# CHINA, THE ENVIRONMENTAL DRAGON

## THE ENVIRONMENTAL SECURITY IMPLICATIONS OF CHINA'S RISE TO GREAT-POWER STATUS

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**AEPI IFP 0900**

Army Environmental Policy Institute

**September 2000**

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## ABSTRACT

China, already one of the world's major powers, is a serious candidate for 21st-century great-power status, given its size, population, economic dynamism, military prowess, and relative natural resource availability. But China also is the center of some of the planet's most serious, far-reaching, and growing environmental problems. Because the effects of environmental degradation increasingly cannot be contained within national borders, because overpopulation places extraordinary demands on the earth's supply of nonrenewable resources, and because there is growing recognition of the effects environmental conditions may have on security, there is a growing imperative to assess the environmental security implications of China's emergent standing in the world.

Responsible treatment of environmental security must begin with careful consideration of the definitional bounds of security: whether security is equated with or viewed as something more encompassing than the domain of mere military affairs; and whether individual security, with its obvious link to environmental conditions, bears a demonstrable relationship to national, regional, and global security. This study takes an expansive view of security that goes beyond the narrow confines of military affairs, calls into question traditional notions of sovereignty, territorial integrity, and even intervention, and defines environmental threats as those conditions of environmental degradation and natural resource depletion that endanger security by contributing to civil unrest, collective violence, interstate conflict, or destabilization.

Environmentally, China represents a potential source of considerable volatility and turbulence in the years ahead. Four environmental problems will be of continuing internal significance: (1) water availability, born of geographic maldistribution and competition between agricultural, industrial, and domestic claimants, with the social and economic dislocations that could result; (2) water quality, with its attendant widespread health and economic effects; (3) air quality, also with its attendant health effects; and (4) the availability of arable land, with its implications for food self-sufficiency. Three environmental problems could have more widespread external ramifications: (1) the spread of acid rain from China's coal-burning energy production to other parts of Asia; (2) increased timber demand, which could engender scarcity in other parts of the world; and (3) accelerated energy demands that could harden Chinese claims on offshore oil reserves.

Most knowledgeable China-watchers contend that environmental conditions, in and of themselves, are unlikely to precipitate unrest, violence, or instability there. Nonetheless, the occurrence of other events or circumstances could serve as "autocatalysts" for resultant (largely internal) security crises: natural or man-made disasters (such as repeated massive flooding); large-scale internal and cross-border flows of environmental refugees; fallout from other political, economic, or social crises (such as a sustained financial crisis); or external pressure by the world community over non-compliance with international environmental agreements and standards.

By the same token, the state of China's environment will not be determined in isolation from accompanying developments in the political and economic spheres. Politically, democratization, the internal devolution of power, and the proliferation of private institutions all are likely to have appreciable effects on environmental trends. The technologically induced spread of democracy, in particular, cannot help but heighten public awareness, expectations, and demands on government. Environmental non-governmental organizations (NGOs), which at present have a tentative toehold inside the country, could play an especially crucial role in influencing China's internal stability, depending on how they operate in providing public education, enhancing political participation, facilitating greater levels of environmental transparency, and extending the reach of government.

Economically, technological diffusion, industrialization, globalization, economic Darwinism, and the expansion of the middle class all promise to figure heavily in determining China's environmental future. Globalization, in particular, will produce levels of industrial and financial interpenetration and interdependence that could breed tensions revolving around (a) the insecurity of Chinese officials over foreign industrial penetration, (b) exposure of foreign workers to unsafe environmental conditions, or (c) unduly harsh Chinese environmental compliance measures against foreign firms. At the same time, even though continued economic development seems likely to widen the gap between rich and poor, there still is likely to be an expansion of the middle class. Because environmental activism is a largely middle-class phenomenon, this could give added impetus and power to the environmental movement inside the country—a development that itself could fuel tensions.

The states of the economy and the environment will continue to be inextricably linked. The further elimination of state-owned enterprises and jobs could easily divert attention from environmental progress, heighten environmental risk, and prompt local officials to flout national laws and regulations in the interest of economic recovery. Further environmental degradation, in turn, could affect the country's ability to remain economically viable, to attract foreign capital, and to maintain a productive work force.

For the United States, the challenge ahead will be to acknowledge the importance of environmental matters to security and to ensure that such considerations are factored into our strategic posture and priorities vis-à-vis China. Several actions are called for, including: (1) pursuing viable multilateral mechanisms for environmental adjudication in the region; (2) dramatically expanding available financial mechanisms (e.g., the Overseas Private Investment Corporation and the Trade and Development Agency) for environmental technology transfer to China; (3) institutionalizing a more closely integrated strategic alliance between U.S. government and industry for the coordinated development of environmental business markets inside China; (4) ratifying the Kyoto Protocol on greenhouse emissions reductions, so that that can be used as added leverage for persuading China to take the lead in environmental reform in the developing world; (5) removing the legislative restrictions that currently prohibit U.S. Agency for International Development operations in China, and thereafter establishing a U.S.–Asia Environmental Partnership presence in China for the purpose of providing strategically targeted technical assistance and facilitating U.S. environmental technology penetration; and (6) accelerating the implementation and further expansion of the military-to-military cooperative environmental agreement recently signed by the U.S. and China.

## ACKNOWLEDGMENTS

The authors are indebted to Mr. Robert E. Jarrett, PE, DEE, of the Army Environmental Policy Institute, certainly for providing the funding and guidance for this study, but, more importantly, for his patient and able stewardship of our efforts.

## ACRONYMS

| | |
|---|---|
| AID, USAID | Agency for International Development |
| APEC | Asia-Pacific Economic Cooperation Forum |
| ARF | ASEAN Regional Forum |
| EPA | Environmental Protection Agency (U.S.) |
| EPB | Environmental Protection Bureau (China) |
| Ex–Im | Export–Import Bank |
| FON | Friends of Nature (China) |
| GDP | Gross domestic product |
| GHG | Greenhouse gases |
| GONGO | Governmental non-governmental organization |
| GVB | Global Village of Beijing |
| IHE | Institute for Human Ecology (China) |
| LNG | Liquified natural gas |
| MEDEA | Measurements of Earth Data for Environmental Analysis |
| NGO | Non-governmental organization |
| OPIC | Overseas Private Investment Corporation |
| RMB | Ren Min Bi = Peoples' Currency |
| SEPA | State (China) Environmental Protection Administration |
| SOE | State-owned enterprise |
| TDA | U.S. Trade and Development Agency |
| TWh | Terawatt-hour |
| TVE | Township and village enterprises (China) |
| UNDP | United Nations Development Program |
| US–AEP | United States–Asia Environmental Partnership |

# CHAPTER 1

## A GREAT POWER RISING

One aspect of a country's greatness, notes Yale University's Jonathan Spence, is its capacity to attract and retain the attention of others. This capacity has been evident from the beginnings of the West's encounter with China: "The sharpness of the feelings aroused by China in the West, the reiterated attempts to describe and analyze the country and its people, the apparently unending receptivity of Westerners to news from China, all testify to the levels of fascination the country has generated."[1]

Based on the "sightings" of China observers over the course of seven centuries, Spence concludes that the impact of China need have little or anything to do with the literalness or precision of actual experience, and that individual experience rarely matches the allegedly universal trend. "We must imagine our [China-watching] pilots and navigators," he says,

> . . . holding rather simple instruments in their hands as they make those sightings. Furthermore, the hands that hold the instruments are often chapped with cold or sleek with sweat. Our guides are standing on sloping decks that shift angle without warning, and are often blinded by a burst of spray or dazzled by an unexpected dart from the previously beclouded sun. And the target of their curiosity remains distant and often somber. . . . And then, too, they cannot even be sure that they have come to the right place.[2]

Indeed, they cannot even be sure they have come to the right place. Thus it is that in considering China, present and future, we do well to view with a healthy skepticism the contemporary sightings of even the most expert observers in our midst. There are those who contend, for example, that China is, if not already a great power, destined for great-power status in the years ahead. Henry Kissinger, for one, argues that "China is on the road to superpower status. . . . Of all the great, and potentially great, powers, China is the most ascendant."[3]

At the same time, there are those who point to the fact that China sits atop—and is itself the perpetrator of—some of the most massive environmental problems the world has ever known. In referring to "China's environmental crisis," investigative reporter Mark Hertsgaard has offered this appraisal: "China's huge population and grand economic ambitions make it the most important environmental actor in the world today, with the single exception of the United States. Like the United States, China could all but single-handedly make climate change, ozone depletion, and a host of other hazards a reality for people all over the world." What happens in China, he contends, is therefore central to one of the great questions of our time: "Will human civilization survive the many environmental pressures crowding in on it at the end of the twentieth century?"[4]

It seems axiomatic that the state of the environment is in fact vital to the future of civilization. How central a role, then, can a China that is—or is alleged to be—a great power be expected to play in that future? More importantly, to the extent that there is a fundamental relationship

between environmental conditions and security—individual, national, regional, and global—what are the environmental security implications of China's rise to great-power status?

## CHINA AS AN OBJECT OF STRATEGIC INTEREST

China's standing in the world—whether it is, or is seen to be, a great power—is a question of signal importance. Why? Because of what great powers are capable of doing, what effects their actions and words have on others, and what is expected of them. Great powers, once they have achieved such exalted standing in the eyes of others, must always be reckoned with, taken into account, and, in the extreme, deferred to. They get their way in this world in large part because they are great; and they are great in direct proportion to their ability to get their way.

At one level, great powers are identified as such by virtue of the fact that their status is accorded formal recognition—by their participation in international concerts and congresses and their permanent membership in the U.N. Security Council.[5] In this formal sense alone, China, as one of the five permanent members of the Security Council, is indeed a recognized great power.

At another level, great powers owe their standing to less-formal forms of recognition by others. Here, perceptions, credibility, and rhetorical bestowal of the appellation "great power" or "superpower" are the coin of the realm. Official U.S. policy documents and public statements—such as the annual White House national security strategy report to Congress—typically steer clear of such anointments in the case of China.[6] Somewhat less cautiously, the most recent *United States Security Strategy for the East Asia-Pacific Region*, issued by the Pentagon, refers to "China's rise as a major power" and to China as "a nuclear weapons state, a leading regional military power, and [a] global player with a permanent seat on the UN Security Council."[7] The State Department's December 1996 "China 2000" plan for the U.S. Embassy in Beijing refers to China as "a major political power" and "a nuclear power" that "is becoming a global economic giant whose economy will soon rank among the world's largest."[8]

Less official, but nonetheless telling characterizations of China that reflect the thinking of elements within the U.S. defense establishment are contained in the recent annual strategic assessments published by the U.S. National Defense University. The 1997 assessment speaks of "the emergence of China as a great power [one of five in the world] and its large influence on the affairs of the Asia Pacific region" due to its size, location, and potential. Within a decade, the report contends, "China could become a power that is a peer to the U.S. in the East Asian theater."[9] The 1998 assessment takes a different approach in portraying China as "the most important transition state": "Of all the transition states [others being Russia and India], China is the most significant, because it will eventually develop a degree of comprehensive national strength sufficient to challenge the values of the core [the United States and its free-market, democratic partners in Western Europe and Northeast Asia], should it choose to do so."[10]

Much of the image we have of China's strength and standing in the world is shaped by the authoritative views of both China watchers and geostrategists, whose perceptions create the "reality" the rest of us accept. Alone among recent U.S. presidents in his credibility on international affairs, Richard Nixon said that China "is destined to be one of the world's leading

powers in the twenty-first century. . . . The potential of a billion of the ablest people in the world will inevitably make China into an economic giant and also a military giant."[11]

Similarly, former Japanese prime minister Kiichi Miyazawa recently observed: "By the year 2020, China will be a huge economic power as well as military power. It is bound to become the other giant power that, with the United States, will have the main say in the world 20 or 30 years from now."[12]

Many others have echoed these views. Former presidential national security adviser Brent Scowcroft, for example, calls China "an emergent great power." Murray Weidenbaum, former chairman of the president's Council of Economic Advisers, has noted: "Of all the fundamental global changes the 21st century will bring, China's rise to great power will be one of the most dramatic." Richard Haass, a senior member of President Bush's national security council staff, concurs: "No relationship may prove as fateful as that between the United States and China. Indeed, managing China's emergence as a great power could well prove to be the defining foreign policy effort of this era." President Carter's national security adviser Zbigniew Brzezinski, more measured in his assessment, suggests that although it is quite unlikely, even under the best of circumstances, that China could become a truly competitive *global* power, the country "is well on the way to becoming the preponderant *regional* power in East Asia."[13]

One of the most provocative and tendentious treatments of the subject is the 1997 book, *The Coming Conflict With China*, by long-time journalists and China hands Richard Bernstein and Ross Munro. They argue that China, armed with growing military and economic strength, combined with the nation's ambitions and xenophobic impulses, seeks to achieve regional hegemony that could challenge American global supremacy and even lead to military conflict with the United States:

> China, after floundering for more than a century, is now taking up the great power role that it believes, with good reason, to be its historical legacy. . . . China is an unsatisfied and ambitious power whose goal is to dominate Asia, not by invading and occupying neighboring nations, but by being so much more powerful than they are that nothing will be allowed to happen in East Asia without China's at least tacit consent.[14]

Such views both reflect and further feed prevailing popular opinion on China's standing in the world. The most recent Gallup-Chicago Council on Foreign Relations survey of foreign-policy opinion leaders and the general public offers a number of important findings in this regard. Nearly equal percentages of the general public (57%) and leaders (56%) consider China's development as a world power to be a critical threat to U.S. vital interests; 95% of leaders and 74% of the public consider China a vital interest of the United States; and 97% of leaders and 69% of the public believe China will play a greater role in the world in the next ten years than it does today. A late-1997 Gallup poll likewise found that 22% of the American public consider China a current economic and military superpower, while 49% think that China, though not now a superpower, promises to become one.[15]

Perceptions play heavily in the great-power game. To be perceived as a great power or superpower is, in some sense, to *be* a great power. Thus, when George Washington University's David Shambaugh notes, "That China will emerge as a superpower early in the twenty-first

century has achieved the status of conventional wisdom,"[16] it forces us to a third level of great-power analysis—the level of actual capabilities, possessions, and potential. Such considerations provide ostensibly objective grounds for adjudging whether China—or any other country—deserves to be called a great power.

In terms of physical size, China is the fourth largest country in the world—about 3.7 million square miles, placing it behind Russia, Canada, and (when Alaska is included) the United States. It shares borders with 15 other countries, ranks third in the world in its reserves of natural resources, and has the highest hydropower potential in the world. With close to 1.24 billion people, it is the world's most populous country, accounting for one-fifth of the planet's total; best current estimates have the country's population growing to 1.4 billion (about 17% of the world total) by the year 2030. Its labor force (53% of which is in agriculture and forestry) is roughly 2.3 times the entire population of the United States.

China's economy is the second largest in the world (in purchasing power parity terms), having quadrupled and grown at an average annual rate of nearly 10% since 1978. Although growth slowed to 7.8% in 1998 and dropped further to 7.1% in 1999, most observers tend to subscribe to estimates that China's economy will overtake that of the United States early in the next century to become the world's largest. Although China remains a predominantly agrarian economy, industry constitutes 49% of GDP. The country ranks 10th globally in international trade volume and enjoys sizable trade surpluses with most of the world's major economies.

But what about China's military capacity and potential? By the traditional definition, Edward Luttwak argues, great powers have been states strong enough to successfully wage war without calling on allies.[17] However overstated this might be in the contemporary context, it nonetheless reminds us how central the military element historically has been and continues to be among the traditionally minded in determining great-power status.

Francis Lees, of St. John's University, contends that a superpower today must possess four attributes: (1) a large, diversified national economy; (2) a major conventional military force; (3) a nuclear weapon capability; and (4) strategic geographic location. By these measures, he says, "Greater China (including Hong Kong) will attain superpower status early in the 21st century, based on its strategic geographic position in the Eurasian land mass, possession of a large conventional military force, a large national economy, and nuclear weapon capability."[18]

Clearly China meets these criteria. It is strategically located in what Zbigniew Brzezinski calls "the world's axial supercontinent [Eurasia]"[19]; it has one of the world's largest, most dynamic economies; and it has the largest military force under arms (over 2.8 million active-duty personnel, twice that of the United States) and the third largest nuclear arsenal in the world. Yet the most vocal skeptics of the thesis that China poses a threat to regional stability and U.S. preeminence invariably point to the underlying quality of China's military—especially its ability (or inability) to project and sustain appreciable force over time and distance—as the ultimate determinant of its greatness.

Shambaugh, for example, asserts: "China will lack the military capabilities to [dominate and become the paramount power in East Asia] for at least a quarter century." Brookings Institution analysts Bates Gill and Michael O'Hanlon voice similar criticism: "The PRC's armed forces are

not very good, and not getting better very fast. . . . The numerous defects of its military establishment notwithstanding, China is a rising power that could one day significantly challenge the United States and its allies in East Asia. But that day will not come anytime soon; it will be at least twenty years before China can pose such a threat."[20]

Such pronouncements are meaningful if we subscribe to the proposition that truly great powers must have militaries whose strength is measured by their ability to successfully wage conventional war and to seize and hold territory at considerable distances from their own shores. Both militarily and strategically, though, it remains to be seen whether such considerations are necessarily relevant to a China that continues, as in the past, to march to its own tune.

Militarily, China may not even be playing the same game as the West. It may instead be seeking to achieve advantage over the United States and others on its own terms, rather than theirs. As Arthur Waldron, director of Asian studies at the American Enterprise Institute, notes: "When approaching military tasks, the Chinese look above all else at the vulnerabilities (material and psychological) of their opponents. That means fighting asymmetrically—seeking to cripple and intimidate and confuse, to obtain a respectable payoff for a small risk."[21]

The wording in China's 1998 white paper on defense is especially telling in this regard:

> A profound reform in the military field led by the development of high-tech weapons is taking place throughout the world. This reform, which is developing rapidly, will exert an important and profound influence on weaponry, military system and setup, combat training and military
>
> theory. . . . During the new historical period, the Chinese army is working hard to improve its quality and endeavoring to streamline the army the Chinese way, aiming to form a revolutionized, modernized and regularized people's army with Chinese characteristics.[22]

Thus, China could be embarked on a true revolution in military affairs that is little more than rhetoric elsewhere. Such a possibility has led Princeton University's Aaron Friedberg to suggest: "The Chinese . . . may be looking for ways not simply to catch up with where we are now but to exceed where we are likely to be in twenty years. In the meantime, they seem to be searching for shortcuts: forms of military capability that will permit them quickly to counter our current strengths and to exert a greater political influence throughout East Asia."[23]

Strategically, it isn't at all clear that military *force projection* is, or ought to be, the *ultima ratio* of great-power behavior in the postmodern media age we live in—especially if one places much stock in non-military "soft power" as a defining feature of post-Cold War international relations.[24] We might better acknowledge the importance of strategic reach in its postmodern context—that is, of *projecting influence* abroad in various forms cultural, economic, and technological, rather than military. Judged in these terms, China has strengths that more than compensate for any military deficiencies it might be said to suffer. Economic market potential alone endows China with great leverage over others. Orville Schell observes, for example:

> The [Chinese communist] party has long mastered the art of controlling what its own people say and think. What is new is the way it has succeeded in controlling expressions of opinion from abroad as well. Its trump card in this global manipulation is, of course, its new ability to withdraw access to China's swelling market and to put pressure on foreign businessmen, politicians, diplomats, academics and even some journalists to be silent or even to polemicize China's brand of market Leninism.[25]

Probably the most significant reflection of China's strategic reach is the pervasiveness and impact of the country's overseas population. Estimated to number more than 50 million, these diaspora Chinese are said to produce some $600 billion in goods and services, control more than $2.5 trillion of wealth (roughly equal to the combined GDP of France and the United Kingdom), and account for 75–80% of all foreign investment in China. In Malaysia, they constitute 30% of the population but control more than half (some say up to three-quarters) of the economy. In Indonesia, they are 4% of the population controlling 70% of the economy; in Thailand, 3% controlling 60%; in the Philippines, 3% controlling 70%; and in Singapore, 75% of the population dominating all walks of life.[26]

Because the patriarchal kinship networks that link the overseas Chinese to one another are "a moral community whose members feel bound to each other and, more so than most ethnic groups, responsible for each other's survival,"[27] they are seen by some as constituting a new supranational economic superpower to rival Europe, Japan, and the United States. In the words of one analyst, "Greater China has become an economic force of global significance."[28]

Others believe, even more radically, that the ethnic Chinese identity could even supersede the need for states, producing a new "Chinese Commonwealth" and a reduced role for interstate activity in the region.[29] In the extreme, this extended Chinese community is the core of the Sinic civilization that Samuel Huntington sees as one of seven or eight that will contest with one another to define the multipolar, multicivilizational, post-Cold War international order. Citing Lucian Pye's memorable characterization of China as "a civilization pretending to be a state," Huntington believes the Chinese government considers mainland China the core state of a Chinese civilization toward which all other Chinese communities should orient themselves—"the worldwide representative of Chineseness."[30]

It is China's special sense of self—the belief in its own uniqueness and centrality, the notion that there is a transcendent galvanizing Chineseness—that is unquestionably the nation's greatest source of strength, that makes China so resilient to change by others, that distinguishes it as perhaps the ultimate falsification of the thesis that the arrival of liberal, democratic capitalism signifies the end of history.[31]

The University of Colorado's Steve Chan offers the perceptive insight that China commands our attention not just because of its huge size, ancient legacy, or current or projected relative national power. It does so because it is the first non-Western power since Japan to demand status recognition while showing itself not especially malleable to external efforts to influence its domestic arrangements or political agenda:

> The importance of China has to do with perceptions, especially those regarding the potential that Beijing will become an example, source, or model that contradicts Western liberalism as the reigning paradigm. In an era of supposed universalizing cosmopolitanism, China demonstrates the potency and persistence of nationalism, and embodies an alternative to Western and especially U.S. conceptions of democracy and capitalism.[32]

This brings us, then, to yet a fourth level of analysis for determining what constitutes a great power: the normative level. Here the question is whether a country that, by other measures, may be considered great, is willing to shoulder the responsibility and demonstrate the leadership required for true *greatness*. Samuel Kim, in a penetrating analysis of China's standing as a great power, puts the point well:

> The concept of a great power has always implied a synergy of two kinds of power: material power and normative power. To say that China is a great power is to say not only that it has special rights and privileges and commands formidable muscle power, but also that it has corresponding special duties and responsibilities and behaves like a responsible great power.[33]

On the one hand, as an extension of the Mao-era idea of a "three-part world," China persists in calling itself a developing country (the third world)—and in fact is officially designated as such by the International Monetary Fund. Beijing's 1996 white paper, "Environmental Protection in China," begins with these words: "China is a developing country."[34] At the same time, the Chinese leadership steadfastly denies any superpower aspirations—a position most forcefully enunciated a quarter century ago by Deng Xiaoping before the Sixth Special Session of the United Nations General Assembly:

> China is not a superpower, nor will she ever seek to be one. What is a superpower? A superpower is an imperialist country [like the United States or the Soviet Union] which everywhere subjects other countries to its aggression, interference, control, subversion or plunder and strives for world hegemony. If capitalism is restored in a big socialist country, it will inevitably become a superpower.[35]

On the other hand, China's every action reflects a country that seeks the recognition and respect due a great power. There is even a passage in the Chinese constitution that reads: "The future of China is closely linked with that of the whole world." Discerning observers realize that the so-called "rise of China" is really a "re-rise" or "re-emergence." In the words of a 1996 *Newsweek* special report: "After 500 years of humiliation, a surging China is about to reclaim its historical position as one of the world's great powers."[36]

For the most part, the "three-part world" theme has been superseded in Chinese foreign-policy discourse today by talk of "one superpower and multiple big powers"—an increasingly multipolar world in which the United States is the one (albeit allegedly declining) superpower, and China is one of a growing number of big powers that have become bold enough to say no to the (by definition, hegemonic) superpower.[37]

The Five Principles of Peaceful Coexistence, codified in the Chinese constitution, continue, as they have for the past quarter century, to be the doctrinal centerpiece of China's foreign policy:

"mutual respect for sovereignty and territorial integrity; mutual non-aggression; non-interference in each other's internal affairs; equality and mutual benefit; and peaceful coexistence in developing diplomatic relations and economic and cultural exchanges with other countries." These principles provide the ideological rationalization by which China's leaders try to maintain a strict demarcation between the country's domestic and international affairs. The fact is, though, that the internal affairs of any great power cannot help but be everybody else's business, while everybody else's business becomes the acquired concern of a great power. So when economist and former vice presidential candidate Pat Choate observes that "China wants the privileges of a great power but without the obligations," it is a reminder that the ultimate measure of China's greatness will be (a) the country's ability to recognize that its handling of such ostensibly internal matters as the environment and human rights cannot be insulated from the rest of the world, and (b) its willingness to act accordingly.[38]

## CHINA AS A SUBJECT OF ENVIRONMENTAL CONCERN

In the final analysis, what truly distinguishes great powers from one another and from lesser powers is not merely their wherewithal and capacity to act but, more importantly, their normative behavior. We expect more of great powers—even though they frequently get by on muscle without fulfilling their obligations. And we generally tolerate more from lesser powers—ignorance, incompetence, oppression, waste—even though they are regularly pressured by the more powerful to do more with less.

