these values are often incommensurate, and trade-offs have to be made. For example, large majorities worldwide value both environmental protection and economic prosperity. Yet these two values often conflict in particular situations, as difficult choices have to be made between species protection versus commercial exploitation, forest protection versus logging, or shifting to cleaner, but more expensive energy sources versus the exploitation of polluting, but cheap fossil fuels, e.g., coal. It is typically only in the concrete decisions that the tensions between different values or the existence of hidden attitudes become apparent. Almost all choices involve some explicit or implicit system of weighting or prioritizing different values, ranging from the individual choice of which vehicle to buy (power versus comfort versus safety versus fuel-efficiency) to collective choices about whether or how to reduce greenhouse gas emissions (economic growth versus environmental protection versus equity). Further, these collective decisions are often made even more difficult because some decision makers are willing to compromise and trade off particular values, whereas others consider certain values absolute and view any effort to compromise them as taboo (56). Thus, most debates over social policies, decisions, and actions are fundamentally disagreements over the relevance and priority of particular values.

Sustainable development, at the most abstract level, emphasizes the values of economic development, environmental protection, and social progress/equity. Although nearly all participants may agree in the abstract about the importance of each of these three “pillars,” there are clearly strong tensions between these values, which often underlie the heated debates over concrete decisions and actions. Yet these divergent values and priorities are rarely explicitly discussed, a situation that often leads to greater misunderstanding, intensified conflict, and gridlock. The Millennium Declaration represents a global effort to explicitly identify and reach a consensus on essential values and attitudes to guide future sustainable development. Further, the achievement of long-term sustainability goals, such as the Great Transition, will require an open, inclusive, and continuing global dialogue about what “the good life” should look like, how to live it, and the values, attitudes, and behaviors, both individual and collective, that will support it.

Achieving global sustainability is one of the greatest challenges of the twenty-first century. History teaches us that human values, attitudes, and behaviors can change, sometimes dramatically, for both good and ill. Unlike the past, however, global society today has the opportunity, emerging knowledge, and resources to consciously create the future it desires. The study of sustainability values, attitudes, and behaviors will play a critical role in this emerging global dialogue about what the good life should mean for the varied peoples and places of Earth.

RESEARCH LIMITS AND FUTURE DIRECTIONS

Most advocates of sustainable development recognize that for it to be realized would require changes in human values, attitudes and behaviors . . . Despite the importance of such value changes, however, relatively little is known about the long-term global trends in values, attitudes, and behaviors that will both help or hinder a sustainability transition (Reference 61).

This review summarizes what is currently known about global sustainability values, attitudes, and behaviors by drawing upon the few multinational and quasi-global-scale surveys that have been conducted. Each of these surveys measured a different part of the “sustainability elephant,” and none had sustainable development as their primary research focus. Likewise, most studies were not theory driven and therefore aimed merely to describe, not explain, global trends in values, attitudes, and behaviors. Some of this data is proprietary, and each survey sampled a different set of countries, making it difficult to do comparative analysis. Further, few efforts, with the exception of the World Values Survey and the GlobeScan Monitor surveys, have measured trends over time. Finally, this review found, in most cases, only limited data available and in many other cases no data at all. Clearly, much work remains to be done, at multiple scales and using multiple methodologies, to identify and understand the key relationships between sustainability values, attitudes, and behaviors, as well as to further apply that knowledge in the effort to “bend the trends” and accelerate the transition toward sustainability.

In the course of this review, a number of important research questions have emerged, including

- Which values and attitudes underlie (un)sustainable behavior?
- How do specific values, attitudes, and behaviors reinforce or contradict one another?
- Can we identify distinct groups or segments within the public holding different sets of sustainability values, attitudes, and behaviors?
- What are the most critical attitude-behavior gaps and what can be done to bridge them?
- What are the primary individual and structural barriers that constrain sustainable behavior in particular social, economic, political, cultural, and geographic contexts?
- What can we learn from past successful and unsuccessful efforts to change public attitudes and behaviors?
- What value and lifestyle changes will be required to achieve the Great Transition scenario?
- How do changes in contextual values (e.g., freedom and democracy, equality, capitalism, globalization) help or hinder sustainable development?
- What explains the differences in sustainability values, attitudes, and behaviors across different nations, regions, or levels of economic development?