By declaring itself a developing country, China seeks to lower the threshold of expectation and responsibility it must measure up to. This, in fact, is a central consideration in China's proposed accession to membership in the World Trade Organization, since Article XI of the WTO charter specifies that "the least-developed countries recognized as such by the United Nations will only be required to undertake commitments and concessions to the extent consistent with their individual development, financial and trade needs or their administrative and institutional capabilities."[39]

At the same time, by aspiring to great-power status (or being perceived as such), China heightens external expectations and focuses unwanted attention on its handling of otherwise internal conditions. Even if we were to concede what really can't be conceded—that the environment is something that can be contained within national borders—China's size, aims, and reach ensure that the country cannot help but have a significant impact on the environment in the years ahead. We do well, therefore, to ask whether China also is an environmental great power or superpower that thereby shoulders special regional and global responsibilities.

To begin with, China is one of eight countries the Worldwatch Institute has designated the E8—states whose possession and consumption of resources, economic performance, and production of pollution disproportionately shape global environmental trends. Even more than the Group of Seven (G7)—the industrial states that have dominated the global economy since World War II—the E8, Worldwatch asserts, will help shape the future of the entire world. China, in particular, is expected to be "increasingly pivotal in any efforts to protect the global environment."[40]

In making the claim (cited above) that, except for the United States, China is the most important environmental actor in the world today, Mark Hertsgaard further portrays China as "a greenhouse giant" whose particular impact on global warming could end up "plunging the world into potentially catastrophic territory" in the years ahead.[41]

*China Trade Report* characterizes China as an environmental superpower: "In light of China's natural resource base, population, and rate of industrialization, it is not hyperbole to state that the leadership's approach to deteriorating environmental quality will be decisive in determining a sustainable future for humanity." Precisely because China's demographic, economic, and industrial impact on the environment is and will continue to be so significant, the fear of such a prospect by others endows Beijing with leverage it can use—and already has used—for purposes of diplomatic "greenmail" to elicit negotiating concessions and financial and technological assistance from the world's wealthier nations.[42]

In their recent study, *The Pivotal States: A New Framework for U.S. Policy in the Developing World*, Yale University's Paul Kennedy and associates attempt to identify those countries, their futures poised at critical turning points, that are likely to affect regional and global security—and thus U.S. interests—significantly in the years ahead. Daniel Esty, director of the Yale Center for Environmental Law and Policy, suggests three criteria for determining how pivotal a state is environmentally: (1) the capacity for environmental issues in that country to affect both national and regional stability; (2) the potential for environmental spillovers onto the United States; and (3) the country's centrality to global environmental negotiations. Based on these criteria, he concludes that China and Russia "stand out as *the* pivotal states" environmentally in the world of today and tomorrow:

> China will soon be the world's largest emitter of greenhouse gases, and its rapid economic growth is causing a range of other environmental harms to its neighbors. Thus, the country's potential for causing serious transboundary environmental spillovers is unmatched. China's unique position as the world's most populous country and as the possessor of vast coal reserves gives it an indisputably central role in international environmental affairs.[43]

Thus, China's pivotalness environmentally is a function of, as much as anything, the country's current and projected impact on global climate change—what Esty adjudges "the most potentially serious global environmental challenge." China currently is the second largest emitter of carbon dioxide globally, contributing 13.5% of the world's total (although its per capita emissions are but one-seventh those of the United States). Most estimates agree that, depending on the actual pace of economic development, the country could surpass the United States by as early as 2020.[44]

At the root of this greenhouse potential lies the confluence of two factors that also are at the heart of China's more general strategic importance: the country's massive and growing population, and the relatively steep trajectory of national economic growth. Both bear a direct relationship to China's reliance on coal to meet national energy demands. China possesses about 13.5% of world coal reserves (behind only the United States and Russia), leads the world in both production and consumption of coal, uses almost 1.4 billion tons a year in accounting for three-

fourths of its commercial energy needs, and seems certain, in light of economic imperatives, to continue such relatively heavy reliance in the future.

Global warming aside, though, China also is pivotal for the more general state of widespread environmental degradation it suffers. Allen Hammond, director of strategic analysis at the World Resources Institute, offers this succinct appraisal:

> Environmental conditions in China could become intolerable if present trends continue. Urban air quality is already unhealthy, with pollution levels well exceeding the World Health Organization's guidelines in many of China's cities, largely because of the country's reliance on coal. But even midrange economic growth is expected to require a sixfold increase in energy consumption over the next half century, and high growth would mean even more. If expanded energy consumption were to translate into a comparable increase in urban air pollution, many cities would be literally unlivable. . . . Uncontrolled dumping of toxic chemicals is already an important environmental issue in China, creating significant health problems, and the country's industrial sector—and thus, potentially, its output of toxic materials—is projected to increase more than tenfold over the next half century. . . . China also faces the prospect of increasingly scarce farmland and water. . . . Already, water clean enough for drinking or even for industrial purposes is zin short supply in many parts of the country.[45]

Official U.S. awareness of the importance of China's environmental situation and its impact on the world is perhaps best reflected in remarks President Clinton made during and prior to his 1998 summit visit to China. In July 2 remarks to the people of Guilin, he noted: "More and more environmental problems in the United States, in China, and elsewhere are not just national problems, they are global problems." Earlier, in an address before the National Geographic Society in Washington, he had observed: "China and the United States share the same global environment. . . . China is experiencing an environmental crisis perhaps greater than any other nation in history at a comparable stage of its development. . . . It is a fool's errand to believe that we can deal with our present and future global environmental challenges without strong cooperation with China."[46]

Just as the distinguishing feature of a truly great power in the strategic realm may be less its wherewithal and capacity to act than its normative behavior, so too the ultimate measure of an environmental great power is perhaps less the global impact of its environmental practices and conditions than its deeper philosophical stance toward the environment. Two documents, in particular, provide signal points of reference for understanding China's underlying attitude toward environmental matters and thus the country's potential for achieving greatness environmentally. The first is the 1991 *Beijing Declaration*, the result of that year's Ministerial Conference on Environment and Development, which was hosted by China and attended by delegates from 40 other developing countries. The second is the June 1997 *National Report on Sustainable Development*, prepared by the Chinese government for that year's Special Session of the UN General Assembly on Environment and Development.[47]

Each of these documents contains a set of principles that, as such, clearly reflect Beijing's policy preferences on environmental matters. These principles (see Table 1-1) seem to portray a China that, in reaffirming its self-proclaimed standing as a developing country, therefore thinks: (a) it should be free to pursue more-or-less unfettered economic development as a first priority; but

that (b) it nonetheless should be treated as an equal with the developed states (who continue to bear primary responsibility for the state of the environment); while (c) being allowed to deal with environmental matters as it sees fit without outside interference or sanction; but (d) with the financial and technological assistance from the developed world that is necessary to make environmental protection and sustainable development feasible.

If accurate, this assessment reads as an attempt by China to avoid responsibility or shift the burden of responsibility for the environment to others. This might lead us to accept Samuel Kim's appraisal of China as the final word, for now, on the country's standing—strategically and environmentally: "By conventional measurements . . . , China is a rising great power. Yet it remains an incomplete great power in a rapidly changing world where transnational challenges to and soft sources of power are becoming increasingly important. Thus, China's future as a complete great power remains indeterminate, if not foreclosed."[48]

On the other hand, the principle stated in the 1997 national sustainable development report—"World peace, stability, environmental protection, and development are indivisible"—could represent a crucial recognition by China that the environment and security are fundamentally linked. The possibility was given added weight by remarks Dr. Ye Ruqiu, deputy administrator of China's National Environmental Protection Agency (now the State Environmental Protection Administration) made at a June 1997 conference on "Environmental Change and Regional Security" in Honolulu. He observed:

> Global and regional environmental problems affect global and regional safety. They, at times, even play a decisive role. For instance, rivalry with each other for common natural resources may cause friction or even conflicts; and ecological disaster in one area may produce large numbers of environmental refugees, As for global environmental problems such as climate change and ozone layer destruction, etc., they threaten the safety of all countries in the world. This demonstrates that environmental pressure is indeed a source of safety concern.[49]

If we give Dr. Ye the benefit of the doubt and infer that he was conceding (a) the effect *national* environmental problems may have on regional and global security, and (b) China's share of responsibility for global environmental problems, it may suggest a China finally prepared to accept the obligations of a truly great power. Only time will tell.

## Table 1-1. Principles for Environmental Protection

**1991 Beijing Declaration**

- Environmental problems must be addressed together with the process of development, by integrating environmental concerns with the imperatives of economic growth and development.
- The right to development of the developing countries must be fully recognized, and the adoption of measures for the protection of the global environment should support their economic growth and development.
- The special situation and needs of the developing countries should be fully taken into account. Each country must be enabled to determine the pace of transition, based on the adaptive capacity of its economic, social and cultural ethos and capabilities.
- It is imperative to establish a new and equitable international economic order conducive to the sustained and sustainable development of all countries, particularly the developing countries. Countries should be able to determine their own environment and development policies, without any barriers or discrimination on trade against them.
- International cooperation in the field of environmental protection should be based on the principle of equality among sovereign states. The developing countries have the sovereign right to use their own natural resources in keeping with their developmental and environmental objectives and priorities. Environmental considerations should not be used as an excuse for interference in the internal affairs of the developing countries.
- The developed countries bear the main responsibility for the degradation of the global environment.
- The developed countries must take the lead in eliminating the damage to the environment as well as in assisting the developing countries to deal with the problems facing them.
- The developing countries need adequate, new and additional financial resources to be able to address effectively the environmental and developmental problems confronting them. There should be preferential and non-commercial transfer of environmentally sound technologies to the developing countries.
- The developing countries will contribute to the process of environmental protection and enhancement by, inter alia, stepping up technical cooperation and transfer of technology among themselves.

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- Environmental protection should be integrated with economic development. In addressing global environmental issues, the international community should take into full account the special circumstances and needs of the developing countries and should make earnest effort to extricate developing countries from their disadvantageous positions in external debt, trade, and financial resources. In the meantime, each country should adopt national economic development strategies that can maintain ecological balance and achieve integration of environmental protection with economic development.
- While environmental protection is a common task of humankind, the developed countries have greater responsibilities. The developed countries should honor their commitments on providing new and additional financial resources and on transferring advanced environmentally sound technology to developing countries on preferential terms.
- International cooperation on environment and development must be based on mutual respect for the sovereignty of states. Respect for national independence and sovereignty should be taken as a fundamental principle in solving global environmental problems. Each country has the right to formulate, according to her national conditions, her own strategies, policies, and measures for addressing environmental protection and development. Meanwhile, each country should refrain from damaging the environment of other countries in the exploitation of its own natural resources.
- World peace, stability, environmental protection, and development are indivisible. In the course of promoting global environmental protection and development, each country should strive to maintain her national stability and to safeguard regional and world peace. Each country, moreover, should seek to solve all disputes through peaceful negotiation and should oppose the threat or use of force.
- Each country's current practical interests, as well as the world's long-term interests, should be taken into consideration simultaneously in dealing with environmental problems. While paying attention to some global environmental problems, priority should be given to regional environmental problems.

## NOTES

[1] Jonathan D. Spence, *The Chan's Great Continent: China in Western Minds* (New York: W.W. Norton, 1998), pp. xi-xviii.
[2] *Ibid.*
[3] Henry Kissinger, *Diplomacy* (New York: Simon & Schuster, 1994), pp. 826, 829. Kissinger envisions the international system of the twenty-first century as containing "at least six major powers—the United States, Europe, China, Japan, Russia, and probably India." (pp. 23-24)
[4] Mark Hertsgaard, "Our Real China Problem," *The Atlantic Monthly*, November 1997, pp. 96-114.
[5] John Spanier, *Games Nations Play*, 7th ed. (Washington: CQ Press, 1990), pp. 53-54, offers this as one of three measures of great-power status. The other two are (1) recognition by other states and (2) possession of great military power (as a particular component of a state's power that, more generally, also includes geographic location, size, population, industry, and wealth).
[6] See The White House, *A National Security Strategy for a New Century*, both the October 1998 (pp. 43-44) and May 1997 (p. 24) editions. There are, nonetheless, some countervailing, more forthcoming official examples. In February 5, 1997 testimony before the Senate Select Committee on Intelligence, Central Intelligence Agency director George Tenet acknowledged "China's reemergence as a world player" and specifically observed: "China stands poised to compete as a dominant regional military power, and it can aspire to be the first new great power since World War II." Likewise, in December 1, 1998 remarks to the World Affairs Council in Reading, Pennsylvania, John Gannon, chairman of the National Intelligence Council, noted: "Scholars can and do debate what constitutes great power status. The intelligence officer at CIA who oversees most of our work on Asia argues for a simple test: a nation is powerful to the degree that it is a valued friend or a feared foe. By this measure China has been a potential power for some time. Now, however, we are starting to see that potential realized." Both statements publicly released by Central Intelligence Agency.
[7] U.S. Department of Defense, Office of International Security Affairs, *The United States Security Strategy for the East Asia-Pacific Region*, 1998, pp. 30-31.
[8] U.S. Department of State, Bureau of East Asian and Pacific Affairs, "China 2000," issued January 6, 1997.
[9] National Defense University, Institute for National Strategic Studies, *Strategic Assessment 1997: Flashpoints and Force Structure* (Washington: National Defense University Press, 1997), pp. 45-55.
[10] National Defense University, Institute for National Strategic Studies, *Strategic Assessment 1998: Engaging Power for Peace* (Washington: National Defense University Press, 1998), pp. 12, 37.
[11] Richard Nixon, *1999: Victory Without War* (New York: Simon and Schuster, 1988), pp. 242, 246. Subsequently, Nixon would further observe (*Seize the Moment: America's Challenge in a One-Superpower World* (New York: Simon and Schuster, 1992), p. 163): "China . . . has not only become a key political player but could also become a major global economic power in the coming decades. . . . China's emergence as a global heavyweight is inevitable."
[12] "The 21st Century: Dawn of an Asian Era?" *New Perspectives Quarterly*, Winter 1997, pp. 36-42.
[13] See Brent Scowcroft, "U.S. Should Engage China—With Eyes Wide Open," *The Wall Street Journal*, April 5, 1999; Murray Weidenbaum, "Which Way Will China Go?" *Across the Board*, April 1997, pp. 31-35; Richard N. Haass, "Starting Over," *The Brookings Review*, Spring 1997, pp. 4-7; and Zbigniew Brzezinski, *The Grand Chessboard: American Primacy and Its Geostrategic Imperatives* (New York: Basic Books, 1997), esp.
pp. 151-173.
[14] Richard Bernstein and Ross H. Munro, *The Coming Conflict With China* (New York: Alfred A. Knopf, 1997), p. 4.
[15] John E. Rielly, ed., *American Public Opinion and U.S. Foreign Policy 1999* (Chicago: Chicago Council on Foreign Relations, 1999); and *The Gallup Poll Monthly*, November 1997, p. 27.

[16] David Shambaugh, "Containment or Engagement of China?" *International Security*, Fall 1996, pp. 180-209.
[17] Edward N. Luttwak, "Where Are the Great Powers? At Home With the Kids," *Foreign Affairs*, July/August 1994, pp. 23-28.
[18] Francis A. Lees, *China Superpower: Requisites for High Growth* (New York: St. Martin's Press, 1997), pp. 39-40.
[19] Zbigniew Brzezinski, "A Geostrategy for Eurasia," *Foreign Affairs*, September/October 1997, pp. 50-64.
[20] David Shambaugh, "The Dragon vs. Uncle Sam," *Far Eastern Economic Review*, June 12, 1997, pp. 62-63; and Bates Gill and Michael O'Hanlon, "China's Hollow Military," *The National Interest*, Summer 1999, pp. 55-62. For similar views, see R. Montaperto and K. Eikenberry, "Paper Tiger: A Skeptical Appraisal of China's Military Might," *Harvard International Review*, Spring 1996, pp. 28-31; and Robert Ross, "Why Our Hardliners Are Wrong," *The National Interest*, Fall 1997, pp. 42-51.
[21] Arthur Waldron, "Why China Could Be Dangerous," *The American Enterprise*, July/August 1998, pp. 40-43.
For further discussion of such asymmetrical preferences, see Bates Gill and Michael O'Hanlon, "Power Plays," *The Washington Post*, June 20, 1999, pp. B1, B5.
[22] Information Office of the State Council of the People's Republic of China, "China's National Defense," July 1998.
[23] Aaron L. Friedberg, "Arming China Against Ourselves," *Commentary*, July-August 1999, pp. 27-33.
[24] See Joseph S. Nye, Jr., *Bound to Lead: The Changing Nature of American Power* (New York: Basic Books, 1990).
[25] Orville Schell, "Suspicions in the East, Confusions in the West," *The New York Times*, March 10, 1997, p. C16.
[26] See John Naisbitt, *Megatrends Asia* (New York: Simon & Schuster, 1996), pp. 19-20; Arthur Waldron, "The Bamboo Network: How Expatriate Chinese Entrepreneurs Are Creating a New Economic Superpower in Asia," *The Wilson Quarterly*, Spring 1996, pp. 86-87; and Peter Kwong, "The Chinese Diaspora," *Worldbusiness*, May/June 1996, p. 26.
[27] Sterling Seagrave, *Lords of the Rim: The Invisible Empire of the Overseas Chinese* (New York: G.P. Putnam's Sons, 1995); quoted in Nancy L. Schwalje, "Lords of the Rim: The Invisible Empire of the Overseas Chinese," *Journal of International Affairs*, Winter 1996, pp. 633-638.
[28] George T. Crane, "Greater China: The Ties That Don't Bind," *Current*, January 1996, p. 19.
[29] David S.G. Goodman, "Are Asia's 'Ethnic Chinese' a Regional Security Threat?" *Survival*, Winter 1997/98, pp. 140-155.
[30] Samuel P. Huntington, *The Clash of Civilizations and the Remaking of World Order* (New York: Simon & Schuster, 1996), pp. 168-169. Somewhat more alarmist in its tone is Huntington's subsequent article, "The Erosion of American National Interests," *Foreign Affairs*, September/October 1997, pp. 28-49, in which he inveighs against diasporas—including Chinese-Americans—in the United States that exert increasing pressure on U.S. foreign policy, while remaining loyal to and providing continuing support to their homeland.
[31] See Francis Fukuyama, *The End of History and the Last Man* (New York: The Free Press, 1992).
[32] Steve Chan, "Relating to China: Problematic Approaches Versus Feasible Emphases," *World Affairs*, Spring 1999, pp. 179-185.
[33] Samuel S. Kim, "China as a Great Power," *Current History*, September 1997, pp. 246-251.
[34] Information Office of the State Council of the People's Republic of China, "Environmental Protection in China," June 1996.
[35] Quoted in Bruce D. Larkin, "China and the Third World in Global Perspective," in *China in the Global Community*, eds. James C. Hsiung and Samuel S. Kim (New York: Praeger, 1980), pp. 63-84.

[36] "Special Report: China on the Move," *Newsweek*, April 1, 1996, pp. 26-53. For comments on China's re-rise or re-emergence, see Gerald Segal, "The Giant Wakes: The Chinese Challenge to East Asia," *Harvard International Review*, Spring 1996, pp. 26-27, 71-72; and Joseph S. Nye, Jr., "Clinton in China: As China Rises, Must Others Bow?" *The Economist*, June 27, 1998, pp. 23-25.
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[38] See Pat Choate, "Selling Out to the Chinese," *New Perspectives Quarterly*, Summer 1997, pp. 21-22.
[39] *Agreement Establishing the World Trade Organization*, April 15, 1994.
[40] Christopher Flavin, "The Legacy of Rio," in *State of the World 1997*, Lester R. Brown et al. (New York: W.W. Norton, 1997), pp. 3-22. The other members of the E8 are the United States, Russia, Japan, Germany, India, Indonesia, and Brazil.
[41] Hertsgaard, "Our Real China Problem." In October 26, 1996 remarks at the Second High Level Roundtable on China's Agenda 21, in Beijing, Eileen Claussen, then-assistant secretary of state for oceans and international environmental and scientific affairs, similarly observed: "Sustainable development in China is of particular interest to the United States because of China's potential to transform the global environment through its own actions. Our two countries, perhaps more than any others, can determine whether issues such as climate change will ever be solved." Remarks publicly released by U.S. Department of State.
[42] Kristina Egan, "Greenmail," *China Trade Report*, January 1997, pp. 10-12.
[43] Daniel C. Esty, "Pivotal States and the Environment," in *The Pivotal States: A New Framework for U.S. Policy in the Developing World*, eds. Robert Chase, Emily Hill, and Paul Kennedy (New York: W.W. Norton, 1999), pp. 290-314.
[44] See Zhong Xiang Zhang, "Is China Taking Actions to Limit Its Greenhouse Gas Emissions?" Paper presented at the United Nations Development Program workshop *Slowing Greenhouse Gas Emissions Growth While Promoting Sustainable Development*, New York, August 1998.
[45] Allen Hammond, *Which World? Scenarios for the 21st Century* (Washington: Island Press, 1998), p. 155.
[46] The White House, Office of the Press Secretary, "Remarks by the President on the Environment to the People of the Guilin Area," July 2, 1998; and "Remarks by the President on U.S.-China Relations in the 21st Century," June 11, 1998.
[47] "Beijing Declaration on Environment, Development," *Beijing Review*, July 8-14, 1991, pp. 10-14; and "Basic Principles and Position on Several Questions Concerning Global Environment and Development," *National Report on Sustainable Development*, Chapter 1, Section 5, June 1997. Available at http://www.acca21.edu.cn/nrport.html.
[48] Kim, "China as a Great Power."
[49] Dr. Ye Ruqiu, "Luncheon Address: A China Perspective on Environmental Cooperation," in *Conference Report: Environmental Change and Regional Security* (Honolulu: Asia-Pacific Center for Security Studies, September 1997), pp. VI-1-VI-8.

# CHAPTER 2

## THE ENVIRONMENT AS A SECURITY CONCERN

It has now been more than two decades since the Worldwatch Institute's Lester Brown first issued a plea to adopt a new and more robust conception of national security attuned to the contemporary world. The threats to security, he argued even then, now may arise less from relations between nations than from man's relations with nature—dwindling reserves of critical resources, for example, or the deterioration of earth's biological systems:

> The military threat to national security is only one of many that governments must now address. The numerous new threats derive directly or indirectly from the rapidly changing relationship between humanity and the earth's natural systems and resources. The unfolding stresses in this relationship initially manifest themselves as ecological stresses and resource scarcities. Later they translate into economic stresses—inflation, unemployment, capital scarcity, and monetary instability. Ultimately, these economic stresses convert into social unrest and political instability.[1]

Brown was followed—cautiously at first—by others who recognized the need not only to expand the bounds of national security thinking and discourse, but to take particular account of environmental concerns in such deliberations. Jessica Tuchman Mathews, then affiliated with the World Resources Institute, argued, for example: "Global developments now suggest the need for . . . [a] broadening definition of national security to include resource, environmental and demographic issues."[2]

One of the most powerful observations made to date—one that could be judged, in equal measure, as either visionary or hyperbolic—is that by writer-analyst Milton Viorst, who argues that "population and environment . . . seem the obvious sources of the next wave of wars, perhaps major wars."[3]

Whether or not, as Viorst contends, the groundwork for a wave of environmental wars is already falling into place, there is growing acceptance today of the proposition that the environment and security are indissolubly linked. The term *environmental security* is, in fact, now an established, if persistently nebulous, part of the argot of national security affairs. Two issues, however, continue to divide experts on the subject and, more importantly, to thereby undermine the legitimacy of environmental security as a worthy object of major national-security policy emphasis: the definitional ambiguity of the concept itself and the causal relationship between the environment and security. Both require elucidation and understanding by anyone attempting to grapple with the environmental security implications of any major international development—be it China's rise to great-power status, the spread of globalization, the expansion of NATO, the anticipated demise of the nation-state, or whatever.

## COMING TO TERMS WITH ENVIRONMENTAL SECURITY

What is environmental security? This question dominates the literature on the subject—frustratingly, but perhaps understandably in light of the uncertainties and confusions that dog the field of national security affairs in the post-Cold War era. It is a question that begs for an answer sufficiently compelling and definitive to give observers confidence that they can know the condition—as well as its presumed antipode, environmental insecurity—when they see it.

Most discussions of the meaning of environmental security focus on the nature of *security*—whether it is fundamentally a military phenomenon (that, by implication, would tend to render environmental concerns largely irrelevant) or something more robust and inclusive (that logically would encompass, and perhaps even revolve around, environmental considerations). Little attention is typically given to the meaning of *environment*—the assumption presumably being that the nature of nature is too obvious to warrant elaboration. Such an assumption, of course, does us little good if what we want is a reasonably systematic, fastidious analytical path that would lead us from the parameters that define the environment to the state of the environment to what we might consider environmental threats to security.

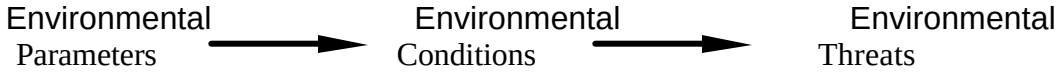


**Figure 2-1. The Environmental Focus**

Institutional definitions of the environment used by the likes of the Environmental Protection Agency (EPA) and the Defense Department are largely unhelpful in specifying what the environment includes. EPA defines the environment as "the sum of all external conditions affecting the life, development and survival of an organism." The Pentagon is only moderately more enlightening: "Air, water, land, man-made structures, all organisms living therein, the interrelationships that exist among them, and archeological and cultural resources."[4]

A more satisfying enumeration is found in China's original 1979 Law on Environmental Protection, which uses the term environment to encompass "the air, water, land, mineral resources, forests, grasslands, wild plants and animals, aquatic life, places of historical interest, scenic spots, hot springs, resorts and natural areas under special protection as well as inhabited areas of the country."[5]

This portrayal provides a basic point of departure for considering what is actually of more direct interest to us: the environmental conditions that hold potential for becoming environmental threats. A useful enumeration of such conditions is contained in the 1991 *Beijing Declaration on Environment and Development*, agreed to by the representatives of the 41 developing countries

who attended that year's Ministerial Conference of Developing Countries on Environment and Development:

> The more serious and widespread environmental problems are air pollution, climate change, ozone layer depletion, drying up of fresh water resources, pollution of rivers, lakes and the marine environment including the coastal zones, marine and coastal resources deterioration, floods and droughts, soil loss, land degradation, desertification, deforestation, loss of biodiversity, acid rain, proliferation and mismanagement of toxic products, illegal traffic of toxic and dangerous products and wastes, growth of urban agglomerations, deterioration of living and working conditions in urban and rural areas, especially of sanitation, resulting in epidemics and other such problems.[6]

Such conditions become problems that command our attention when they threaten or endanger something of value to us. What do we mean "something of value": regional stability? U.S. interests? U.S. objectives? U.S. credibility? For that matter, what do we mean by "us": the United States? the developed world? humanity? The answers aren't at all clear.

Then-Senator Al Gore, in his 1992 book *Earth in the Balance*, sought to identify, categorize, and differentiate environmental threats according to their presumed reach and impact. Using an ordering scheme similar to that commonly used to characterize different levels of military operations, he described as local (or tactical) threats such things as water pollution, air pollution, and illegal waste dumping. Problems like acid rain, the contamination of underground aquifers, and large oil spills, on the other hand, are fundamentally regional threats, while global warming and ozone depletion are strategic. In turn, Eileen Claussen, former assistant secretary of state for oceans and international scientific and environmental affairs, has defined as global environmental threats those "which are human-caused and have, or can be expected to have, serious economic, health, environmental, and quality of life implications for the United States." Examples include climate change, the production and trade of highly toxic chemicals, the loss of biodiversity, ozone depletion, and marine degradation.[7]

Both schemes regrettably fail to take due cognizance of the convergence that has occurred in the postmodern media age in which we live between the tactical (local) and strategic domains of action. Seemingly obscure, minor events in the remotest reaches of the globe can (and regularly do) have almost instantaneous strategic reverberations at many spatial and temporal removes from their point of occurrence. Thus, what might otherwise appear to be an environmental condition with purely local consequences—polluted air or water supplies, the progressive diminution of arable land due to desertification, the loss of forest reserves—can in fact produce effects of strategic import.

Environmental threats may take the form of either environmental degradation or resource scarcity. The magnitude and reach of their consequences bring us face to face with the importance—but also the difficulty—of formulating a relevant conception of security. In one sense, we have to acknowledge in this regard that there is fundamental disagreement between those who think environment and security should be linked and those who think not. The latter, who might be characterized as rejectionists, generally consider security a military-diplomatic-intelligence enterprise that is antithetical to, and thus should be kept separate from, environmental endeavors for fear of militarizing the latter.[8]

In the former camp are those who, though agreed that there is a definite and proper linkage between environment and security, nonetheless differ in their notions of what security is all about or whose security is at stake. At one end of the spectrum are those who adhere to a relatively traditional belief that *national* security is the appropriate frame of reference, that the security of the state is what matters, and that security is properly a state-run and -oriented enterprise.[9]

At the other end of the spectrum are those who think the individual is the proper focus of security concerns and that individual well-being is the very essence of the security *problematique*. Norman Myers is the most visible and compelling proponent of this point of view. In his book *Ultimate Security: The Environmental Basis of Political Stability*, he notes:

> Security applies most at the level of the individual citizen. It amounts to human wellbeing: not only protection from harm and injury but access to water, food, shelter, health, employment, and other basic requisites that are the due of every person on Earth. It is the collectivity of these citizen needs—overall safety and quality of life—that should figure prominently in the nation's view of security. . . . The entire community of nations, indeed all humankind, needs to enjoy security in the form of acceptably clean (unpolluted) environments, supplies of environmental goods such as water and food, and a stable atmosphere and climate. In short, all nations need a planetary habitat that is secure in every down-to-Earth respect—which means, in turn, that "we" are only as safe as "they" are.[10]

In very much the same vein, the United Nations Development Program (UNDP) has invested a great deal of intellectual capital in propounding the idea of *human security*, which, "though simple, is likely to revolutionize society in the 21st century." Human security stands in clear distinction to traditional notions of national and global security, where the focus was on such things as national interests, the defense of territory from external aggression and, in the extreme, nuclear holocaust. Human security has two major dimensions: first, safety from such chronic threats as hunger, disease, and repression; and second, protection from sudden and hurtful disruptions in the patterns of daily life.

The UNDP identifies seven categories of threats to human security: economic, food, health, environmental, personal, community, and political. The environmental threats countries face today are a combination of the degradation of local ecosystems and of the global system. While most forms of environmental degradation have their severest impact locally, other effects migrate beyond national frontiers and thereby represent global challenges to human security.[11]

By focusing on security at the human level, we are forced to acknowledge two things:

- In its fullest sense, security is not simply about providing for the common defense but also tending to those other aims enunciated in the Preamble to the U.S. Constitution: forming and preserving a more perfect union, establishing justice, ensuring domestic tranquility, promoting the general welfare, and securing the blessings of liberty.

- In its most fundamental sense, security means freedom not just from threat and intimidation, harm and danger, but no less from doubt and fear, need and want.

Psychologist Abraham Maslow brought us to the realization that security and safety are fundamental human needs, exceeded in their potency only by the more basic physiological needs for food, water, shelter, and the like. Because the state of the environment is instrumental in determining whether and how both of these levels of basic human needs are met, and because such needs translate into human rights, there is a clear link between environmental security and human rights.

Barbara Rose Johnston makes the persuasive case that "environmental degradation and human rights abuse are inextricably linked." The right to health, a decent existence, work, and occupational safety and health, she notes, along with the right to an adequate standard of living, freedom from hunger, an adequate and wholesome diet, and decent housing; the right to education, culture, equality and nondiscrimination, dignity, and harmonious development of the personality; the right to security of person and family; the right to peace; and the right to development are all established by existing United Nations covenants. (Table 2-1, accompanying, contains passages from selected documents concerning the environment as a human right.) Thus:

> Human rights are abused when political and economic institutions and processes wrest control over traditionally held resources without negotiation or compensation. Human rights are abused when political and economic institutions and processes degrade environmental settings, place individuals and populations at risk, withhold information about that risk, and rationalize selective exposure on the basis of national security, national energy, and national debt. And, even in the context of strong legal protection for human rights and environmental quality, human rights are abused when cultural forces and economic greed co-opt and corrupt the implementation of legal structures.[12]

Viewing security in this fashion—as, at root, a human state or condition—argues for the recognition that security at the national or global level is tied to, even a function of, that at the individual level. And identifying the health of the environment as a human right brings into question the continuing relevance of long-held notions of (state) sovereignty and territorial integrity; not only do environmental effects readily cross national borders (a form of external aggression), but the desiderata for responding to the human consequences of such effects could well be seen as comparable to those for any other form of humanitarian intervention (an increasingly likely and acceptable practice in the post-Cold War world).

## Table 2-1. The Environment-Human Rights Connection

- From Universal Declaration of Human Rights (1948):
  Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family . . . . (Article 25(I))
- From Stockholm Declaration of the UN Conference on the Human Environment (1972):
  Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being . . . . (Principle 1)
- From International Covenant on Economic, Social and Cultural Rights (1976):
  . . . the right of everyone to the enjoyment of the highest attainable standard of physical and mental health. (Article 12.1)
- From *World Charter for Nature*, UN General Assembly Resolution 37/7 (1982):
  Mankind is a part of nature and life depends on the uninterrupted functioning of natural systems which ensure the supply of energy and nutrients.
- From African Charter on Human and People's Rights, Banjul (1986):
  All peoples shall have the right to a general satisfactory environment favorable to their development. (Art. 24)
- From Legal Principles for Environmental Protection and Sustainable Development, World Commission on Environment and Development (1987):
  All human beings have the fundamental right to an environment adequate for their health and well-being. (Article 1)
- From Costa Rica Declaration of Human Responsibilities for Peace and Sustainable Development (1989):
  . . . human beings have the fundamental right to live in an environment of a quality that permits a life of dignity and well-being. (Preamble)
- From Economic Commission of Europe Charter on Environmental Rights and Obligations (1990):
  Everyone has the right to an environment adequate for his general health and well-being. (Principle 1)
- From The Hague Recommendation on International Environmental Law (1991):
  . . . the individual and collective fundamental human right to an environment which ensures a healthy, safe, and sustainable existence and spiritual well-being. (Principle I.3b)
- From *Rio Declaration on Environment and Development*, UN Conf. on Environment and Dev. (1992):
  Human beings . . . are entitled to a healthy and productive life in harmony with nature. (Principle 1)
- From Draft Declaration of Principles on Human Rights and the Environment, Sierra Club (1994):
  - All persons have the right to a secure, healthy and ecologically sound environment. This right and other human rights, including civil, cultural, economic, political and social rights, are universal, interdependent and indivisible. (Part I, Principle 2)
  - All persons have the right to freedom from pollution, environmental degradation and activities that adversely affect the environment, threaten life, health, livelihood, well-being or sustainable development within, across or outside national boundaries. (Part II, Principle 5)
- From Draft International Covenant on Environment and Development, World Conservation Union (1995):
  . . . the right of everyone to an environment and a level of development adequate for their health, well-being and dignity. (Article 12.1)

**PRINCIPAL SOURCE: THE EARTH CHARTER CAMPAIGN, HTTP://WWW.EARTHCHARTER.ORG**

As one scholar has noted perceptively, a broader interpretation of security than the traditional one we are used to brings into question the optimistic social contract assumption by which state (national) security translates, *ipso facto*, into security for all its citizens. This more comprehensive view envisions the provision of broad-based (including ecological) security to the largest possible component of humanity, not just to the administrative apparatus of the state; in so doing, it thereby tends to erode state primacy and sovereignty.[13]

In the larger transnational context, it becomes increasingly clear, in the words of another student of the subject, that "for *all* [emphasis added] people to be [truly] secure, there must be reasonable equity in the provision of basic human needs among individuals, genders, communities, generations, nations, and ethnic groups. Sharp differences in peoples' sense of their own social, political, economic, personal, and environmental security will generate conflict, and thus further insecurity."[14]

Such views lend support to the results of a 1998 survey conducted by the Millennium Project of the American Council for the United Nations University. Respondents to the survey generally agreed that an acceptable definition of environmental security should include these elements:

- Public safety from environmental dangers caused by natural or human processes due to ignorance, accident, mismanagement, or design
- Amelioration of natural resource scarcity
- Maintenance of a healthy environment
- Amelioration of environmental degradation
- Prevention of social disorder and conflict (promotion of social stability)[15]

By implication, then, where the public is safe from environmental dangers, where natural resource scarcities and environmental degradation are ameliorated and a healthy environment is maintained, social stability is likely to be promoted and social disorder and conflict prevented. The result is a state of environmental security. Where these conditions do not exist, the result is environmental insecurity.

## IN SEARCH OF CAUSATION

Generally speaking, the link between the environment and security takes three forms. The first is the destructive effects of security activities—most notably military operations and training, and weapons development and use—on the environment. The second is actual environmental warfare involving the targeting, destruction, or manipulation of the environment for hostile purposes. The third, that of particular interest here, is the effects the environment may have on security—specifically as a cause or precipitant of insecurity in the form of violence, instability, and the like.[16]

The idea that conflict may be caused—or at least prefigured—by environmental conditions (and resource scarcities) is the heart of most discussions of, and disagreements on, the subject today. Significantly, it is a notion that has risen well above the level of sterile academic debate and intruded itself into the highest policy councils. Without doubt the most authoritative international source to address the environment-security relationship is the 1987 final report of the World Commission on Environment and Development (the Brundtland Commission). It is worth quoting at length:

> Environmental stress is both a cause and an effect of political tension and military conflict. Nations have fought to assert or resist control over raw materials, energy supplies, land, river basins, sea passages, and other key environmental resources. Such conflicts are likely to increase as these resources become scarcer and competition for them increases. . . .
>
> A number of factors affect the connection between environmental stress, poverty, and security, such as inadequate development policies, adverse trends in the international economy, inequities in multi-racial and multi-ethnic societies, and pressures of population growth. . . . The real sources of insecurity also encompass unsustainable development, and its effects can become intertwined with traditional forms of conflict in a manner that can extend and deepen the latter. . . .
>
> Environmental stress is seldom the only cause of major conflicts within or among nations. Nevertheless, they can arise from the marginalization of sectors of the population and from ensuing violence. This occurs when political processes are unable to handle the effects of environmental stress resulting, for example, from erosion and desertification. Environmental stress can thus be an important part of the web of causality associated with any conflict and can in some cases be catalytic. Poverty, injustice, environmental degradation, and conflict interact in complex and potent ways. . . . In addition to the interrelated problems of poverty, injustice, and environmental stress, competition for non-renewable raw materials, land, or energy can create tension. . . . As unsustainable forms of development push individual countries up against environmental limits, major differences in environmental endowment among countries, or variations in stock of usable land and raw materials, could precipitate and exacerbate international tension and conflict.[17]

Similarly, the 1995 final report of the Commission on Global Governance, in advocating a more inclusive conception of security ("Global security must be broadened from its traditional focus on the security of states to include the security of people and the planet"), suggests a strong relationship between the environment and security:

> Environmental deterioration, particularly in areas of pervasive poverty and recurrent drought, is a growing source of potential conflict. . . . Social breakdown and internal conflict in Somalia, Rwanda, and Haiti were undoubtedly exacerbated by environmental deterioration accompanied by mounting population pressures. These phenomena will, if unchecked, create on a much broader scale the underlying conditions that set the stage for future conflicts. . . .