We encourage collaborative research to identify, measure, and explain the trends in global sustainability values, attitudes, and behaviors over time. This research should integrate survey, ethnographic, historical, and experimental methods leading to both global-scale surveys repeated at regular time intervals and local-scale, intensive studies to identify and overcome critical barriers to sustainable behavior. These collaborations should involve the active participation and training of scientists from both developed and developing countries. Finally, we propose, as an invaluable first step, that an international workshop be convened to gather the lessons learned from past global-scale surveys, identify key future research questions, and develop a collaborative research program.

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LITERATURE CITED

1. Natl. Res. Council., Policy Div., Board Sustain. Dev. 1999. *Our Common Journey: A Transition Toward Sustainability*. Washington, DC: Natl. Acad.
2. Maio GR, Olson JM, Bernard MM, Luke MA. 2003. Ideologies, values, attitudes, and behavior. In *Handbook of Social Psychology*, ed. J Delamater, pp. 283–308. New York: Kluwer Acad./Plenum
3. Marshall MG, Gurr TR. 2005. *Peace and Conflict 2005*. College Park, MD: Cent. Int. Dev. Confl. Manag., Univ. Maryland
4. Adams WM. 1990. *Green Development: Environment and Sustainability in the Third World*. London: Routledge
5. World Comm. Environ. Dev. 1987. *Our Common Future*. New York: Oxford Univ. Press
6. UN Gen. Assem. 2000. *United Nations Millennium Declaration: 2000*. New York: UN Dep. Public Inf.
7. Earth Chart. Int. Secr. 2000. *The earth charter*. <http://www.earthcharter.org>
8. World Summit Sustain. Dev. 2002. *The Johannesburg Declaration on Sustainable Development*. http://www.housing.gov.za/content/legislation_policies/johannesburg.htm
9. Raskin P, Banuri T, Gallopín G, Gutman P, Hammond A, et al. 2002. Great transition: the promise and lure of the times ahead. *SEI PoleStar Ser. Rep. 10*, Glob. Scenar. Group, Stockholm Environ. Inst., Boston, MA
10. UN. 2004. *Millennium development goal indicators database*. http://millenniumindicators.un.org/unsd/mi/mi_goals.asp
11. Earth Chart. Int. Secr. 2004. *The*