The uneven and often inequitable impact of political, economic, and environmental change on different segments of a population often gives rise to violent conflicts. A root cause of many

conflicts is poverty and underdevelopment. But not all development failures create security crises. A distinction must be made between the general conditions of poverty, inequality, and environmental degradation that may generate instability in the long term (and that must be addressed as part of a larger effort to promote sustainable development) and the specific developments, policies, or abuses that may precipitate conflict and lead to sporadic or sustained violence.[18]

Within the United States, the respected Carnegie Commission on Preventing Deadly Conflict suggests that there are at least three clear ways in which the use and misuse of natural resources may underlie conflicts that hold potential for mass violence: (1) the deliberate manipulation of resource shortages for hostile purposes (e.g., using food or water as a weapon); (2) competing claims of sovereignty over resource endowments (such as rivers or oil); and (3) the exacerbating role played by environmental degradation and resource depletion in areas characterized by political instability, rapid population growth, chronic economic deprivation, and societal stress.[19]

The Clinton administration has, for the most part, thoroughly internalized the belief that environmental conditions can have a demonstrable impact on the precipitation of conflict and on security more generally. This is manifested most clearly in the four national security strategy reports the White House has issued since 1993. The July 1994 and February 1995 reports used nearly identical language to characterize the relationship:

> Increasing competition for the dwindling reserves of uncontaminated air, arable land, fisheries and other food sources, and water, once considered "free" goods, is already a very real risk to regional stability around the world. The range of environmental risks serious enough to jeopardize international stability extends to massive population flight from man-made or natural catastrophes . . . and to large-scale ecosystem damage caused by industrial pollution, deforestation, loss of biodiversity, ozone depletion, desertification, ocean pollution and ultimately climate change.[20]

The more recent May 1997 and October 1998 reports portray environmental damage as one of a number of transnational threats—along with terrorism, international crime, drug trafficking, illicit arms trafficking, and uncontrolled refugee migrations—that endanger U.S. interests, citizens, and even the American homeland itself:

> Environmental threats do not heed national borders and can pose long-term dangers to our security and well-being. Natural resource scarcities can trigger and exacerbate conflict. Environmental threats such as climate change, ozone depletion and the transnational movement of hazardous chemicals and waste directly threaten the health of U.S. citizens.[21]

Elsewhere, in various settings, President Clinton has highlighted the environment–security linkage. In a September 1993 address to the United Nations General Assembly, he commented that the "roots of conflict are so often entangled with the roots of environmental neglect and the calamities of famine and disease." The following spring, in Earth Day remarks, he stated even more forcefully: "We have to understand the urgency and magnitude of this environmental issue as a global crisis. We have to work to stop famine and stabilize population growth and prevent further environmental degradation. If we fail, these problems will cause terrorism, tension and war."[22]

Secretary of State Madeleine Albright has echoed this theme, as did her predecessor Warren Christopher. Secretary Albright has observed:

> Competition for scarce resources . . . can still elevate tensions among countries or cause ruinous violence within them. In addition, a lack of environmentally sound development can entrap whole nations within a cycle of deepening poverty, disease and suffering. There is nothing more destabilizing to a region than to have as a neighbor a society so depleted in resources that its people have lost not only faith, but hope.[23]

In an important 1996 memorandum to all State Department under secretaries and assistant secretaries, "Integrating Environment Issues Into the Department's Core Foreign Policy Goals," Secretary Christopher emphasized the numerous ways in which the quality of the earth's environment affects U.S. national interests:

> Worldwide environmental decay threatens U.S. national prosperity. . . . In an integrated world economy, environmental degradation in one part of the globe can affect economies everywhere. . . . Environmental and resource issues can also have an important effect on political stability in regions key to U.S. interests. Disputes over scarce water resources can exacerbate existing political conflict. . . . Rapid population growth . . . can combine with stagnant economies or diminished natural resources, and contribute to domestic political disorder, or to migration and international conflict.[24]

Both the State Department and the Agency for International Development (AID) have official stated positions on the importance of environmental developments around the world to U.S. interests and foreign policy. The State Department position reads:

> Global environmental problems—such as the buildup of greenhouse gases, toxic chemicals, and pesticides; species extinction; deforestation; and marine degradation—respect no borders and can threaten the health, prosperity, and security of all Americans. . . . Countries, especially in the developing world, face a number of complicated and interrelated transboundary environmental challenges. . . . These issues—air quality, water and energy resources, land use, and urban/industrial growth—either can contribute to political and economic tensions or can be a focus of regional cooperation.[25]

AID's position is similar:

> At the local level, environmental degradation poses a growing threat to the physical health and economic and social well-being of people throughout the world. Explosive and poorly managed urbanization has contributed significantly to air, water, and soil pollution worldwide. The erosion and degradation of soils, loss of fertility, deforestation, and desertification beset rural communities and undermine food production, cause malnutrition, and impel migration. Water shortages cause conflicts among industrial, agricultural, and household users within countries and among nations. . . . America's own well-being is directly threatened by environmental degradation around the world. We cannot escape the effects of global climate change, biodiversity loss, and unsustainable resource depletion. The consequences of local environmental mismanagement—increasing poverty, social instability, wars over resources—endanger our political and economic interests.[26]

The Central Intelligence Agency now has an environmental center that, among other responsibilities, is charged with monitoring and assessing the role played by the environment in country and regional instability and conflict. This new intelligence community emphasis was underscored by John Deutch, during his tenure as President Clinton's second director of central intelligence. In 1996 testimony before the Senate Select Committee on Intelligence, he spoke of the growing threat of environmental degradation: "A deteriorating environment can not only affect the political and economic stability of nations, it can also pose global threats to the well-being of mankind."[27] In a subsequent speech to the World Affairs Council in Los Angeles, he observed:

> Environmental trends, both natural and man-made, are among the underlying forces that affect a nation's economy, its social stability, its behavior in world markets, and its attitude toward neighbors. . . . Environmental degradation, encroaching deserts, erosion, and overfarming destroy vast tracts of arable land. This forces people from their homes and creates tensions between ethnic and political groups as competition for scarce resources increases. There is an essential connection between environmental degradation, population growth, and poverty.[28]

Sherri Wasserman Goodman, who has held the position of deputy under secretary of defense for environmental security throughout the Clinton administration, has also reaffirmed the link the highest levels of the administration believe exists between the environment and security:

> It is clear that environmental degradation and scarcity and related conditions (such as increased population growth, urbanization, and migration, and the spread of infectious diseases) may contribute significantly to instability around the world. . . . Environmental scarcities can interact with political, economic, social, and cultural factors to cause instability and conflict. . . . The multiple effects of environmental scarcity, including large population movements, economic decline, and capture of environmental resources by elites, can weaken the government's capacity to address the demands of its citizens. If the state's legitimacy and capacity for coercive force are undermined, the conditions are ripe for instability and violent conflict. If the state's legitimacy and coercive force capacity remain intact or are bolstered, the regime may turn more authoritarian and challenge the trend of democracy and free markets around the world. Either way, our security is affected, and U.S. military forces may become involved, when environmentally linked instability spills over to other states in a key region, or when a complex humanitarian emergency results from environmentally rooted population movements.[29]

Collectively, these statements and others of similar or greater import (see Table 2-2) say much about the extent to which policy practitioners—and, presumably, the bureaucracies they superintend—seem now to have internalized the general proposition that environmental stress of some sort *can be* an *antecedent* to some form of insecurity (or conflict or violence). "Antecedent" is a safer choice of terms than "cause," precisely because the question of whether and how much environmental conditions can be said to actually *cause* insecurity is the core of the ongoing debate, in both academic and policy circles, over whether the environment deserves to be thought of as a legitimate, serious security concern. On methodological grounds, some scholars even shy away from considering something as nebulous as environmental degradation in the same breath with more readily identifiable and measurable instances of resource scarcity and

depletion. Similarly, methodological concerns on the output side of the equation deter some from even considering insecurity, a largely psychological state, as the effect of interest—preferring instead to rely on observable and documentable instances of violence.[30]

Because of the difficulty of establishing true causation, there is a rather widespread tendency to acknowledge that environmental factors must be considered in consonance with other—social, political, and economic—factors as contributors to insecurity. What is generally left unsaid, however, because it is inherently unclear, is which comes first: the social-political-economic chicken or the environmental egg. The University of Toronto's Thomas Homer-Dixon, one of the most respected but also controversial speakers on the subject, considers environmental scarcity—renewable resource scarcity—the ultimate source, though never the sole cause, of conflict and instability.

There are, he believes, three sources of environmental scarcity: degradation or depletion of a resource, increased consumption of the resource (due to population growth or rising per capita resource consumption), and uneven distribution that gives relatively few people disproportionate access to the resource and subjects the rest to scarcity. Environmental scarcity interacts with other political, economic, and social factors—the character of the economic system, levels of education, ethnic cleavages, class divisions, technological and infrastructural capacity, the legitimacy of the political regime—to produce intermediate social effects—poverty, inter-group tensions, population movements, institutional stress and breakdowns—that, in turn, lead to instability and conflict.[31]

Homer-Dixon's research is especially useful in focusing our attention on intra-state conflict—where most experiential evidence seems to suggest the post-Cold War future lies—because, as he notes, "environmental scarcity rarely, if ever [contrary to conventional wisdom], causes interstate war."[32] His work is less than totally useful, however, in focusing on resource scarcity to the exclusion of environmental degradation.[33] He thereby essentially dictates exclusive attention to such things as food security, water security, and energy security, while excluding other forms of environmental stress—including what, by semantic contrivance, we might refer to as atmospheric security.

Where Homer-Dixon is especially insightful is in leading us in the direction of the most powerful counterargument that can be made to resolute critics of environmental causation. He says that whereas, on first analysis, the main causes of civil strife appear to be social disruptions (e.g., poverty, migrations, ethnic tension, institutional breakdown), in reality scarcities of renewable resources, including water, fuelwood, cropland and fish, can precipitate these disruptions and thereby powerfully contribute to strife. By broadening his formulation, we may posit the existence of a more general *masking phenomenon* by which ostensibly political and economic causes of unrest, violence, conflict, and destabilization (e.g., political repression; economic deprivation, exploitation, and dislocation) actually may mask underlying, less visible, less discernible environmental sources of dissatisfaction, discontent, and alienation (e.g., diminished quality of life; threats to safety and well-being).

## Table 2-2. The Environment–Security Connection

- From *World Charter for Nature*, UN General Assembly Resolution 37/7 (1982):
  - The degradation of natural systems owing to excessive consumption and misuse of natural resources, as well as to failure to establish an appropriate economic order among peoples and among States, leads to the breakdown of the economic, social and political framework of civilization.
  - Competition for scarce resources creates conflicts, whereas the conservation of nature and natural resources contributes to justice and the maintenance of peace and cannot be achieved until mankind learns to live in peace and to forsake war and armaments.

- From *Moscow Declaration*, Global Forum on Environment and Development for Human Survival (1990):

  World peace, the full and equal participation of women and men, fairness, the elimination of poverty and a determination to protect our children from preventable disease and death, are essential conditions for sustainable, environmentally sound development in our interdependent world.

- From *Rio Declaration on Environment and Development*, UN Conference on Environment and Development (1992):
  - Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary. (Principle 24)
  - Peace, development and environmental protection are interdependent and indivisible. (Principle 25)
  - States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations. (Principle 26)

- From *Copenhagen Declaration*, World Summit for Social Development (1995):

  We share the conviction that social development and social justice are indispensable for the achievement and maintenance of peace and security within and among our nations. In turn, social development and social justice cannot be attained in the absence of peace and security or in the absence of respect for all human rights and fundamental freedoms. This essential interdependence was recognized 50 years ago in the Charter of the United Nations and has grown ever stronger. (Principle 5)

- From *The Earth Charter*, Earth Charter Commission, Benchmark Draft II (April 1999):

  The Earth community stands at a defining moment. With science and technology have come great benefits and also great harm. The dominant patterns of production and consumption are altering climate, degrading the environment, depleting resources, and causing a massive extinction of species. A dramatic rise in population has increased the pressures on ecological systems and has overburdened social systems. Injustice, poverty, ignorance, corruption, crime and violence, and armed conflict deepen the world's suffering. (Preamble)

**Principal Source: The Earth Charter Campaign,** http://www.earthcharter.org

Strategically, identifying and diagnosing ultimate causes is of monumental importance. All strategy, regardless of its instrumental particulars, seeks two things above all else—(1) assured security (of the most inclusive variety), and (2) the prevention of crisis. Where crisis occurs, strategy has largely failed, and insecurity results; the situation predominates over decisionmakers, as do the visible symptoms of the moment over more obscure underlying causes. The strategic imperative, therefore, is to prevent crisis from occurring in the first place by targeting and treating root causes. But which causes—environmental degradation and resource scarcity, or the political, economic, and social factors that give rise to or exacerbate such conditions (population, poverty, ignorance, resource inequity, government incapacity, infrastructure deficiency)?

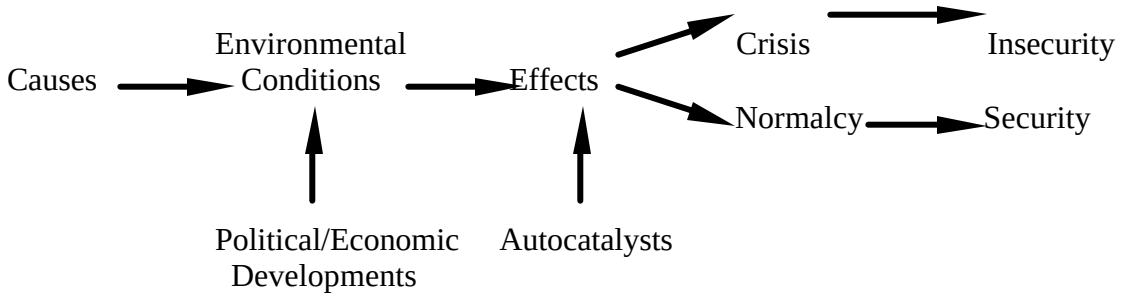


**Figure 2-2. The Train of Causation**

Figure 2-2 portrays a relationship in which these latter political, economic, and social factors are the ones that actually demand our attention. Population, for example—when explosive growth places increasing consumption demands on extant resources, when concentrated urbanization overtaxes primitive infrastructure capacity, when migration brings different peoples into opposition over common sources of sustenance—cannot help but produce conflict-inducing environmental stress.

Two other sets of considerations also must be taken into account. The first is the range of political and economic developments that surround, and therefore cannot be divorced from, the emergence of particular environmental conditions. Politically, the spread of democracy will have much to say about (a) the awareness, expectations, and tolerance of any populace for environmental degradation or deprivation, and (b) the demands they place on government for effective environmental stewardship. Of similar import and impact will be the presence and proliferation of public and private institutions (especially non-governmental organizations), whose interactions define the state of civil society, and whose activism greatly influences the extent and pace of government action or inaction. Likewise, the decentralization of government authority to sub-national levels—as well as the devolution of certain functions to the private sector—may heighten the difficulty of uniform or even consistent environmental performance across jurisdictions, even as it creates new centers for competitive autonomy leading to innovative environmental reform.

Economically, the inevitable diffusion of technology—from automobiles, refrigerators, and air conditioners characteristic of rapid basic societal modernization to cleaner materials, products, and processes characteristic of more mature stages of development—can have both positive and negative impacts on the environment. With most of the developed world moving to largely service-based economies, the industrialization that increasingly will be concentrated in the developing world also will have expectably pronounced environmental effects.

On the one hand, population growth will produce mass markets of poor, uneducated consumers ripe for cheap products produced by dated, inefficient, polluting manufacturing processes that result in massive waste and environmental damage.

On the other hand, as economic and industrial globalization advances, as commercial markets become more open to entry and competition, as international environmental standards and compliance mechanisms take hold, and as industry gradually comes to see profitability and competitive advantage in cleaner products and manufacturing methods, the result could be a measurable greening of the marketplace. With globalization and the accompanying push for free-market capitalism will come many new examples of cut-throat economic Darwinism that widens the gap between rich and poor and provides infinite incentives for yet other forms of environmental racism and classism. At the same time, though, there is likely to be an expansion of the global middle class. Because environmental activism is fundamentally a middle-class, democratic phenomenon, this will give new life and reach to the environmental movement that will generate new pressures on—and frequently adversarial, sometimes hostile responses from—government.

A second set of considerations that must be taken into account is the appearance of autocatalytic events that feed off of and accentuate environmental degradation and resource scarcity, thereby almost assuredly heightening public awareness and discontent. Natural and man-made disasters—floods, drought, earthquakes, hurricanes, massive oil spills, nuclear or chemical incidents—are the most common and identifiable such autocatalyst. The death and destruction they wreak magnify and are multiplied by the state of the environment and the failure of government to take necessary preventive action. As public awareness of this connection grows, so too does public disaffection and restiveness. Environmental refugees—masses of people displaced (knowingly or not) by the degraded sustainability of their surroundings—seem likely, with heightened media-age expectations and mobility, to become an ever more common autocatalyst. As with most movements of aliens onto the territory of others, tensions and attendant violence are almost inevitable. Another autocatalytic possibility is the occurrence of economic, political, or social crisis—a continuation or reprise of the Asian financial crisis, for example, or a coalescence of transnational religious or ideological fervor, either of which could heighten awareness and frustration over inequality, persecution, or unfulfilled expectations. Even international agreements (such as the Kyoto accords) that raise public awareness, sensitivity, and intolerance of environmental malfeasance and government inaction, or that, conversely, prompt governments to unusually harsh enforcement of environmental standards against foreign concerns, could be autocatalytic precipitants of unrest and violence.

Recognizing the existence of such factors, their relationship to one another, and their likely effects is the necessary first step in even accepting the proposition that the environment and

security are inextricably linked. It also, though, is the first step in determining the actual state of environmental security—in China or anywhere else in the world—and in then forging an effective preventive response that targets and acts on underlying causes rather than merely reacting to visible symptoms. It is a task that demands uncharacteristic strategic insight and initiative from policymakers too accustomed to the simplistic certainties and unambiguous threats of the Cold War.

## NOTES

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# CHAPTER 3

# ENVIRONMENTAL CONDITIONS IN CHINA

Two major developmental factors are at the root of China's environmental challenges: the country's population dynamics and economic growth, along with the urbanization that attends both. An appreciation of these factors is crucial to an understanding of the environmental security issues that China may face and pose in the years ahead.

## THE POPULATION TIME BOMB

China is the most populous country in the world; its unusually dense population is distributed unevenly across its territory. Most of the population of 1.24 billion is concentrated in the eastern and southern coastal areas, where there is arable land. China's population, roughly five times that of the United States, lives in an area equivalent to that east of the Mississippi River.

Mao Zedong, the founder of the People's Republic, was strongly pro-natalist and subscribed to the notion that population represents an important element of national power. According to Mao, "a big population is a very good thing" and "even if China's population multiplies many times, she is fully capable of finding a solution."[1] China experienced extremely rapid population growth from 1949, when the population numbered some 542 million, through the decade of the '70s. Over time, demographers and planners signaled alarm over China's burgeoning populace and the carrying capacity of the land. There is general scholarly agreement that the optimal population size for China is 680 million. That figure was exceeded in 1964.[2] In 1979 Beijing adopted the one-child-per-family policy and a population control program that employed propaganda, financial incentives, social pressure, and some coercion.[3] These controversial measures have slowed the rate of population increase. According to the State Statistical Bureau, the population has effectively stabilized, with 200 million fewer people than if there had been no family planning intervention. The Chinese target for the year 2000 is 1.3 billion people, with the population now generally expected to peak in 2033 at 1.48 billion.[4]

## UNPRECEDENTED ECONOMIC GROWTH

During the 1980s, the Chinese economy grew at close to 10% per year, enabling a doubling of rural incomes. From 1993 to 1997 annual growth rates averaged 11%, surpassing average rates for both developing and developed countries. China's gross domestic product (GDP) now ranks second in the world in purchasing power parity terms.[5] But while aggregate sustained growth rates have been some of the most impressive in the world, per capita GDP is still below $500.[6] The Chinese government

estimates that there are some 80 million rural people still living in poverty. In addition, income disparities between rich and poor in China are growing faster than anywhere else. While much of the poverty in China is rural, an increasingly large cohort of urban poor has emerged. Between 12 and 22 million urban dwellers (of a total urban population estimated at 200 million) live in absolute poverty—lacking basic food, clothing or shelter.[7] These numbers underreport the extent of the problem, since they do not include the "floating population" of rural residents who have migrated to the city unofficially. In Beijing, for example, one-third of the population is estimated to be "floating" migrants. The Chinese environmental white paper, issued in June 1996, attributed much of China's environmental degradation to rapid urbanization. Approximately 350 million Chinese, 29% of the population, lived in cities in 1995, up from less than 20% in 1980. By 2000, over 400 million are expected to reside in urban areas. Environmental minister Xie Zhenhua has summed up the problem well: "Environment pollution, with cities at the center, is still developing and gradually extending to the countryside; the scope of ecological destruction is expanding and intensifying; and eco-environmental problems have become major problems affecting overall social and economic development in some regions."[8]

Although rates of economic growth have slowed—9.6% in 1996, 8.8% in 1997, 7.8% in 1998, 7.1% in 1999—China is still expected to overtake the United States as the world's largest economy by as early as 2010. Already China consumes more red meat, grain, and fertilizer, and produces more steel than America.[9] (Due to outdated technology, however, it takes twice the amount of energy to produce a ton of steel in China as it does in the United States.[10]) In its rapid industrialization, the Chinese government adopted a deliberate policy of modernization and growth over pollution prevention. Incurring additional expense for environmental safeguards or slowing the pace of development were not costs the Chinese were willing to pay during most of the 1980s.

## RESOURCE AVAILABILITY

Three aspects of resource availability are particularly germane to China's environmental security situation: natural resource scarcity; the degradation of existing resources; and the relative demand for resources.[11]

From the standpoint of resource availability, with population-to-arable-land and -water ratios that are unfavorable—both compared to other parts of the world and in terms of the carrying capacity of the land—China is at risk regardless of any other conditions that may be present. Population growth is outpacing agricultural productivity increases, and water and energy resources are unevenly distributed and unmatched to the demand for them. China is simply not endowed with enough arable land or water to provide for her growing population.

Added to this natural predisposition for environmental risk is the toll taken by rapid industrialization without environmental safeguards. This has resulted in serious environmental degradation and resource depletion. Water, air, soil, timber, and fisheries have been despoiled through a deliberate policy preference for economic growth at the expense of environmental protection. Urban encroachment, salination, desertification, and water diversion from irrigation to industry have reduced arable land

availability. Extensive reliance on soft coal as the primary energy source has produced acid rain and increasing levels of carbon emissions. Untreated industrial waste has polluted much of the limited water resources.

The changing consumption patterns of the Chinese that are accompanying their economic development also contribute to resource vulnerability. As incomes grow, so does the demand for electricity, water, meat, automobiles, and other consumer goods. Although China has traditionally been very energy efficient on a per capita basis, today that is quickly changing. Thus, water, food and energy availability, or security, will be principal determinants not only of China's continued economic growth but also of the likelihood the country may be faced with internal or regional conflict in the years immediately ahead.

## WATER SECURITY

Both water availability and water quality are key environmental concerns in China. Water availability is the more critical issue in terms of conflict potential. China has one-third the global average per capita water availability (2,292 $m^3$/capita in China versus a world average of 7,176 $m^3$/capita). While China is relatively water-deprived in the aggregate, the situation is exacerbated by seriously uneven distribution. The scarcity in northern China is the most pronounced—average availability there being 750 $m^3$ of water per person, compared to 9,413 $m^3$/capita in the United States. About 80% of the water, and approximately 700 million people, are in the southern part of China where the climate is more tropical and rainfall is heavier.[12] Twenty percent of China's water, but two-thirds of the cropland and 550 million people, are in the north.[13]

Water shortages are estimated to cost the Chinese $35 billion annually in agricultural losses (66 million tons, or 17% of the annual harvest, are lost to water shortages) or industrial underproduction. The water table in northern China has dropped significantly, due to excessive water demands from the urban population, heavy industrial growth, and the growing use of agricultural irrigation. Approximately 550 million people, or twice the U.S. population, live with water shortages. Four hundred of China's 600 cities are affected.

Agriculture draws most heavily on water resources, consuming 87% of available fresh water. Farmers now use 400 billion metric tons of water each year for irrigation. And since 70% of China's grain is produced on irrigated land, water availability is crucial to meeting the country's grain needs. Shortages of water have already begun to affect agriculture. The Yellow River, which feeds much of the grain belt in central China before meeting the sea, is drying up. In 1997 this great river failed to reach the sea for 226 days. For much of that time it did not even reach the coastal province of Shandong, which produces a fifth of the corn and a seventh of the wheat in China. Shandong relies on the Yellow River for half of its irrigation water. Press reports indicated that the drying of the Yellow River before Shandong, in 1995 alone, lowered the grain harvest by 2.7 million tons—or enough to feed 9 million people. The Huai river failed to reach the sea for 90 days in the drought-ridden year of 1997. The Fen river, feeding Shanxi province, has disappeared altogether. It was drained to support the coal industry in the provincial capital of Taiyuan.[14]

Future forecasts are grim. A growing mismatch between supply and demand for water will occur in China over the next several decades. In agriculture, the major current user of water, greater affluence will increase consumer demand for meat, poultry, and produce, which will drive agricultural use of water to 665 billion metric tons by 2030. Industry now uses 7% of the water, though industrial use may increase five-fold in the next thirty years from 52 billion (1995) to 269 billion metric tons of water. Domestic use accounts for only 6% of the current total. But with a 25% increase in the population projected by 2030, absent per-capita consumption increases, demand for water will increase by one-quarter. Add to that the increased use of indoor plumbing and other water-intensive trappings of greater affluence, and domestic consumption is forecast to rise from 31 billion tons (1995) to 134 billion tons in 2030. Total water demand is projected to increase over the 35-year period from 483 to 1,068 billion metric tons. This almost three-fold increase in demand simply cannot be satisfied with available domestic resources. Demand side management can hope to reduce consumption some. In agriculture, for example, drip irrigation for high-value crops could reduce water use substantially. A shift to less water-intensive crops (from rice to wheat) and products (from pork to poultry) would require less water. In residential use, recycling of wastewater and use of more efficient water supply and sewerage systems would conserve water. Industry uses water least efficiently and presents the greatest scope for technological innovation to cut water consumption per unit of production (e.g., China uses 23 to 56 $m^3$ of water to produce a ton of steel; the United States less than 6. China uses 450 $m^3$ of water to make a ton of paper; industrialized countries less than half that amount).[15]

Even with progress in conservation, China faces serious water shortages. This will likely lead to a reallocation of water resources out of agriculture and into residential and industrial uses. If farmers can no longer irrigate and must rely on rain-fed agriculture, their yields will decline by at least one-half. This would increase demand for imported grain, affecting not only China's balance of trade, but also world grain supply and prices. The MEDEA study on the Future of Chinese Agriculture, jointly undertaken by the National Intelligence Council and the CIA, predicts that by 2025 China will need to import 175 million tons of grain. Lester Brown of the Worldwatch Institute has reached similar conclusions, suggesting that by 2030 China's demand for imported grain will be equivalent to the total supply of export grain available in the world.[16]

Pricing of this scarce resource is part of the problem. Until the early 1980s, water was free. When a fee was imposed on farmers it was based not on consumption but on the amount of land to be irrigated. This caused distortions and provided no incentives for conservation. In northern China, when pricing switched to being based on consumption not acreage, usage dropped 20%. However, the unit pricing is still flawed, since water prices for farmers in northern China cover only one-tenth of the real cost of the water. [17]

Already, inter-provincial political conflicts have emerged along the Yangtse River over access to water. Also, in western China, physical conflict has erupted between farmers in Ningxia province and herders in Inner Mongolia. The impoverished farmers no longer have irrigation for their crops and, since 1993, have invaded Inner Mongolia by the thousands to harvest an edible native grass. The official press reports 2.5 million acres of grassland destroyed by this, and 1,511 officials and 1,100 police injured in attempts to stop such incursion.[18]

More dramatic in terms of loss of life and dislocation but less economically damaging than water shortages is the perennial issue of flooding. As Daniel Gunaratnam, a World Bank hydrologist, suggests, "There is no doubt that China's water shortages, long-term, constitute a more serious threat to her development than the floods."[19] However flooding is what makes the news and holds the attention of politicians. During the '90s, floods have cost the Chinese on average $10 billion per year. The 1998 flooding of the Yangtse wreaked $20 billion in damages.[20] It was the worst incidence of flooding since 1954. The official press reported 4,610 people killed across 29 provinces. A total of 200 million people were affected through loss of homes (26 million dwellings destroyed) and forced migration (22.01 million people relocated). As the waters receded, there were close to 3 million people living on dikes. Nearly 23 million head of livestock were lost and 77.9 million hectares of crops were affected; 7.35 million hectares of which were wiped out.[21] The floods were estimated to take a 0.5 percent toll on GNP for 1998, though that was largely offset by new infrastructure investment demands that the floods created. As a result, the official pronouncement from the Chinese government was that the country would still meet its target of 8% GDP growth.[22] Overall, natural disasters in China in recent years have caused economic losses on the order of 3% of GDP. This large figure is due in part to the vagaries of nature but perhaps more to the level of environmental protection and infrastructure available in China. By contrast, in Japan natural disasters cost on average 0.8% of GDP. In the United States, they account for 0.06% of GDP.[23]

While water availability is the largest single environmental issue in terms of economic growth limitation and destabilization potential, water quality is also a serious issue in China. And, of course, there is negative synergy between the two. According to a UNEP report prepared by Chinese environmentalists, virtually all of China's surface water is polluted to some degree. Seventy-eight percent of the urban river water is non-potable, and 50% of underground water in cities is tainted. In 1997, 41.6 billion tons of wastewater were discharged into rivers, of which 22.7 billion tons were from industrial sources and 18.9 billion tons were municipal effluent.

China has seven major river systems. Of these, the water in the Yangtse, Yellow, and Pearl Rivers is marginally acceptable. The Yangtse contains permanganates, elevated BOD, and volatile phenols. The impact of the Three Gorges Dam on water quality in the Yangtse cannot yet be determined, but environmentalists fear the damhead reservoir will concentrate pollutants and create a toxic cesspool. The Yellow River suffers from both pollution and damming/diversion. Ammonia nitrogen, along with pollutants common to the Yangtse, is found there.[24] In the Yellow River watershed, abnormal incidence of mental retardation and developmental disorders have been traced to excessive levels of arsenic and lead in the water and food supplies.[25] The Pearl River is relatively more tainted, with mercury in addition to the above pollutants. The Hai, Luan and Liao Rivers are seriously polluted, with the water quality described as bad. The Huai and Songhua rivers have shown improvement. Along the Huai River, where some 150 million people live, the pollution was particularly severe. In a sad and telling study, school children in the area were interviewed and asked the color of water. Their response was black. The pollution of the Huai River is a negative consequence of economic liberalization and the growth of township and village enterprises. Many paper mills were established to take advantage of plentiful wheat stalks which produce a low-grade but saleable paper through a highly polluting process. In August 1996, the State Council issued water pollution regulations governing effluent into the Huai River. Paper

mills with an annual capacity of less than 5,000 tons were to be shut down.[26] The resulting closure of tens of thousands of township and village enterprises was heralded by Beijing as a major environmental victory. However, independent reports since then suggest as many as 40% of the mills have reopened. Freshwater lakes are moderately polluted, reservoirs also to a lesser extent. The major pollutants of these bodies of water are organics which cause eutrophication. However, elevated levels of phosphorous, nitrogen, volatile phenols, mercury, and, in some cases, arsenic are found as well.[27]

In the last several years the volume of industrial effluent has fallen some—from 22.2 billion tons in 1995 to 18.8 billion tons in 1997. The treatment rate for industrial sewage has risen in the same period from 76% to 84.7%.[28] While industrial trends are somewhat encouraging, domestic sewage volumes have risen.[29] One third of coastal fishing grounds are ruined by pollution.[30]

## LAND USE ISSUES

Despite the attention paid to urban and industrial growth, China is still largely an agricultural economy; eighty percent of Chinese workers are engaged in farming or agriculture-related activities.[31] With 22% of the world's population living off only 7% of the world's arable land—and half of that land in mountainous terrain—per capita usable land is only 0.078 hectares.[32]

The quantity of arable land is China is the subject of intense debate—between Chinese officials who claim sufficient acreage and yields, and foreign researchers, most notably Lester Brown of the Worldwatch Institute, who has forecast serious grain shortages based on lower figures for total available farmland. Estimates of arable land range from 95 million hectares to 140 million hectares.[33] (Part of the discrepancy stems from difficulties in data collection but it is also thought that there has been a pattern of undercounting arable land by local officials and farmers so as to lower the harvest quota that must be offered up to the state.) Traditional Chinese agriculture, in the most ideal conditions and soil, with proper crop rotation, natural fertilizers, and a nearly meat-free diet, could feed seven people per hectare of land. Current population density on Chinese land is thirteen persons per hectare.

The amount of arable land being taken out of cultivation or compromised by pollution is increasing. Rural soil degradation through deforestation, misuse of fertilizers, and improper irrigation and drainage practices is having an adverse impact on agricultural output. Over one-third of China's land experiences soil erosion. Five billion tons of topsoil disappear each year. Over a twenty-year period until the early '90s, there was a cumulative loss of approximately six percent of arable land in China; in 1992 that rate jumped to five percent per decade.[34] Over 27% of the land is now desertified. Urban expansion overtakes 1.1 million acres of farmland annually.[35] Some 90% of the grasslands are damaged—130 million hectares moderately to severely. Each year another 2 million hectares of grasslands is seriously degenerated.[36]

Agricultural yields per hectare have increased with the use of commercial fertilizers, but with increased use of fertilizers has come stress on water resources. China now uses almost three times the fertilizer per hectare of the United States, and yet its reported grain yields are only 87% of U.S. yields.[37] Irrigation

has contributed to increased yields from marginal land; however, increasingly there is competition between urban dwellers, industry, and agriculture for water. Topsoil loss from erosion due to poor cropping practices and deforestation is substantial.

China has gone from being a net food exporter to running an annual grain deficit of fifteen million tons. The country has the second largest grain deficit in the world after its neighbor and competitor for a shrinking global grain surplus, Japan. Future forecasts of grain needs are generally grim, but also highly variable. The most alarming and alarmist estimates are those by Lester Brown, who predicts that by 2020 the Chinese will consume 549 million tons of grain, only 294 million of which will be produced domestically. Other responsible and respected estimates, including ones by the U.S. Department of Agriculture and the World Bank, predict far lower levels of grain imports that range from being one-tenth to one-quarter of Brown's estimates. One of the most rigorous recent studies, performed by the International Institute for Applied Systems Analysis, concludes that, contrary to Brown's assertions, China very clearly will have the wherewithal to feed itself.[38]

Solid waste is an increasingly problematic land issue. There is an estimated 7 billion tons of industrial solid waste, covering 60,000 acres of land. Urban household solid waste increases by 10% per year. The majority of solid waste is dumped in unsanitary landfills.[39] Beijing has already experienced localized protests from residents blocking garbage trucks from dumping additional waste in nearby landfills due to their odor and perceived health risks.

Another land use issue, indirectly related to both food and water security, is timber. Just as Lester Brown has popularized the question "Who will feed China?", Chahgjin Sun of the Worldwide Fund for Nature has asked, "Who will house China?" China is relatively forest scarce. Only 13.92% of China is forested, as compared to a global average of 22%. Whereas China's population-to-arable-land ratio is worrying, the population-to-forest ratio is more dramatic. China has only 4% of the globe's forest acreage.[40] There is an increasing domestic demand for timber due to population growth, increased consumption of paper products, housing shortages, and other construction needs. At the same time, forests are affected by industrial growth, urbanization, and competition with agriculture. They are both degraded by adverse environmental conditions, and in turn their disappearance exacerbates environmental problems, affecting water resources and agriculture.

China has been importing timber products for almost two decades and is now among the top three timber importers in the world. The Chinese now spend annually between 2 and 5 billion dollars on importing forest goods. These imports are projected to rise, since demand will continue to increase and domestic supply will decrease as a result of both conservation and deforestation. The timber gap for the year 2000 is forecast to be 40 million $m^3$/year.[41] Other countries will also be experiencing timber shortages and increased import needs. Competition for this renewable but currently constrained resource will affect world market prices. Additionally, the demand for timber, if it cannot be sourced domestically, is a potential flashpoint for conflict.

In response to the deforestation-worsened flooding, the Chinese government banned all logging of old-growth forest along the land that feeds the Yangtse River in western China, in the northeast where

flooding was also serious, and in the upper reaches of the Yellow River. According to the new regulation, no trees were to be cut after September 1, 1998 and all timber transport was to be completed by October 31. While this regulation offered positive environmental impact if consistently enforced, it threatened adverse localized impact on employment and potential for national-level timber deficit. Some 241,000 state-employed timber workers were to be laid off, along with a large number of part-time workers. The latter group were not eligible for compensation from the central or provincial governments.[42] Similar unemployment, disemployment—especially from a "safe" government job (the socialist state was seen as providing an "iron rice bowl" or guaranteed job security), and inadequate payment of expected compensation, have been precipitants in recent localized friction, demonstrations, and general civil unrest in Manchuria and various other parts of China. There will be continual pressure in opposition to downsizing this large state-owned industry and enforcing the logging ban due to the local economic impact and the insatiable demand for the resource.

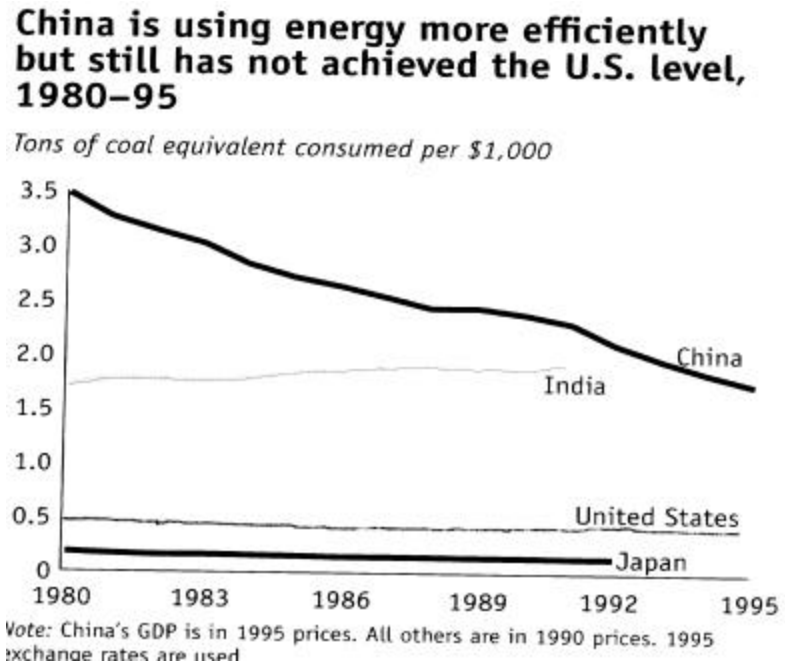
## ENERGY SECURITY

China is energy-scarce compared to global per capita averages. Coal is relatively plentiful and has a high heating capacity, hence the heavy reliance on it for energy despite the environmental impact. China has 11.1% of global proven coal reserves, ranking third behind the United States and Russia. But as plentiful as coal is, the per capita allocation is only 95 tons against a world average of 182. Only 2.3% of known oil is located in China, making it the eleventh most oil-rich country in the world. There are only 3 tons of oil per person, versus 25 globally. Natural gas is even less plentiful. With 0.8% of available natural gas, China ranks 23rd in the world. On a per capita basis, the availability is 967 cubic meters per person, just over one-third the global average.[43] The relative availability of energy sources in China is also unique. In other energy-resource rich countries, the natural gas either parallels or exceeds crude oil reserves. In Britain and the United States the two fuels are roughly equal. In Russia there is six times the known natural gas as recoverable crude oil. In China, known gas is less than one-third of oil reserves.[44] China does have the world's largest hydropower potential, but availability is offset by the high cost of hydro-plant construction and long transmission lines required.

With increasing population and economic growth has come a sharp rise in energy consumption. Energy use doubled between 1980 and 1995; however, during the same period China's GDP increased four-fold. This equates to energy elasticity of less than 0.5 percent. There is usually a parallel relationship between increases in energy consumption and economic output. The fact that the Chinese GDP growth curve diverged so steeply up from the energy use curve over time indicates that China has been effecting increases in energy efficiency unmatched by other industrializing countries along similar growth paths. Had China continued to consume energy at the same rate since 1980, their current energy use would be roughly double today's level.

China now ranks second to the United States in total energy consumption (surpassing Russia in 1993). Energy consumption in 1997 was 1,440 million tons of coal equivalent.[45] And, while efficiencies have been realized through closure of old factories and a shift from heavy industry to light manufacturing,

China has not reached the level of energy efficiency (energy use per unit of GDP) of the United States, as the figure indicates.



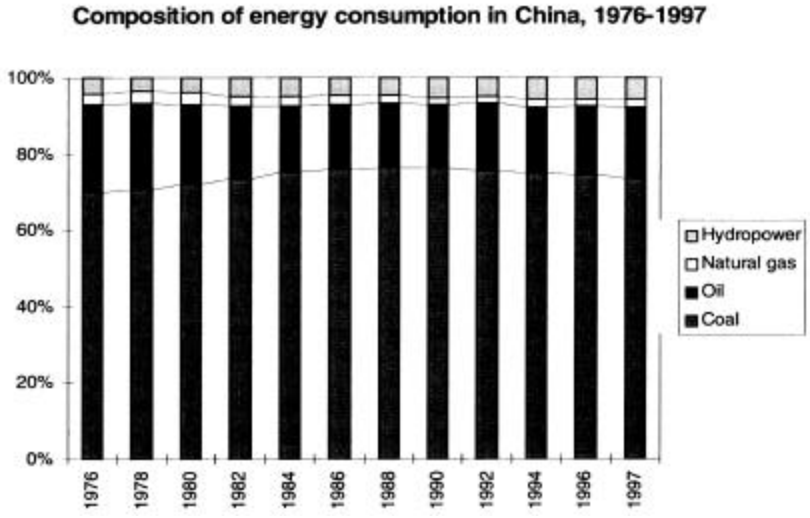

Source: *Clear Water, Blue Skies*, p. 47.

**Figure 3-1. China's Energy Efficiency**

China's industries, which account for a large portion of total energy use, use energy less efficiently than comparable industries in developed countries. However, energy use on a per capita basis—1.165 tons of coal equivalent—is only half the world average and one-twelfth that of the United States.[46] This low relative consumption is changing with increasing standards of living. Were Chinese rates to approach U.S. per capita consumption, aggregate energy demand would increase exponentially given their population base. Vaclav Smil asserts that while national characteristics would influence consumption patterns, international comparaters suggest quality of life in a modern economy is associated with per capita energy consumption levels roughly twice what China's are today. Factoring in projected population growth would yield an aggregate energy consumption figure for China 2.5 times greater than at present.[47] A recent Pacific Northwest National Laboratory study predicts a four-fold increase in power demand by 2020 over 1995 levels to 4,000 Terawatt-hours (TWh).

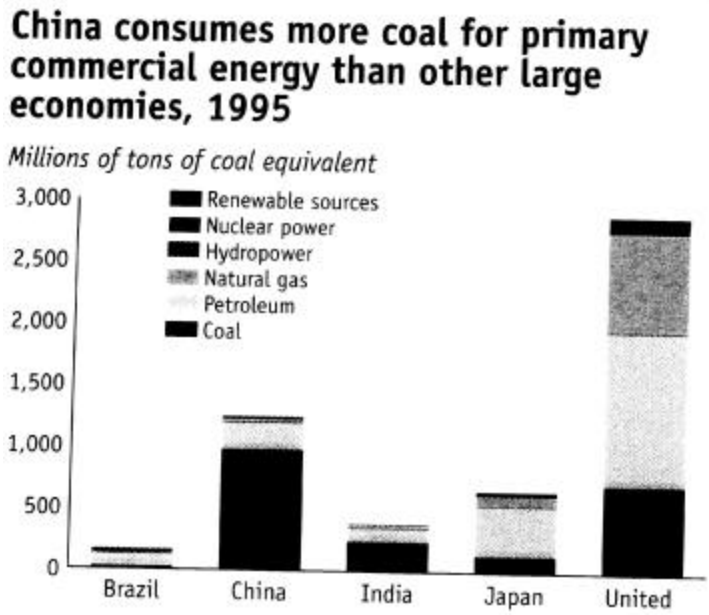
Seventy-five percent of China's energy needs are met by coal as compared to twenty-five percent for the United States and twenty percent of commercial consumption for both Russia and Japan.[48] Coal

burning generates three-fourths of China's electricity. Figure 3-2 shows the mix of energy sources in China over time. Figure 3-3 compares China's energy consumption and mix with other major economies.




Source: U.S. Energy Information, *China Country Analysis Brief*, June 1999.

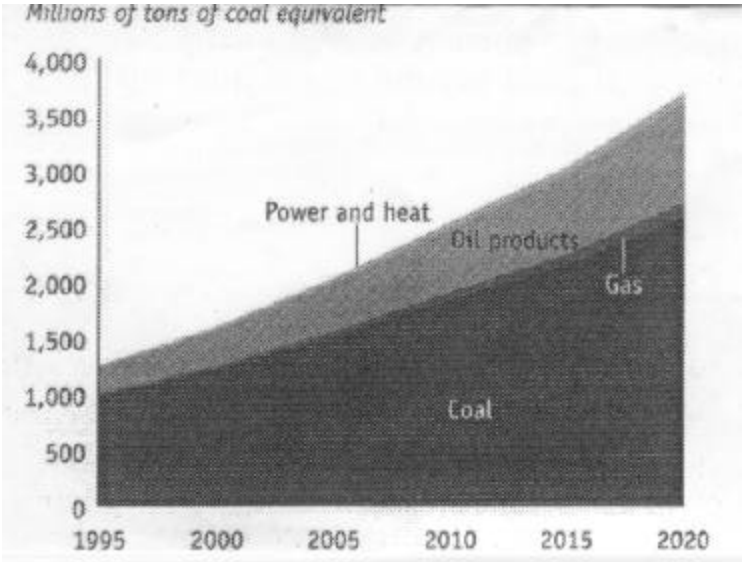
**Figure 3-2. China's Energy Consumption**




Source: *Clear Water, Blue Skies*, p. 46.

**Figure 3-3. Comparative Energy Consumption**

China is the largest consumer of coal in the world, but also the largest producer. One-third of all global coal—1.2 billion tons in 1998 (with 1.1 billion projected for 1999) is produced in China. It exported 32 million tons that year to South Korea and Japan.[49] Domestic coal consumption was 967.5 million tons in 1995, which represents a 29-fold increase since the founding of the People's Republic of China in 1949.[50] The heavy reliance on coal, given its location in largely remote areas, strains the country's inadequate transport system. Already over 40% of transported freight on north–south rail lines consist of coal. The road system is so underbuilt it cannot cope with the growing demand for coal transport. Siting power plants at the coal location requires vast quantities of cooling water. This is being implemented only to a limited extent in the north and northwest, exacerbating deficits in a chronically water-scarce area.[51] Despite a current oversupply and financial losses from inefficient state-owned or small coal enterprises, domestic demand for coal is expected to double from current figures by 2010. As Figure 3-4 shows, coal will continue to provide most of China's energy needs in the future despite policy emphasis and investment focused on energy diversification. Emphasis is being given to the development of coal liquefaction, coal bed methane production, and pipeline transport activities.[52]



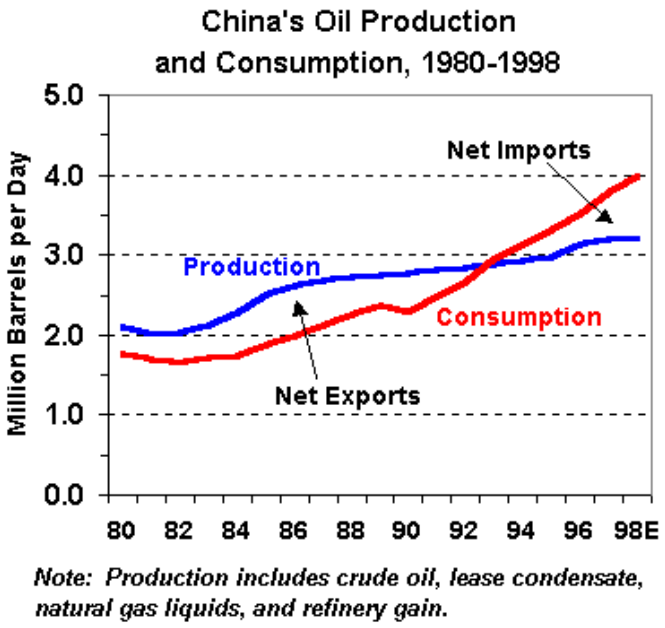

Source: *Clear Water, Blue Skies*, p. 31.