- earth charter initiative handbook. <http://www.earthcharter.org/files/resources/Handbook.pdf>
12. Pew Res. Cent. People & Press. 2003. *Views of a Changing World*. Washington, DC: Pew Res. Cent.
 13. Revkin A. 2005. A new measure of well-being from a happy little kingdom. *New York Times*, Oct. 4, p. 1
 14. UN Dep. Econ. Soc. Aff., Popul. Div. 2003. *World Population Prospects: The 2002 Revision*. New York: UN
 15. Pew Res. Cent. People & Press. 2004. *The Pew Global Attitudes Project Dataset*. Washington, DC: Pew Res. Cent.
 16. Organ. Econ. Co-op. Dev. 2005. *Official development assistance increases further—but 2006 targets still a challenge*. http://www.oecd.org/document/3/0,2340,en_2649_34447_34700611_1_1_1_1,00.html
 17. Environics Int. 2002. *The world economic forum poll: global public opinion on globalization. Exec. brief*. http://www.globescan.com/brochures/WEF_Poll_Brief.pdf
 18. Organ. Econ. Co-op. Dev. 2003. *Public Opinion and the Fight Against Poverty*. Paris: OECD Dev. Cent.
 19. Program Int. Policy Attitudes. 2001. *Americans on foreign aid and world hunger: a study of U.S. public attitudes. Exec. Summ.* http://www.pipa.org/OnlineReports/ForeignAid/ForeignAid_Feb01/ForeignAid_Feb01_rpt.pdf
 20. Smillie I, Helmich H, eds. 1999. *Stakeholders: Government-NGO Partnerships for International Development*. London: Earthscan
 21. Inglehart R, Basanez M, Diez-Medrano J, Halman L, Luijkx R. 2004. The 1999–2002 values surveys integrated data file 1.0. See Ref. 42, companion CD-ROM
 22. Environics Int. 2000. *Environics International environmental monitor*. <http://jefflab.queensu.ca/poadata/info/iem/iemlist.shtml>
 23. Pew Res. Cent. People & Press. 2002. *What the World Thinks in 2002*. Washington, DC: Pew Res. Cent.
 24. Inglehart R, Basanez M, Diez-Medrano J, Halman L, Luijkx R. 2002. World values surveys and European values surveys, 1981–1984, 1990–1993, and 1995–1997. In *Inter-University Consortium for Political and Social Research* (computer file). Ann Arbor, MI: Inst. Soc. Res.
 25. Environics Int. 2002. *International Environmental Monitor*. Toronto, Can.: Environics Int.
 26. Eur. Opinion Res. Group. 2002. Eurobarometer: energy: issues options and technologies. Science and society. *Rep. EUR 20624*, Eur. Comm., Brussels, Belg.
 27. Ehrlich PA, Holdren JP. 1972. Review of *The Closing Circle*, by B. Commoner. *Environment* 24:26–39
 28. Intergov. Panel Clim. Change. 2000. *Emissions Scenarios*, Port Chester, NY: Cambridge Univ. Press
 29. Lambin EF, Turner BL, Geist HJ, Agbola SB, Angelsen A, et al. 2001. The causes of land-use and land-cover change: Moving beyond the myths. *Global Environ. Change: Hum. Policy Dimens.* 11:261–69
 30. Parris TM, Kates RW. 2003. Characterizing a sustainability transition: goals, targets, trends, and driving forces. *Proc. Natl. Acad. Sci. USA* 100:8068–73
 31. UN. 2001. *Majority of World's Couples Are Using Contraception*. New York: UN Popul. Div.
 32. Bongaarts J. 1997. Trends in unwanted childbearing in the developing world. *Stud. Fam. Plan.* 28:267–77
 33. USAID. 2004. *Demographic and health surveys. STAT-compiler*. <http://www.measuredhs.com>
 34. US Bur. Census. 1999. World population profile: 1998. *Rep. WP/98*, Washington, DC
 35. World Bank. 2004. World development indicators CD-ROM 2004 (Computer file). Washington, DC: Int. Bank Reconstr. Dev.

36. World Bank. 2005. Global economic prospects 2005: trade, regionalism, and development (Computer file). Washington, DC: Int. Bank Reconstr. Dev.
37. Environics Int. 2002. Consumerism: a special report. Environics Int., *Rep.*, Toronto, Can.
38. Veblen T. 1899. *The Theory of the Leisure Class: An Economic Study of Institutions*. New York: Macmillan
39. Chicago Council Foreign Relat. 2002. *Worldviews 2002*. Chicago: Chicago Council Foreign Relat.
40. Baumol WJ, Nelson RR, Wolff EN. 1994. *Convergence of Productivity: Cross-national Studies and Historical Evidence*. New York: Oxford Univ. Press
41. Sen AK. 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford, UK: Oxford Univ. Press
42. Inglehart R, Basanez M, Diez-Medrano J, Halman L, Luijckx R, eds. 2004. *Human Beliefs and Values: A Cross-Cultural Sourcebook Based on the 1999–2002 Values Surveys*. Delegación Coyoacán, Méx.: Siglo XXI
43. GlobeScan. 2002. *Global Issues Monitor*. Toronto, Can.: GlobeScan
44. Held D, McGrew AG, Goldblatt D, Perraton J. 1999. *Global Transformations: Politics, Economics and Culture*. Stanford, CA: Polity/Stanford Univ. Press
45. Peters E, Slovic P. 1996. The role of affect and worldviews as orienting dispositions in the perception and acceptance of nuclear power. *J. Appl. Soc. Psychol.* 26:1427–53
46. Leiserowitz AA. 2006. Climate change risk perception and policy preferences: the role of affect, imagery, and values. *Clim. Change* In press
47. Inglehart R, Norris P. 2003. *Rising Tide: Gender Equality and Cultural Change Around the World*. Cambridge, UK: Cambridge Univ. Press
48. Miller MJ, Devarajan S, Swanson EV. 2002. *Goals for development: history, prospects, and costs, Vol. 1*. http://econ.worldbank.org/files/13269_wps2819.pdf
49. Great Transit. Initiat. Coord. Unit. 2006. *Great transition initiative: visions and pathways for a hopeful future*. <http://www.gtinitiative.org/default.asp?action=34>
50. Kingdon JW. 1995. *Agendas, Alternatives, and Public Policies*. New York: Harper Collins Coll.
51. Baumgartner FR, Jones BD. 2002. *Policy Dynamics*. Chicago: Univ. Chicago Press
52. Baumgartner FR, Jones BD. 1993. *Agendas and Instability in American Politics*. Chicago: Univ. Chicago Press
53. Blake J. 1999. Overcoming the ‘value-action gap’ in environmental policy: tensions between national policy and local experience. *Local Environ.* 4:257–78
54. Kollmuss A, Agyeman J. 2002. Mind the gap: Why do people act environmentally and what are the barriers to proenvironmental behavior? *Environ. Edu. Res.* 8:239–60
55. Stern PC. 2000. Toward a coherent theory of environmentally significant behavior. *J. Soc. Issues* 56:407–24
56. Tetlock PE. 2003. Thinking the unthinkable: sacred values and taboo cognitions. *Trends Cogn. Sci.* 7:320–24
57. Inglehart R. 1999. Globalization and post-modern values. *Washington Q.* 23:215–28
58. World Bank. 1995. *World Development Report*. New York: Oxford Univ. Press
59. Leiserowitz AA, Kates RW, Parris TM. 2005. Do global attitudes and behaviors support sustainable development? *Environ. Sci. Policy Sustain. Dev.* 47:20–38
60. US Dep. Transp., Bur. Transp. Stat. 2002. *Transportation statistics annual report 2001*. http://www.bts.gov/publications/transportation_statistics_annual_report/2001/
61. Mabogunje AL. 2004. *Framing the fundamental issues of sustainable development in sub-Saharan Africa*. <http://www.cid.harvard.edu/cidwp/104.htm>