**Figure 3-4. China's Coal Needs**

The Chinese also rely on petroleum for energy and produced 160 million tons (Mt) in 1997, ranking fifth in the world. They hope to increase production to 200 Mt by 2010.[53] Ninety percent of current

production is onshore. There is limited refining capacity, particularly for heavy-grade crude. Agip, Exxon, Shell, Texaco, and Mitsubishi are the major foreign investors in the Chinese petroleum sector, though they are required to hold non-controlling interests in Chinese petroleum enterprises.

In 1993 China became a net oil importer, as production over a ten-year period up to 1997 rose only one percent per year while demand grew at 5.5% per year. From 1990 to 1996, oil imports rose from 3 to 22.6 Mt.[54] Figure 3-5 demonstrates this change.




Source: EIA, p. 2.

**Figure 3-5. Oil Production and Consumption**

In 1997, China imported 15% of oil consumed. In 2000, DOE predicts, China will be importing one million barrels of oil each day.[55] By 2020, as much as 40% of China's oil may be imported—a volume equal to over half of Saudi Arabia's current production.[56]

Oman is China's largest supplier of oil, selling an average of 189,000 barrels per day in 1997. China experienced a temporary oil surplus in 1998 and limited import licenses to protect domestic production. Omani imports fell to 67,000 barrels per day, but rose again in 1999. To secure access to foreign oil to meet anticipated future demand, China has acquired oil production concessions in Kazakhstan, Russia, Mongolia, Thailand, Papua New Guinea, Venezuela, Sudan, Iraq, and Peru. In 1997, the Chinese pledged to invest $4 billion in a Kazakh oil company over the next 20 years in exchange for a 60% shareholding and an oil pipeline connecting Kazakhstan and China.[57] They have pledged $1.3 billion to develop an Iraqi field as soon as UN sanctions are lifted.[58] The Chinese hope to resolve territorial

disputes with Vietnam to allow for offshore oil and gas exploration in the Beibu Gulf. Similarly, the Spratly Islands may offer significant oil and gas resources (though the projections vary widely depending on the source). These islands are claimed as sovereign territory by China, the Philippines, Vietnam, Taiwan, Brunei, and Malaysia.

China still exports crude oil to Japan and Korea, with Japan being the largest customer at 120,000 to 160,000 barrels per day. In 1999 a dispute arose over the state-owned petroleum enterprise's decision to suspend export of crude to Japan at low world market prices and instead to refine it for domestic use. Eventually this decision was overturned, but only after Japanese protest. [59] As domestic demand for petroleum products increases, while at the same time demand from other countries for imports is also increasing, this tension will rise. Competition with Japan for scarce resources, reliance on Japan for export earnings, and Japan's dependence on China as a source of needed commodities raise a red flag in terms of regional conflict potential.

Natural gas accounts for only 2% of China's energy use. The Chinese plan to increase reliance on natural gas to 6% of the energy mix by 2010 through development of reserves located in the west, construction of a pipeline, and increased imports of liquefied natural gas[60] (LNG). Historically, natural gas has lacked a champion in the energy bureaucracy; it has been used mainly for residential and small-scale industrial uses and fertilizer and chemical production rather than in power generation or transport. Expansion of natural gas use will require huge capital investment and pricing reform to attract foreign financial participation. The cost of building a Siberian pipeline is estimated at $7 to 12 billion. Sea transport of LNG would be cheaper, but large-scale investment would be required for facilities to liquify and re-gasify it for use.[61]

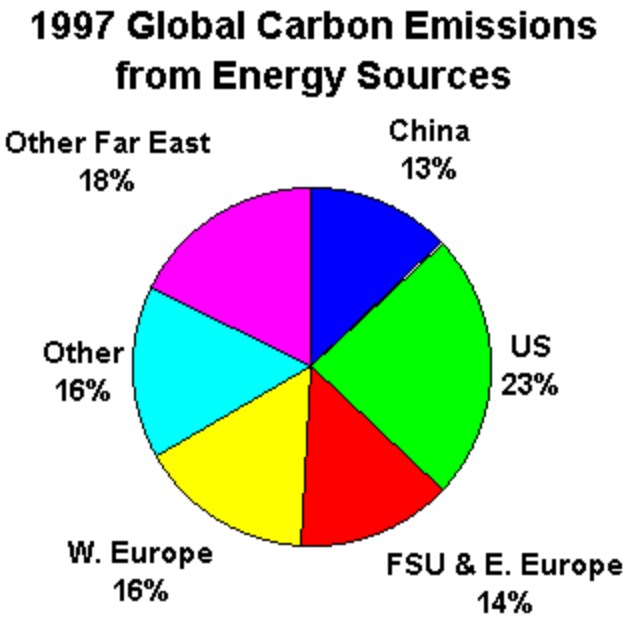
While China has huge hydropower potential, unfortunately most hydro-energy resources are located in the southwest, far from the coast, where energy is needed most. To use hydro potential, control flooding, and perhaps equally important to satisfy a Chinese government need for massive monuments, the largest dam project in the world is underway on the Yangtse river. While estimates vary widely, the Three Gorges dam is expected to cost $72 billion to build. It will increase electricity output 10%, provide 18.2 GW of generating capacity, and produce 85TWh (terawatt-hours) of electricity per year when completed in 2009.[62] However, it will take 30,000 acres of prime agricultural land out of cultivation and create a 660 kilometer-long reservoir that environmentalists fear will be silted and concentrated with pollutants.[63] The United States and Canada—leading dam builders—along with EX–IM and others, declined to finance the project. China has good wind, solar, and geothermal energy potential, but these resources are generally not located close to energy-consuming concentrations. Limited investments in renewable resources R&D and pilot programs have not yielded more than locally significant results.

The Chinese have a relatively small built nuclear energy capacity. In 1992 China opened its first domestic-design nuclear plant near Shanghai, with a 300 MW capacity. In 1994 in Guangdong a much larger plant was opened using a U.S. design and French light-water reactors. Russia, France, and Canada have investments in the nuclear sector. In 1997 the United States agreed to sell nuclear reactors to China, though recent allegations of nuclear weapons espionage against the Chinese have had a chilling

effect on technology transfer in that area. Current plans call for building four new plants with eight reactors by 2001, though this target is likely to prove unrealistic.[64]

Coal will continue to be the mainstay of Chinese energy production due to its availability, a pricing structure which does not account for environmental costs, and the capital and lead-time required to fully develop alternative energy sources. (Some pricing reform has taken place—coal subsidies have fallen from 61% in 1984 to 29% in 1995. Similarly, petroleum subsidies fell from 55% in 1990 to 2% in 1995).[65] By sector, industry is the largest energy consumer in China, with transport accounting for only about 10% of consumption. By contrast, in the United States, transport and industry consume roughly equivalent proportions of energy, each about 40% of total energy consumption.[66] Transport fuel prices are particularly low in China by international standards. A liter of premium gas in China costs $.25, in Japan it runs $.97, in Germany $1.01 and in the United States, $.36.[67] As automobile and other vehicle use increases, there will be an even greater need to rationalize fuel prices to reflect full economic and environmental costs.

China is the second largest carbon-emitting nation after the United States. Figure 3-6 shows total carbon emissions from energy sources by country or region.




Source: EIA, p. 6.

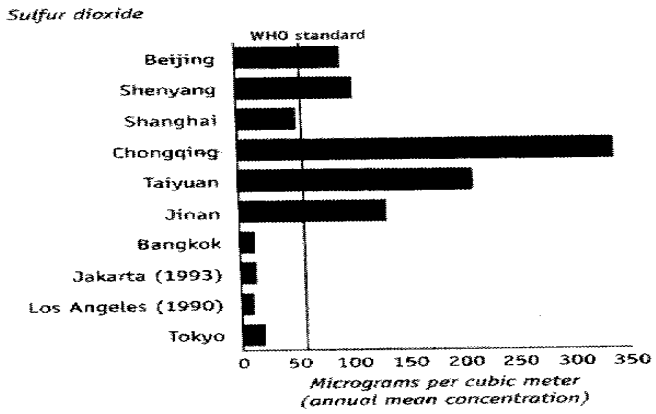
**Figure 3-6. Global Carbon Emissions**

Russia's emissions have declined due to the collapse of much of its heavy industry; U.S. rates are rising slowly. With continued reliance on coal, and population and economic growth that could increase consumption 2.5-fold from current levels, China is projected to surpass the United States in carbon emissions by 2020 (though estimates range from 2010 to 2025, depending on the model used).[68] Not only will carbon dioxide increase, but so will other greenhouse gases (GHG) such as methane (from natural gas extraction and rice farming) and, one of the most potent GHGs, nitrous oxide (from increased fertilizer use). Of the global total amount of nitrous oxide, China already contributes 20%.[69]

Coal burning is the largest problem in urban air pollution—producing 70% of the particulates and smoke, 90% of the $SO_2$, and 80% of the $CO_2$ emissions. [70] Chinese coal has a high energy factor but the average ash content is 27%, and sulfur, while generally low, can range up to 5% in southern deposits. Coal is burned throughout the country and in production processes from the household level to large industrial furnaces. Coal use in traditional household stoves accounts for the high levels of indoor air pollution and prevalence of lung cancer in non-smoking rural Chinese women. Coal is used in heating and industrial processes, and generates 75% of China's electricity. There are hundreds of thousands of burners without any pollution control equipment.

Environmental conditions in China adversely affect the health and productivity of its citizens. In most developing countries, infectious diseases and vector-borne and gastro-intestinal illnesses are the prevalent causes of morbidity and mortality. The Chinese have relatively lower rates of these, but much higher rates of respiratory illnesses and deaths, and chronic diseases such as lung and liver cancer. Chronic obstructive pulmonary disease is the leading cause of death in China and occurs at a rate that is twice the average for developing countries.[71] World Bank modeling indicates urban air pollution is responsible for 178,000 premature deaths each year; indoor air pollution causes an additional 111,000 premature deaths annually that could be averted if China met its own class 2 air pollution standards.[72]

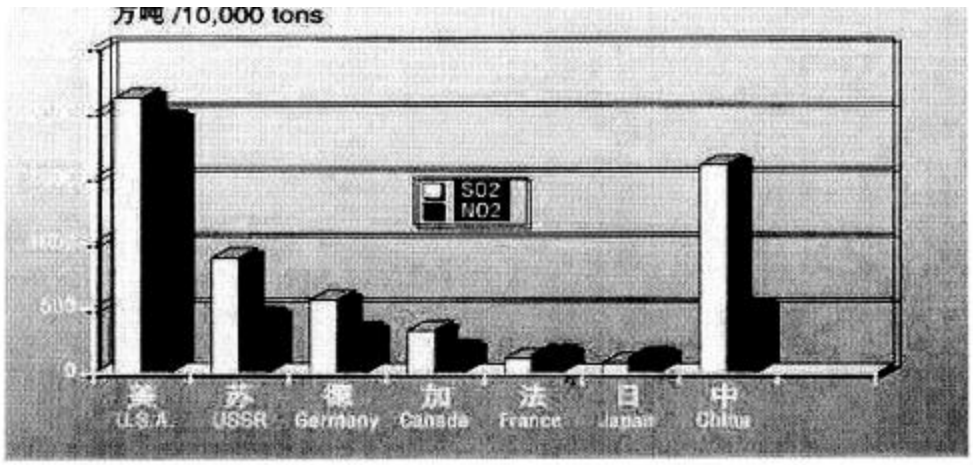
Currently employed emission control technologies reduce sulfur dioxide emissions by less than 6% in the power sector. China currently emits over 23 million tons of sulphur dioxide annually. As Figure 3-7 shows, $SO_2$ levels in China's main cities exceed WHO standards for health risk, and far surpass other Asian and U.S. cities thought of as highly polluted.



Source: *Clear Water, Blue Skies*, p. 6.

**Figure 3-7. Sulfur Dioxide Levels**

The rain in southern Chinese cities is routinely below pH 4.5, though acid rain and its damage to forests and cropland is not confined to the south. It affects up to 40% of the country and causes an estimated $13 billion in damages each year.[73] Figure 3-8 shows $NO_2$ and $SO_2$ emissions in China as compared to other selected countries.




**Volume of Emission of SO2 and NO2 in some Countries**

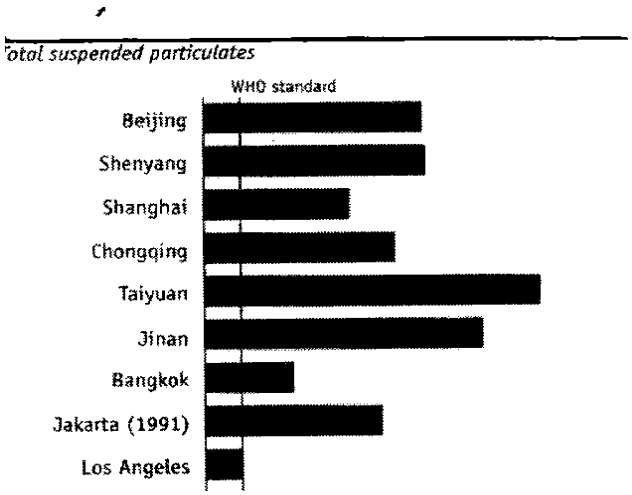
Source: http://svrl-pek.unep.net/soechina/acid/acidb1.htm

**Figure 3-8. Comparative $SO_2$ and $NO_2$ Emissions**

Thirty percent of the acid rain in western Japan is caused by sulfur dioxide emissions from coal burning in China.[74] With many new coal-fired power plants both under construction and planned, acid-rain causing emissions from China will become an even greater problem for Japan and Korea. Unfortunately, desulphurization processes increase both construction and operating costs of power plants by about 20%. By 2035, Chinese sulfur dioxide emissions alone will exceed those of the rest of the then-industrialized world combined. "Smoke" discharges, as reported by the Chinese government, are close to 19 million tons per year.[75] Figure 3-9 demonstrates vividly the particulate pollution problem in Chinese cities as compared to other cities.

Vaclav Smil estimates that 200 million Chinese are exposed to annual concentrations of total suspended particulates above 300 mu g/m$^3$, with 20 million people exposed to 600 mu g/m$^3$.[76]

Another contributor to air pollution is transport. While the Chinese vehicle fleet is still small, it lacks pollution control devices and cleaner fuel and thus is a major source of urban pollution. For example, while Beijing has only 10% of the cars of Tokyo and New York, vehicular emissions are approximately the same for all three cities.[77] On the plus side, China has set a target of lead-free gas use by 2000. Leaded gas was eliminated in 1997 in Beijing, Shanghai, Guangzhou, Tianjin, Nanjing, Shenzhen, Wuhan, Dalian, Shenyang, and Xian.[78] There are now 15 million motor vehicles in China, a figure which has grown exponentially of late and will continue to grow.[79] By 2021, Chinese auto industry production capacity is expected to reach 6 million. Private car ownership was forbidden until 1980; now 1.3% of urban families have cars. With increasing mechanization of agriculture there will be greater demand for farm vehicles.[80] As a boost to the economy, in late 1998 the Chinese government lifted a 1995 ban that prohibited banks from offering car loans.[81]




Source: *Clear Water, Blue Skies*, p. 6

**Figure 3-9. Suspended Particulates**

With urban areas that are already unhealthy due to heavy pollution and massive traffic jams, it seems ironic that the Chinese are anxious to abandon the bicycle as a means of family and goods transport—which they formerly championed. Official policy advocates that every family in future have a car.[82] This would mean 300 to 400 million Chinese vehicles (when in 1995 there were only 500 million cars registered in the world) and, even if Chinese cars were to get double the mileage of U.S. cars, it would require a doubling of China's current annual crude oil consumption just to power them.[83]

## ENVIRONMENTAL POLICY

In the initial phase of recent Chinese industrialization, the government was not committed to incurring the costs of pollution prevention or remediation in its state-owned industries, nor did it provide incentives for pollution control to private industries as they developed. Over time, pollution problems in urban areas became more pronounced, the adverse health effects of such pollution became more widely recognized, and, most compelling for policymakers, there arose a realization that natural resource contamination and scarcity would increasingly constrain the country's efforts to modernize. The cost of air and water pollution and soil degradation in China is currently estimated at 10% of GDP.[84] This figure, interestingly, is 10 times what the government spends annually on managing the environment.

China's first environmental legislation was promulgated relatively early. In 1979 the Standing Committee of the National People's Congress passed the Environmental Protection Law, which provides the legislative framework for assigning managerial responsibility, sets priorities and benchmark measures, and describes penalties. Sixteen subsequent national environmental laws give media-specific requirements. Statutes and regulations (over 400) issued by the State Council provide specific implementation guidance. At the subnational level there are over a thousand laws and regulations. The major pieces of national legislation include:

- The Basic Law on Environmental Protection (amended 1989)
- The Law of Forests (1984)
- The Law of Natural Resources (1986)
- The Law of Land Resources (1986)
- The Law of Air Pollution Prevention and Treatment (1987)
- The Law of Water Resources (1988)
- Management Procedures for the Environmental Protection
- of Construction Projects (1989)
- The Law of Water and Soil Conservation (1991)
- The Act of Protected Areas (1994)
- The Bio-diversity Protection Action Plan (1994)
- The Law of Air Pollution Prevention and Treatment (1995)
- The Law of Water Pollution Prevention and Treatment (1995)
- The Law of Solid Waste Pollution Prevention and Treatment (1995)
- Law of Noise Control (1996)
- Law of Radioactive Pollution Control and Prevention (1996)
- Catalogue of Hazardous Wastes (1998)[85]

The current Chinese constitution, adopted in 1982 and since amended in 1988 and again in 1993, is the most fundamental source of articulated environmental policy. Article 26 reads: "The state protects and improves the environment in which people live and the ecological environment. It prevents and controls pollution and other public hazards. The state organizes and encourages afforestation and the protection of forests." Article 9 reads, in part: "The state ensures the rational use of natural resources and protects

rare animals and plants. Appropriation or damaging natural resources by any organization or individual by whatever means is prohibited."[86]

The amended Basic Law on Environmental Protection, passed in 1989, was implemented with three policy thrusts: "putting prevention first and combining prevention with control"; "polluter pays"; and "intensifying environmental management." This policy emphasis is progressive and resembles the orientation of the United States and other industrialized countries.

Following the Rio Summit on Sustainable Development in 1992, the Chinese developed their country-specific Agenda 21 Plan. The plan's priorities include:

- An emphasis on sustainable development and prevention and control of industrial pollution
- A focus on the urban environment
- Increasing energy efficiency.
- The introduction of ecofarming, afforestation, and biodiversity conservation
- The promotion of research and science and technological progress
- Education and consciousness raising
- Improving the legal and regulatory structure for environmental compliance[87]

The Ninth Five-Year Plan (1996-2000), as outlined by then-Premier Li Peng, lists "strengthening environmental and ecological protection and rationally developing and using natural resources" as the last of four strategies (after science and technology, education and family planning) to "achieve a coordinated and sustainable economic and social development." Specifically, Li states:

> Our country's per capita arable land, water and forests and some mineral resources are below average. Since our country is now rapidly promoting industrialization and since we have adopted methods of extensive production and operation, waste of natural resources and environmental pollution are quite serious. With population growth and economic development, this problem will probably become even worse. We should make greater efforts to conserve and rationally develop and use our natural resources, including land, water, forests, grasslands, minerals and biological resources according to the law, and do all we can to reduce waste. We should develop marine resources and improve the system of paid use and pricing of natural resources as quickly as possible and establish systems for economic compensation for the renewal of natural resources. We should adhere to the policy of synchronizing the planning, implementation and progress of economic development, urban and rural construction and environmental protection, and ensure that all construction projects meet the requirements for environmental protection.[88]

The five-year plan sets targets for pollution abatement and environmental improvement in selected cities by the year 2000 (see Table 3-1). These targets are clear and ambitious, requiring increases in the treatment of industrial wastewater from 63 to 74% and total wastewater from 19 to 25%. About 40% of planned investment will go toward wastewater reduction and half toward air pollution abatement.[89]

**Table 3-1. Pollution Abatement Targets**

| Emission | 1995 Level | 2000 target |
|---|---|---|
| **Water** | | |
| Wastewater (billions of tons) | 42.2 | 48 |
| Industrial | 27.1 | 30 |
| Municipal | 15.1 | 18 |
| Chemical oxygen demand (millions of tons) | 22.3 | 22 |
| **Air** (millions of tons) | | |
| Smoke dust | 17.4 | 17.5 |
| Industrial fugitive dust | 17.3 | 17.0 |
| Sulphur dioxide | 23.7 | 24.6 |
| **Solid Waste** (millions of tons) | | 1,110 |
| Industrial | | 930 |
| Municipal | | 180 |
| **Industrial Solid Waste Disposal** | 62 MT | 60 |

Source: *Clear Water, Blue Skies,* p. 30.

The National Environmental Protection Agency developed a Trans-Century Green Plan (1996–2010) for environmental investment. The plan includes 3,000 candidate projects requiring 300 billion RMB (Ren Min Bi = Peoples' Currency). Phase One of the plan consists of 1,399 projects for a total investment of 180 billion RMB, which amounts to 40% of the Ninth Five-Year Plan total investment. Foreign funding of $6.7 billion is needed for 700 Phase-One projects, notionally allocated as $1.5 billion from the World Bank, $750 million from the Asian Development Bank, $880 million from Japan, $400 million from Canada, and $500 million from other bilateral sources.[90] The initial focus is on the cleanup of three rivers, three lakes, two zones, and one city.[91] According to environmental minister Xie Zhenhua, the target for the year 2000 is to allocate 1.2% of GDP for environmental investment.[92] Minister Xie speaks eloquently on the importance of Chinese environmental stewardship in the global context: "There are no national boundaries in handling environmental issues. The earth is big, yet it is only a global village whose residents should cooperate closely to preserve their surroundings."[93]

The Chinese have been active in international fora and are party to over 30 international environmental treaties and other multilateral legal instruments. The most critical of these include:

- Vienna Convention for the Protection of the Ozone Layer
- Montreal Protocol on Substances that Deplete the Ozone Layer
- International Convention for the Prevention of Pollution from Ships

- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
- Convention on the International Trade in Endangered Species of Wild Flora and Fauna[94]

On May 29, 1998, China became the 37th signatory to the Kyoto Protocol on global climate change. The Chinese central government has signed bilateral environmental cooperation agreements with 23 countries.[95]

## ENVIRONMENTAL ENFORCEMENT

National-level sustainable development objectives and legislation in China are reasonably complete; however they are not matched by effective implementation and adequate financing. At the highest level, the National People's Congress has an Environmental Protection and Natural Resources Conservation Committee responsible for legislative review and external exchanges on the environment.[96] The State Council has an Environmental Protection Commission that provides inter-ministerial coordination and environmental policy development. In addition, each ministry has its own environmental management establishment, as do most medium and large-scale state-owned enterprises.