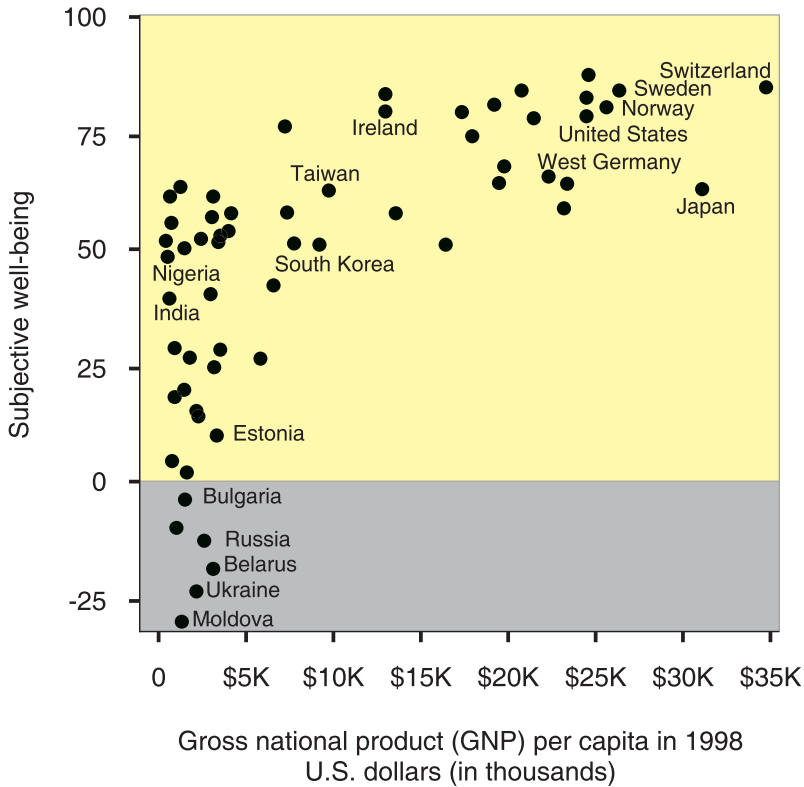


Figure 1 Subjective well-being by level of economic development. The subjective well-being index reflects the mean of the percentage of respondents in each country who describe themselves as very happy or happy minus the percentage who describe themselves as not very happy or unhappy and the percentage placing themselves in the 7–10 range, minus the percentage placing themselves in the 1–4 range, on a 10-point scale on which 1 indicates that one is strongly dissatisfied with one’s life as a whole, and 10 indicates that one is highly satisfied with one’s life as a whole. Sources: figure reprinted with permission from Reference 57, subjective well-being data from Reference 24, GNP per capita for 1993 data from Reference 58.

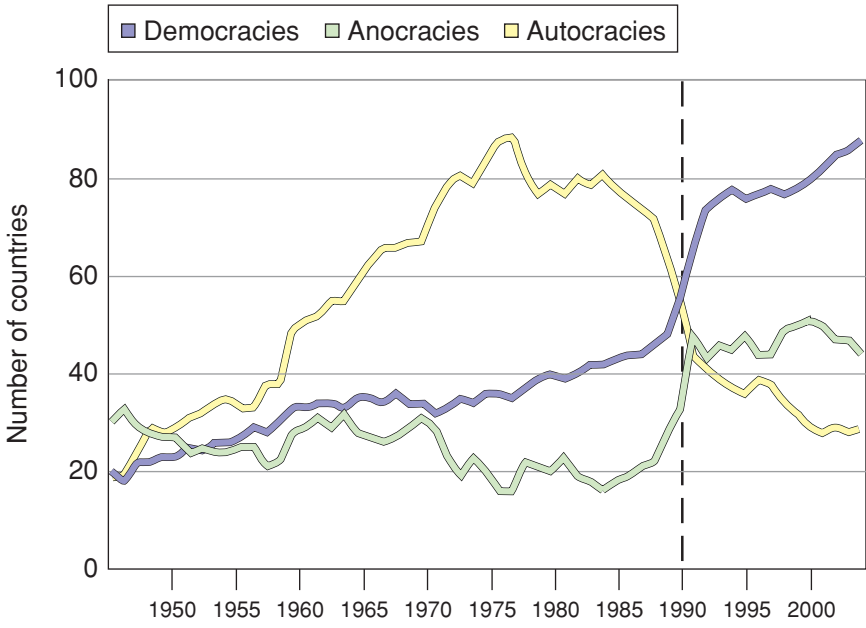


Figure 6 Global regimes by type, 1946–2004. Reprinted with permission from Reference 3.

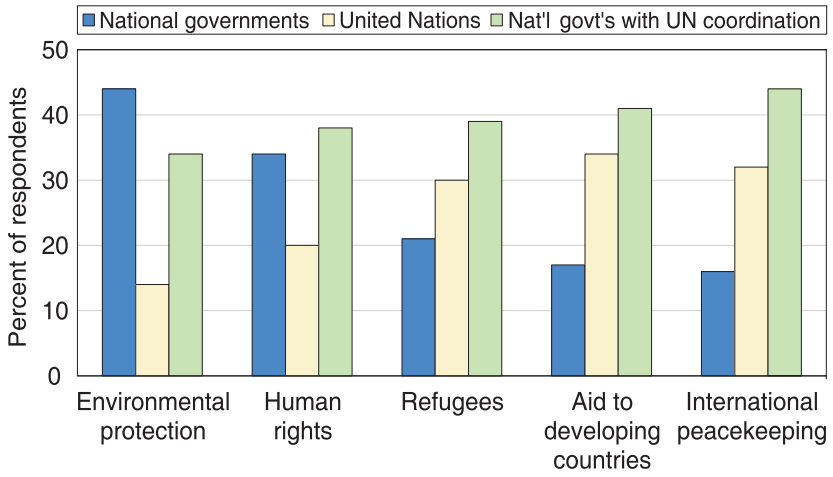


Figure 7 Who should make policy decisions in the following areas? Reprinted with permission from Reference 21.