The National Environmental Protection Agency, similar to the U.S. EPA, was established in 1988 to promulgate standards and conduct environmental monitoring. Its official responsibilities are:

- To formulate national guidelines, policies, laws and regulations on environmental protection and provide supervision over their implementation.
- To work out national plans and programs for environmental protection; to participate in the formulation of medium and long-term plans for national economic and social development.
- To supervise and administer the country's work in nature conservation and to make programs and plans for the establishment of nature reserves, preparing and presenting proposals to the State Council for approval in establishing new national nature reserves.
- To organize the implementation of environmental management and enforcement, provide monitoring, and perform environmental impact assessments.
- To formulate and issue national standards for environmental protection.
- To oversee environmental protection concerning the atmosphere, water, soil, and oceans; to provide supervision and management for the control and prevention of pollution.
- To formulate and organize the implementation of national policies for environmental protection.
- To manage and supervise environmental monitoring, nationwide.
- To direct and coordinate nationwide education on environmental protection.

- To assist in the formulation of China's basic principles on global environmental issues and to participate in negotiations dealing with international conventions.'[97]

On March 27, 1998, this body was renamed the State Environmental Protection Administration (SEPA) and promoted from sub-ministry to ministry-level status. The minister, Xie Zhenhua, reports directly to the State Council and concurrently holds the post of vice chairman of the Environmental Protection Commission under the State Council.[98]

SEPA's portfolio has been expanded to include responsibility for nuclear issues. Control of natural resources has been transferred to it from the former Ministry of Forestry. SEPA has representatives from every ministry with environmental responsibilities and provides oversight to the environmental activities of all other ministries. Given the agency's newly elevated status, Minister Xie is now included in cabinet-level meetings. SEPA has been given the unique authority to hire and fire personnel and, consistent with government-wide downsizing, may cut its already small staff by as much as 40%. The agency does not possess authority to draft legislation; such authority rests with the State Science and Technology Commission.[99]

Enforcement of environmental standards is highly decentralized. This is a function of both resource availability and mandate. While the list of SEPA's responsibilities above is extensive, the agency's staff and reach are extremely limited. The current SEPA staff ceiling is 261. By contrast, the U.S. EPA headquarters employs about 7,000.[100] SEPA does not have the reach to have national impact. Environmental regulatory enforcement in China is conducted through a web of environmental bureaucracy that crosses sectors and reaches vertically to the village level. Beyond SEPA, there are over 2,500 environmental protection departments, employing some 88,000, above the county level. The total number of environmental workers in various departments and enterprises is greater than 200,000.[101] The real implementation might rests at provincial, county, township, and enterprise levels. Because of this, as well as the competing demands and priorities for compliance and investment, there is great variation in environmental performance and penalty throughout the country.

There are environmental components, regulators, and decisionmakers at every level of the Chinese political system—consisting of the central government, 31 provinces (including several mega-cities with provincial status), over 600 cities, about 1000 townships, and 1 million villages. Lines of authority, relationships, and incentives are overlapping and often in conflict. The success of a given environmental initiative depends, therefore, on a complex process of coalition building, consensus, and negotiation.[102]

Environmental Protection Bureaus (EPBs) exist at the provincial, municipal, and county levels. These EPBs set their own standards, sometimes more stringent than national standards.[103] They rely on local government financing that derives largely from resident industries and from fees and fines levied on polluters. This financing structure is inherently flawed, in that EPBs that promote pollution prevention and discourage capital-intensive investment have fewer operational resources.

The historic absence of a strong central oversight body has led to uneven and often lax enforcement.[104] Weak enforcement is compounded by a structure of regulatory incentives that are not designed to

achieve compliance. The "polluter pays" principle central to China's current overarching legislation, a concept that is the basis for U.S. and other industrialized countries' laws, is not compelling when imposed on ministerial work units and state-owned enterprises, since the accountability and penalty reverts to the government. The penalties to industries, even when imposed, do not cover the economic costs of the pollution they generate. Particularly in the Special Economic Zones, companies often opt to pay the fines rather than prevent or clean up their waste. In many cases, the regulations are enforced only with foreign firms, and in joint ventures the Western partner often is expected to deal with compliance.[105]

The government's recent reorganization to elevate the status of the national environmental agency demonstrates political commitment and should make the task of acting as watchdog on productive ministries and their massive, oft-polluting holdings more feasible. But SEPA will remain constrained in terms of power, resources, and reach. Government policy and action still put economic growth first, and when there is a conflict between production and conservation or prevention, the former prevails.

An example of the challenge to SEPA and the central government in general is the issue of township and village enterprises (TVEs). Incomplete data show that while TVEs are responsible for much economic contribution, they are largely unregulated and are major polluters. Through a much-publicized campaign (prompted by media coverage of the pollution followed by public outcry), the central government announced the closure of polluting TVEs along the Huai River. Since then, however, spotty press reports indicate that a large number of the closed industries have restructured on paper so as to avoid the law and reopened without changing their production and discharge processes.[106] On a more positive note, increased media coverage of environmental issues has raised public sensitivity to the health impacts of these issues. Environmental awareness and activism are on the rise in China. In 1997, a reported 6,177 proposals, 67,268 letters, and 96,379 visitors with environmental issues were received by the various levels of the People's Congress and the Political Consultative Committee. [107] At the same time, there is a greater awareness of environmental legislation, and now copies of various environmental laws are readily available in public bookstores. As a result, there has been a dramatic increase in the number of environmental civil cases in the Chinese courts.[108] In April of 1996, and further amended in October of 1997, the Chinese government passed legislation that made "jeopardizing the environment" a capital offense. Recently a provincial court convicted the manager of a paper mill of polluting the water supply and sentenced him to two years in prison and a fine of 50,000 RMB. The China Daily reported, "this is the first time that a Chinese has received criminal punishment for damaging environmental resources after a clause in the new criminal law.…It should sound the alarm to those who turn a deaf ear to environmental protection and continue to endanger their ecosystem."[109]

China has a national accrediting body for ISO 14000 environmental management system certification. A handful of Chinese industries have already been ISO certified, among them the huge Capitol Iron and Steel Works on the outskirts of Beijing. ISO 14000 is generally regarded by Chinese authorities as far more of a policy tool than in Japan or the West. SEPA and local EPBs are strongly pushing industry to adopt the standard in order to make their job of enforcement and improvement of environmental management easier. A requirement by China's accreditation body that all certification bodies register with it (it has yet to accredit any international organizations) has led to the development of a two-tier

system comprising domestic registered certification bodies and non-registered international organizations whose certifications are not recognized domestically.[110]

## FINANCING ENVIRONMENTAL INVESTMENTS

Funding constraints are a key factor in the pace of environmental investment. Although the Chinese had planned to increase environmental spending from 0.7 percent of GDP ($17 billion annually) to 1.5% of GDP (approximately $40 billion) by the year 2000, actually spending remained at about 1% of GDP in 1999. Given the magnitude of the problem, it is estimated that expenditures more in the range of 5 to 10% of GDP ultimately will be required. This higher level of investment is clearly unrealistic given the competing demands for resources posed by China's continued commitment to industrial growth.[111] Approximately 60% of currently available pollution prevention and remediation resources is controlled by city and county governments to finance urban water and sanitation, recycling, and solid waste removal. Twenty percent of total environmental investment derives from the productive ministries and the military, and is channeled into the industries and assets they control. Another 10% of environmental spending comes from foreign investors. The final 10% of environmental investment is from bilateral and multilateral loans.[112]

The World Bank has approved nearly $4.7 billion in environmental loans to China since 1991 to address urban air and water pollution. They work with municipal and provincial authorities on enforcement, resource demand management, and infrastructure upgrading. At the central level the World Bank supports the SEPA in policy development with an emphasis on energy, and technical assistance in water pricing.[113] Multilateral assistance also is provided by the UNDP, UNEP, and the Global Environmental Facility. Bilateral assistance and commercial loans in the environment sector come principally from Japan (the largest donor), Austria, Canada, Germany, Australia, France, Norway, and Denmark.[114] The Japanese Overseas Development Assistance program provided $100 million for the Japan–China Environment Center in Beijing. Japan also, through its Green Aid program, subsidizes demonstration projects to introduce Japanese technologies. Japan and Germany offer tied aid, mixed credits, and other subsidies to priority projects in the environment sector.[115] The U.S. Export–Import (Ex–Im) Bank is active in China but the United States provides no direct bilateral loans or grants. The U.S.–Asia Environment Program, the Overseas Private Investment Corporation, and the Trade Development Agency are prohibited from operating in China.

Environment as an industry sector is expanding. Over the last ten years, annual output value has increased twelve-fold (in 1997 the environment industry sector accounted for 0.7% of GDP, and 1.6% of total industrial output value), profits have grown sixteen-fold, and employment has doubled. Approximately 1.7 million Chinese are employed in 9,090 enterprises. As in the United States, the sector is predominated by smaller-scale enterprises. Only 4.3% are large enterprises in China, though these contribute 13% of total output value.[116]

## ENVIRONMENTAL NGOS

Chinese environmental NGOs are new, few in number, walk a narrow path of political acceptability, and focus their efforts on environmental awareness and education. The Chinese government, cognizant of the enormity of problems and aware of its own ineffectiveness in educating the populace and motivating consumption and disposal behavior change, has allowed the formation of private environmental organizations and environmental clubs associated with universities. At the provincial and local level there is a variety of nature clubs and various environmental campaigns supported by work units, but their scope and reach are quite limited.

A unique aspect of Chinese NGOs is their lack of autonomy from the state. In order to register as an NGO there is a two-step process with the Ministry of Civil Affairs. There is no law governing NGOs; they are covered by the "Regulations on the Registration and Administration of Social Organizations." The first step of the registration process is obtaining a state or Party sponsor who will vouch for the advisability of registering the group, and who is expected to provide oversight to the group's operations. Once a sponsor is obtained, the NGO must submit documentation on mission, membership, and funding sources for approval by the Ministry of Civil Affairs. NGOs are not permitted to expand beyond predetermined geographic bounds and cannot set up branch offices. Of the over 200,000 social organizations registered in China, only 1,800 are national. The current arrangement requires good government contacts, a committed leader, and either personal financing or external funding.[117]

The fledgling environmental movement in China struggles to address cultural and political legacies that discourage personal responsibility for environmental stewardship. A traditional Chinese view is that natural resources are bestowed upon mankind from the heavens and therefore there is no need to conserve them. A social norm is that individuals and families attend to the environment within their gates but not the "commons." A by-product of the communist regime is the notion that the state will provide for and solve problems, environmental and otherwise. These beliefs lead to apathy and a less than receptive audience for environmental consciousness raising and mobilization.[118]

One of the major obstacles to the growth and sustainability of NGOs in China is resources. Negligible revenues are received from NGO members, some in-kind costs are covered through free access to state-owned media, contributions come from overseas Chinese, and some corporate and donor support has been received. This unstable funding base is unlike other countries, where the affluent, through a tradition of philanthropy, can support NGO activity for the social good.

There are only four real environmental NGOs in Beijing. Friends of Nature (FON), directed by Liang Congjie, a retired university history professor, is the first environmental NGO registered in China. It was started less than five years ago. Registration took almost a year while Dr. Liang searched for a sponsor (first applying to NEPA, which declined after a 10-month wait, then seeking sponsorship from the Academy of Chinese Culture where he was vice president). Friends of Nature sees its role as supporting the government whose responsibility it is to regulate and enforce. At the same time, FON believes they can raise issues that perhaps the State Environmental Protection Administration cannot.

Its funding base is largely external, but small membership fees are charged to the 600-some mainly intellectual and business members. (Their membership totals close to 2,000 if student members, who belong through their university affiliation, are included.) The lack of environmental awareness among the public is their critical concern. To address this they have held publicized discussion groups on environmental concerns, sponsored summer camps for children and tree-planting events, and published "green" science books. As the best known of Chinese environmental NGOs, Friends of Nature was publicly lauded by the State Environmental Protection Committee at the 4th Environmental Protection Conference in 1996. However, since that time they have taken on somewhat more visible and controversial issues such as highlighting the illegal logging and destruction of the habitat for the golden monkey in southwest China, and advocating relocation of the huge parastatal Capital Steel Corporation from the Beijing suburbs to a less populous location.[119]

Green Earth Volunteers was formed in 1996 as an offshoot of Friends of Nature. They promote tree planting, recycling, children's environmental education, urban organic gardening, and bird watching. Their children's group, the "Little Green Earth Volunteers," publicized the Yangtze River Dolphin, which is endangered by the Three Gorges Dam.[120]

Global Village of Beijing (GVB) was founded during the Fourth World Conference on Women in Beijing in 1995. With approximately 1,000 members, GVB focuses on women and their relationship with the environment. They encourage sustainable consumption through two weekly television shows and environmental columns in the print media. GVB has set up a pilot recycling project in western Beijing. GVB director Sherry Liao believes that public education is more critical than new technology in addressing China's problems, is wary of being seen as a pawn of foreign powers, and favors a cooperative rather than confrontational approach in dealing with both government and industry.[121]

The Institute for Human Ecology (IHE) distinguishes itself as the first and only nationwide environmental NGO in China. Like the other indigenous NGOs, it was started by and owes its continuation to a single well-connected individual. In this case it is Zhang Xiaoai, or Diane Chang, the daughter of the former minister of defense and only surviving "Long Marcher," Zhang Aiping. IHE was endorsed by the State Council and is registered as a corporation in the state of Virginia. In concert with U.S. associates, IHE assists U.S. environmental firms to understand the Chinese market. IHE is also involved in a conservation project with the Nature Conservancy in Yunnan Province. In November 1997, IHE held the "China Environment Forum," which brought together Chinese government officials who have environmental responsibilities, international environmental NGOs, and private-sector manufacturers and vendors of environmental technologies. The rationale behind the conference was that China's environmental problems are transnational in impact, not merely internal issues, and therefore a broader community of actors should be enlisted to assist China in addressing these problems.[122]

Another cohort of so-called NGOs are the governmental NGOs or GONGOs. There are thousands of these. They are in essence an extension of government; most of their funding comes from the government and their leadership may be identical to the leadership of the sponsoring agency. Some are set up to facilitate work with, and receive funding from, foreign NGOs or private institutions. Environmental GONGOs include: the China Environmental Protection Foundation, the China Society of

Environmental Science, and the National Natural Science Foundation. GONGOs play a useful role in China in that they draw together scholars from institutions and disciplines that would not normally interact to deal with the interdisciplinary environmental issues. Given their stature, GONGOs have the advantage of direct access to policymakers, both to obtain information and to present recommendations.[123]

## THE STATE'S STATEMENT OF INTENT

Given the state of China's environment, what does Beijing propose to do about it? Actions rarely measure up to rhetoric in politics, not least in China, but the level of emphasis Premier Zhu Rongji gave to environmental matters in his March 5, 1999 "Report on the Work of the Government" to the second session of the Ninth National People's Congress is telling. First, in the interest of promoting all-round development of agriculture and the rural economy, he stated:

> Allocations for investment this year in water conservancy projects and projects to protect natural forests in the central budget will again be increased by a sizable amount. . . . We must be fully prepared to prevent major flooding and combat heavy disasters. . . . We should develop farmland improvement and water conservancy projects. . . . We should pay close attention to making planned and sparing use of water, developing water-saving agriculture and spreading the use of various types of water-saving techniques. We must work to prevent and control pollution and protect water resources. While paying due attention to preventing floods, we should prevent and fight drought as well. We must put in practice a strict land management system and measures to protect forests and grasslands. Logging in the natural forests in the middle and upper reaches of the Yangtze River and the Yellow River will be stopped. In the forest areas in the northeast and Inner Mongolia and in other natural forest areas, logging will be either restricted or terminated. . . . We need to develop large-scale afforestation and grass-growing projects and successfully carry out major ecological projects and control soil erosion so that future generations can enjoy green mountains and rivers.

Zhu then went on to elaborate in some detail on the importance of continued progress "in implementing a sustainable development strategy":

> We should continue to make progress in implementing a sustainable development strategy. We should always bear in mind our responsibility to the people and our future generations and protect our natural resources and the ecological environment. We should improve the planning for resources and their management, avoiding waste of resources for short-term gains in development, protecting resources and making a more comprehensive use of resources. We should enhance our awareness of the importance of environmental protection, continue to increase investment in environmental protection and intensify our efforts to control and treat pollution in major cities, regions, valleys and sea areas. We should encourage clean production, and enterprises that discharge pollutants in levels that exceed the stipulated standards should remedy the situation within a specified time. Those that fail to do so must be closed down. . . . We should do a better job of formulating urban and rural development plans and strictly implement them, punishing those who violate

> stipulations of the plans. We should continue to control population growth and improve the quality of the population. Further efforts should be made to improve the responsibility system for attaining population and birth control targets. In our efforts to control population growth, we should focus on rural areas and the floating population.[124]

It will be difficult enough for Beijing to make reality coincide with rhetoric. It will be even more difficult for the United States to determine what that reality is and what it means strategically.

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# CHAPTER 4

## CRAFTING A STRATEGIC RESPONSE

It would be unduly hyperbolic, even alarmist, to claim that China is an environmental powder keg waiting to explode. On the other hand, it would be myopic and imprudent, if not altogether irresponsible, to deny that the country's massive environmental problems represent a potential security threat of utmost strategic importance to the United States. Thus would China scholar Elizabeth Economy, in a recent appraisal of the U.S. foreign policy implications of China's environmental situation, be moved to make the tepid, if appropriately measured, observation: "Chinese and American leaders believe that the environment is a low priority issue with plenty of common ground. This is a big mistake. . . . China's impact on the global environment should not be underestimated.[1]

Three considerations should guide the U.S. approach to assessing and responding to the environmental situation in China. First, environmental problems do not exist in a vacuum. Especially in the case of China, they must be viewed in light of their relationship to other political and economic developments that inevitably feed on one another. Second, our concern with and response to environmental conditions in China must necessarily be nested within the larger range of issues that dominate U.S.–China relations. Third, the state of China's environment is not simply an environmental issue that can (or must) be approached through traditional, largely bilateral environmental channels. Nor, on the other hand, given its security ramifications, can it be viewed narrowly as a problem that lends itself to military solution. It is, rather, a multifaceted strategic problem that calls for a variegated response involving an array of national and international diplomatic, economic, technological, and military measures.

### CALCULATING CHINA'S FUTURE

Given China's predictable unpredictability, to say nothing of the stochastic hand of post-Cold War change, no one—not even the Sinologists among us—can say with confidence what lies ahead for China. Yet, because the country's environmental future is so closely tied to its political and economic future, our success in dealing with the former will have much to do with how accurately we have anticipated the latter.

One of the most perceptive recent attempts to speculate with some authority on China's future is that of Boston University's Walter Clemens. At one level, Clemens envisions a range of possible political and economic futures for China: from a continuation of the country's present form of communist capitalism; to the replication of models like Singapore's authoritarian capitalism, post-Soviet Russia's anarchic capitalism, Taiwan's democratic capitalism, or internal breakup; to a unique Chinese transcendence of Western and other models.[2]

At another level, Clemens posits six alternative global futures, including two highly plausible scenarios in which China follows a disturbingly negative course. In the first, common to those who see China as an ominous post-Cold War threat, the country marches toward confrontation

with an enfeebled U.S. hegemon. Most Chinese remain poor, but the country's enormous GDP permits Beijing to build economic clout and formidable, technologically advanced armed forces. China's oil requirements deepen its motives to hold onto central Asia and to dominate the South China Sea. Inevitable collision with the United States revolves around the incorporation or attempted incorporation of Taiwan back into China proper. An equally disturbing scenario, which Clemens characterizes as "fragmented chaos," centers on the biosphere's increasing inability to support human life on Planet Earth. China's every move creates new demands on the environment, which in turn produces inevitable global repercussions. Millions are unemployed as the country's economy slows, and millions more go unfed because too much scarce farm land has been sacrificed to industry. A surfeit of serious environmental problems undermines public health. Border peoples become more restive, and Beijing's dictators are further challenged by democratic reformers and regional potentates. Faced with such turmoil inside China, Washington oscillates between do-nothing complacency and the arrogance of power, and the predictable result is acute instability.[3]

In both such futures, the state of China's environment figures prominently and thereby commands our attention to the many political and economic developments that assuredly will affect and be affected by that environment. The most important political development ahead inside China will be the extent of democratization. While experience has shown that democracies aren't particularly kind to the environment, the more liberal flow of information and ideas characteristic of democracy invariably produces greater awareness of and sensitivity to environmental conditions, which translates into heightened demands on government for more responsive and accountable environmental stewardship.[4]

What of course isn't clear is how far democratization will proceed in China. Experts regularly and heatedly disagree in their prognostications.[5] Some think capitalist market forces and globalization will lead inexorably to greater levels of democracy. Others argue, in contrast, that economic and political forces can and will be kept separate; that deeply embedded elite fears of chaos, fragmentation, and foreign intervention will sustain authoritarian rule for the foreseeable future; that continued economic progress will mollify any who would challenge such rule.[6]

As China scholar Leo Orleans has observed: "The Chinese leadership and people have a common fear of anything that will cause social unrest and disturb the country's social discipline, the lack of which in Western democracies the Chinese see as a serious flaw. That is why sporadic initiatives to bring democracy to China over the past 100 years never set as their goal the expansion of either individual or human rights." Thus, in the years ahead, "we will see China inch toward a democracy but a democracy with Chinese characteristics."[7]

Harry Harding, contending that *limited* political change is likely to be the order of the day in China over the next decade, nonetheless acknowledges that even such limited change is by no means inevitable: "It is possible that the trends toward political liberalization and pluralization could be halted or even reversed, particularly if the country's socioeconomic problems mounted. In such a case, China could witness an even 'harder' authoritarian system, with tighter controls over social and political life. Or its political system could lose coherence, with instability and unrest becoming the norm."[8]

Even if it isn't clear how far democratization will proceed, six related developments—all having some bearing on the state of the environment—are clear. First, the Chinese people evince increasing awareness of and sensitivity to the condition of their surroundings. A recent poll of Beijing households found that "enjoying a good living environment," "improving living conditions and raising the level of daily life," and "staying healthy" were three of the ten things respondents desired most. Other polls have found that while substantial numbers of the Chinese people are unhappy with government's efforts to combat pollution (among other things) and almost unanimously in agreement that more should be done to improve air and water quality where they live, they rate the overall quality of their life almost a third better than it was in the early '90s and expect its quality to improve another third by 2002. Finally, some 47% of the Chinese people think that environmental protection should receive priority over economic development, while another 32% regard the two as equally important.[9]

Second, whatever may be said in purely political and structural terms about the prospects for democracy in China, computer technology is producing spontaneous democratization that China's rulers would be hard pressed to control, much less prevent, even if they were so inclined. Such electronic emancipation virtually guarantees greater access to, demand for, and communication about living conditions inside China, as well as a vehicle for political and social mobilization. Recent figures indicate that as many as 2.1 million Chinese made use of the Internet in December 1998, up from 1.2 million just six months earlier. According to other knowledgeable sources, though, the real Internet usage figure already could be as high as 3.4 million, with expectations that the number could reach as high as 10 million by mid-2000. Eighty-five percent of users are under age 35, and they represent an influential elite of students, intellectuals, and officials. The government is acutely ambivalent about these trends, recognizing the necessity of Internet access for a knowledge-based economy, but also wary of the social and political risks of public awakening.[10] As one analysis of the subject notes:

> The Chinese government has tried to square the circle, by expanding the presence of the Internet in the country while continuing to develop measures to control what and who their citizens can and cannot access in cyberspace. However, considering the rapid pace of the diffusion of the Internet and related tools, the growth in on-line content providers as well as the decentralized and increasingly inexpensive nature of the technology, governments like the CCP [Chinese Communist Party] will have a trying time preventing Internet-driven information pluralism without incurring significant economic and political problems in the process.[11]

Third, the Chinese media, increasingly autonomous and diverse in their political content, are becoming more of a democratizing force—driven ever more by the profit motive, inclined to pursue news of interest to the public, skeptical of party and government authorities, and confident of their own abilities and leverage. The media have been greatly aided in this regard by China's growing prosperity, widening literacy, adherence to market forces, deemphasis of ideology, and acquisition of new technologies. At the same time, powerful domestic institutions continue to restrict what can appear in print or over the airwaves. Complete media autonomy from the state, states a recent CIA analysis of the subject, is highly unlikely to materialize in the near future, if ever. Nevertheless, available evidence suggests, "the evolutionary reform in the media now taking place will continue as China's economy and social structure change. The

media will continue to pose problems for government policies and could again, as they did in 1989, contribute to popular agitation for political change."[12]

Fourth, there are growing signs in China of political protest and even of government tolerance of such protest—provided it is focused on specific grievances and doesn't criticize China's top leaders. The fact that China's environmental regulators reportedly respond to more than 100,000 citizen complaints a year is indicative of the growing level of discontent over living conditions. Such discontent is most palpable in highly visible cases like the Three Gorges Dam project, where between 1.5 and 1.9 million people will be uprooted and 30,000 hectares of prime agricultural land flooded. Unrest over that project is a major concern of the government—and with good reason, according to one sociologist who interviewed residents and officials in the area that will be affected by the flooding. "If the Three Gorges project isn't managed well," he warns, "we're going to see riots, rebellion and maybe even a revolution."[13] On the whole, though, environmental protest to date has generally been viewed by government as less threatening and thus relatively more tolerable than other (political) forms of protest. In the words of a Western diplomat in Beijing:

> I think the government is starting to recognize the value of small-scale demonstrations as a useful pressure valve, as long as they are related to social and economic grievances. But I think they will be less accommodating to workers' demonstrations than to those complaining about, say, the polluted canal behind their house. And I suspect the line will be drawn clearly against criticism of central leaders or individuals.[14]

Fifth, in China as elsewhere, non-governmental organizations (NGOs) are coming to play an increasingly important role. As a general rule, the proliferation of NGOs around the world represents a major movement toward the creation of a healthy, democratic civil society. In China, there are relatively few truly non-governmental organizations, but where they do exist, it is largely because their agendas coincide with those of the government. Environmental protection is distinctly such an area. As one analysis notes:

> The most successful organizations are those promoting causes that fit in neatly with Beijing's own policies—environmental protection, for instance. Beijing finds itself unable to prevent local leaders from chopping down trees, polluting rivers and fouling the air in the name of regional development. Locally, there's not much tree-huggers can do. By forming national networks, however, they are faring better."[15]

Two things remain to be seen: (1) whether China's central government is merely tolerating the existence of such NGOs as a matter of necessity, using them as tools of political necessity and convenience, or actually encouraging their active participation in a more democratic political process; and (2) whether the NGOs themselves can progress from their present posture of compliant cooperation with the government to a more activist, even confrontational posture. Experience elsewhere has generally shown a strong correlation between the forcefulness of environmentalism and the extent and pace of environmental reform.

Finally, what seemed clear five years ago when Gerald Segal, of London's International Institute for Strategic Studies, first made the statement, seems no less clear today: "The basic question over China's future revolves around the degree to which Beijing's authority will give way to the

centrifugal pull of China's increasingly dynamic prosperity. . . . Never in China's history has such a push for decentralization been accompanied by the pull of so many outside forces."[16]

Like many other parts of the world, China is experiencing a progressive devolution of power, especially to sub-national levels of government, that reflects the globalization of the world economy, the rise of economically driven region-states that transcend national boundaries, and the growing obsolescence of central state sovereignty and control. In the words of another source: "Central-local relations in China today are at a crossroads. While China is not likely to become a loose confederation, or even a centrally coordinated federal system like that of Australia, Canada, Germany, or the United States, it has moved quite far from the unitary state completely controlled from the top down by the Communist Party and national government."[17]

What seems most likely in the years ahead, suggests Segal, "is a continuing devolution of power. To an extent, Beijing will pretend to rule the provinces and the provinces will pretend to be ruled by Beijing. The result is likely to be a looser United States of China or a Chinese Economic Community."[18] Environmentally, the question will be what impact regional autonomy is likely to have on the consistency of, and adherence to, uniform environmental standards and on inter-provincial relations over shared environmental and resource concerns.

Economically, much will revolve in the years immediately ahead around the question of whether China's economy will remain robust and vital or suffer the fate of other collapsed Asian economies. Slower growth, it has been noted, could mean trouble in China's cities, where millions of people are losing their jobs as part of the country's plan to reform its creaking state-owned enterprises (SOEs). The World Bank has said that China must maintain a growth rate of more than 5% to avoid unrest and absorb laid-off workers. Trouble in the cities could spread to the countryside where some peasants, according to the state-run media, are becoming incensed at the state's inability to pay cash for their crops.[19]

In responding to the question on China's economic future, "Will China Be Next [to experience financial collapse]?" *The Economist* has argued that the real issues ahead are whether China's growth is slowing or even grinding to a halt; whether the resulting unemployment will prompt political unrest, or a power struggle among the leadership; and then whether that will send China in a disturbingly nationalistic direction. The answer, based on current evidence: "Yes, yes and probably."[20]

Already, the closure of inefficient SOEs has reportedly provoked protests in several provinces. In some cases, fears that unrest could spiral out of control have prevented the government from taking more aggressive action to restructure bankrupt state companies. One of the most high-profile cases of labor unrest acknowledged by the government occurred in Mianyang in southwestern Sichuan province. More than 100,000 textile workers took to the streets there demanding government assistance and accusing local officials of stealing unemployment funds following the closure of several factories.[21]

Economies in the process of conversion to capitalism, where resource distribution follows the law of the market rather than the political imperatives of the state, tend to generate more conflict over economic spoils than do paternalistic economies.[22] Thus, as suggested by at least one

source, China seems likely to err on the side of authoritarian political control in the immediate future:

> It is likely, then, that looming instability will undermine any impulse toward political liberalization. The current middle strata of corporate directors and local government leaders—those locked into the existing property rights regime of state or publicly owned industries—will surely prefer corporatism and soft authoritarianism to democratic change. If social unrest stemming from SOE reform challenges their managerial rights and threatens them with recrimination for their side payments to bureaucrats, they will even support hard authoritarianism if it is necessary to protect "public order." They are likely to interpret democracy under such circumstances as tantamount to chaos.[23]

Political and economic developments such as these promise to have a pronounced effect on the state of China's environment, on the saliency of environmental conditions there, and on our ability to distinguish environmental causes from other sources of unrest and conflict. By the same token, we do well to remember that the environmental situation will be only one facet of a larger array of enduring, frequently volatile issues between the United States and China: Taiwan, Tibet, the future of Hong Kong, nuclear espionage, illegal campaign contributions, China's admission to the World Trade Organization, the continuing U.S. bilateral trade deficit, the piracy of U.S. intellectual property, PRC weapons sales to the likes of Iran and Pakistan, human rights violations, the NATO bombing of China's embassy in Belgrade, the use of abortion in China's population control policies, and on and on. Environmental concerns will have to compete for attention, therefore, in a relationship that could flourish, stagnate, or disintegrate for any of a variety of reasons. This congeries of issues is at the heart, in fact, of the current low ebb in the relationship. In the words of Jia Qingguo, a professor of international relations at Beijing University, "This may be the lowest point in Sino-American relations since [President] Nixon established diplomatic ties."[24]

## A TEST FOR U.S. LEADERSHIP

The environmental situation in China thus provides an extraordinary opportunity for—and in fact demands—extraordinary leadership by the United States. Unfortunately, in many respects the United States has failed of late to provide the sort of international leadership one might expect of the world's self-proclaimed only superpower. For example, the convention on anti-personnel landmines, the Kyoto protocol, the biosafety protocol to the convention on biological diversity, the UN convention on the rights of the child, and international family planning all represent major initiatives the United States has either declined to support or actively impeded.[25]

On the other hand, it is important not to lose sight of important environmental accomplishments the United States and China have made. Table 4-1 is an enumeration of the agreements reached between Presidents Clinton and Jiang Zemin at their October 1997 and June 1998 summits. Other major agreements between Vice President Gore and Chinese Premier Zhu Rongji came out of the second session of the U.S.–China Policy Forum on Environment and Development in April 1999. These agreements included a memorandum of understanding for a $100 million clean energy program that will accelerate the deployment of clean U.S. technologies for energy efficiency, renewable energy, and pollution reduction; a statement of intent for the development

of a sulfur dioxide emissions trading feasibility study; a memorandum of understanding for the joint development of a natural gas pipeline in south-central China; and various other agreements involving energy efficiency, air quality management, cleaner air and cleaner energy technology, and the impact of pollution on children's health. A more recent joint statement (see text at Appendix 1), announced May 19, 2000, pledges stronger cooperation between both countries on a range of environmental protection and sustainable development efforts, particularly with regard to global climate change.[26]

Could more be done, though, to further lessen the prospects that China's environmental situation could degenerate into a security problem for the United States and others in the region? The answer is yes.

## THE FIRST STEP: REORGANIZING AT HOME

The place for the United States to start in responding to China's environmental situation is at home. China's size, reach, and impact, its ambitious and aggressive approach to the future, and the image it has acquired as a prospective post-Cold War equivalent to the Soviet menace all provide suitable impetus and justification for a major overhaul of America's approach to environmental security. Such an overhaul is, in fact, a necessary precondition for dealing with China environmentally in a manner consistent with America's larger strategic aims.

Organizationally and institutionally, the United States has yet to make the necessary post-Cold War transformation of its national security apparatus to accommodate the range of issues that now confront us. To be sure, as a reflection of the high-level rhetoric we hear about the environment as a new transnational threat, there now is a senior director for environmental affairs (one of some fifteen functional and regional offices) on the National Security Council staff. There is a memorandum of understanding (contained at Appendix 2) that seeks to establish a framework for environmental security cooperation among the Department of Defense, the Department of Energy, and the Environmental Protection Agency. The State Department has an assistant secretary for oceans and international environmental and scientific affairs, who answers to one of five under secretaries and oversees twelve new regional environmental hubs around the world (including an East Asian hub in Tokyo responsible for monitoring transboundary environmental issues and the promotion of energy efficiency and renewable energie.) And, since the beginning of the Clinton administration, there has been a deputy under secretary of defense for environmental security, one of eleven offices at that level reporting to the under secretary of defense for acquisition and technology (not, significantly, to the Pentagon's under secretary for policy).

While some observers see these organizational arrangements as indicative of a new emphasis on environmental security, in point of fact all of these offices and their associated activities are relatively obscure, minimally manned and funded operations whose effect is largely cosmetic. The most telling example of this minimalist approach is the Pentagon's environmental security program, which is almost entirely oriented on the narrow, relatively parochial relationship of the U.S. military establishment to the environment, rather than on the larger question of how the environment affects security.

## Table 4-1. Achievements of U.S.–China Summit, June 1998

The agreements reached between the United States and China as part of President Clinton's visit build on the achievements of the October 1997 summit between Presidents Clinton and Jiang Zemin, deepen cooperation between the two countries on a broad range of issues, and contribute to a more stable, secure, open, and prosperous world.

I. NONPROLIFERATION AND SECURITY:

Military-to-Military Relations

- Disaster Response. The United States and Chinese militaries expressed satisfaction with the exchanges recently conducted in the area of humanitarian assistance and disaster relief and intend to continue cooperation in this area.
- Environmental Security. The United States and Chinese militaries reached an agreement to conduct cooperation and exchange in the area of military environmental protection and security.

. . .

IV. ENERGY AND ENVIRONMENT: The United States and China established a number of programs to address environmental degradation, cleaner uses of energy, and climate change.

- Climate Change. Under the auspices of the Environment and Development Forum and in conjunction with the Framework Convention on Climate Change, senior-level experts of the United States and China will initiate a dialogue on climate change.
- Energy and Environment Cooperation. In implementation of the U.S.-China Energy and Environment Cooperation Initiative, which is an outgrowth of the Environment and Development Forum and was agreed upon by Presidents Clinton and Jiang in October 1997, the United States and China are taking the following steps:
  1) The United States and China will cooperate on Phase One of China's Nationwide Air Quality Monitoring Network, using U.S. equipment and a technical assistance grant from the Environmental Protection Agency.
  2) U.S. firms and Chinese entities signed contracts in the energy and environment area, including agreements for two power projects and three coal bed methane exploration contracts.
  3) The Oil and Gas Industry Forum will hold its first meeting in Beijing in November 1998 to promote cooperation between industry and government representatives of the two countries on domestic Chinese and international oil and gas development issues.
  4) The United States and China will hold an energy finance conference in September 1998 in Beijing to promote trade and investment by American companies in China's energy sector.
- Peaceful Uses of Nuclear Energy. The United States and China concluded an agreement on cooperation concerning peaceful uses of nuclear technologies.

**V.** SCIENCE AND TECHNOLOGY: The United States and China will expand cooperation in the areas of health sciences and natural resource management. These efforts also support the work of the U.S.-China Environment and Development Forum.

- Fighting Disease. The U.S.-China Health Protocol is being renewed to continue cooperation in a range of areas, particularly child health issues such as combating birth defects, disabilities and health hazards due to environmental factors.
- Water Resources Conservation. The United States and China will launch a water resource management initiative beginning with a workshop in the United States in the second half of 1998 to coordinate more closely bilateral cooperation in water resource development and management with the aim of promoting effective utilization and sustainable development of water resources and developing business opportunities in both countries.
- Marine Resources Conservation and Natural Disaster Reduction. The U.S. National Oceanic and Atmospheric Administration and China's State Oceanic Administration will convene a bilateral conference on marine disaster forecasting and reduction and Integrated Coastal Management in the fall of 1998 to focus on algae blooms, environmentally safe navigation, oil exploration, marine construction, marine safety, coastal monitoring and natural disaster response.
- Preserving Natural Resources. The U.S. Natural Park Service and China's National Park Agency have concluded a memorandum of Understanding to undertake personnel exchanges and cooperated on park and natural resource management.
- Endangered Species. The United States and China will enhance cooperation in conservation and the protection of endangered species.
- Emergency Preparedness. The Federal Emergency Management Agency and the Chinese Ministry of Civil Affairs are actively discussing measures to cooperate on emergency preparedness, response, recovery and mitigation of the effects of disasters. The national Oceanic and Atmospheric Administration and its Chinese counterparts are expanding cooperation in similar areas.

**Source: The White House, "Achievements of U.S.–China Summit," Fact Sheet, June 27, 1998**

There was modest rhetorical effort during the early days of the Clinton administration to take an expansive view of the subject—part of the environmental security program's mission then being "to strengthen national security by integrating environmental, safety, and occupational health considerations into U.S. defense and economic policies."[27] And, through the tenures of both Les Aspin and William Perry as secretary of defense, environmental security commanded an entire chapter in each year's annual Defense Department report to the president and Congress.

Nonetheless, the specific goals of the program have remained notably narrow—e.g., to support the readiness of U.S. forces by ensuring access to air, land, and water for training and operations; to improve quality of life by protecting military personnel and families from environmental, safety, and health hazards; to ensure that weapon systems, logistics, and installations have greater performance, lower life-cycle costs, and minimal health and environmental effects. Moreover, since William Cohen became secretary of defense in early 1997, environmental concerns have virtually dropped off the map in the Pentagon's annual report, warranting only minor mention in the larger context of acquisition reform and international cooperative programs.[28]

The environmental security program commands a meager 1.5% ($3.9 billion) of the overall Pentagon budget, all of which goes to conservation, pollution prevention, technology, compliance, cleanup, and base realignment and closure activities. The only internationally oriented activity in the program's portfolio is the modest—but extremely promising—program of military-to-military environmental cooperation, the boldly stated goal of which is to "enhance international security."[29]

## MUSCULAR MULTILATERALISM

The United States should move aggressively to seek multilateral mechanisms for dealing with China's environmental problems. This imperative is driven by the increasingly obvious fact that environmental developments inside China can have such a material impact on others throughout the region, and by the concomitant need to broaden the base for environmental security accountability and responsibility beyond the easier but more tenuous bilateral sphere.

The most ideal solution might well be the establishment of an all-encompassing regional collective security apparatus, consistent with the Chapter 8 provisions of the UN Charter, that would undertake the comprehensive policing of all aspects of security—including environmental—throughout the region. Such a prospect seems frustratingly unlikely for the foreseeable future, not least because of China's historical aversion to multilateral enterprises and U.S. reticence to push for bold international institutional reform. As Admiral Joseph Prueher, then-commander in chief of the U.S. Pacific Command, now U.S. ambassador-designate to Beijing, noted in November 1998 remarks at Shanghai's Fudan University: "Other than the United Nations and regional organizations such as the ASEAN Regional Forum, there are no broader integrating regional institutions to reconcile conflicting ambitions. We must work together to develop such institutions for stability and security."[30]

In the near term, the most fruitful avenue for focusing collective regional attention and action on the environmental situation inside China would seem to be either the ASEAN Regional Forum

(ARF) or APEC (the Asia-Pacific Economic Cooperation forum), in both of which China and the United States are participants.

Given the composition of its membership and the focus of its activities, the ARF seems to offer relatively more potential for progress, even though the desire to minimize institutionalization thus far has been one of its cardinal characteristics. The ARF is designed to be a forum for dialogue "through which its members can discuss regional political and security issues of concern and develop cooperative measures which might be taken to contribute to the maintenance of peace and security in the region and to the avoidance of conflict."[31]

The ARF has agreed on a gradual three-stage evolutionary approach of confidence building, preventive diplomacy and, in the longer term, conflict resolution. To date, the organization has instituted a number of confidence-building measures involving greater transparency through exchanges of personnel, the disclosure of information, the establishment of data bases, and the promulgation of cooperative agreements and conventions. Aside from selected disaster prevention measures in the area of maritime security cooperation and the mobilization of relief assistance to natural disasters, environmental measures have yet to command ARF attention. By the organization's own admission, if it "is to become, over time, a meaningful vehicle to enhance the peace and prosperity of the region, it will have to demonstrate that it is a relevant instrument to be used in the event that a crisis or problem emerges."[32]

APEC, in turn, established to promote economic integration in the Pacific and to sustain economic growth, provides a forum for discussing a broad range of important regional economic issues, including environmental concerns. Climate change featured prominently in discussions leading up to the Kyoto conference, and APEC's leaders, in their 1995 Osaka Action Agenda, established the promotion of environmentally sustainable growth as one of six major areas of economic and technical cooperation.[33]

In their March 1994 vision statement, APEC's environmental ministers stated:

> We believe sound environment and sound economic policies are mutually supportive and that preventing environmental degradation is fundamental to sustainable development. . . . APEC economies recognize the inter-relationship among poverty, unsustainable patterns of production and consumption, population growth, natural resource depletion and environmental degradation, and the potential for regional approaches in addressing global environmental problems. We encourage an enhanced dialogue focused on opportunities for regional co-operation in priority areas such as environmental technologies, environmental education and information, policy tools, and sustainable cities as well as earth observation and global changes research.[34]

## DEMILITARIZING ENVIRONMENTAL SECURITY

The most vocal critics of attempts to marry environmental and security concerns decry what they see as the inappropriate and counterproductive militarization of the former. Ironically, China's environmental situation presents an unusually rich opportunity to make progress toward true global demilitarization by reorienting those instruments of U.S. power that most militarized the Cold War.

**MILITARY-TO-MILITARY COOPERATION.** The non-traditional, essentially non-military involvement of the military establishment in international environmental cooperation offers one of the singularly most promising policy instruments available to the United States for enhancing environmental security—vis-à-vis China and other parts of the world as well. Military-to-military cooperation therefore should be at the forefront of our efforts to engage China environmentally. Sherri W. Goodman, deputy under secretary of defense for environmental security, has aptly described the utility of such endeavors:

> Military cooperative efforts on environmental issues support the U.S. national security strategy and U.S. foreign and defense policy goals. These cooperative efforts also protect our international access to land, sea, and air for operations and training by demonstrating our ability to protect valuable natural resources.
>
> We recognize that by serving as a role model through engagement in military environmental matters we can help build trust, increase transparency, and help change military attitudes about issues such as civilian/military interactions.
>
> Environmental cooperation with foreign militaries—through such efforts as information sharing and joint development of alternative strategies for addressing common environmental concerns—is a highly leveraged and effective way to engage other militaries in a low threat and non-controversial dialogue that enhances U.S. presence.[35]

The October 1997 and June 1998 summit meetings between Presidents Clinton and Jiang Zemin paved the way for such cooperation by calling for "cooperation and exchange in the area of military environmental protection and security." This led to the September 15, 1998 "Joint Statement on the Exchange of Information by the United States Department of Defense and the Chinese Ministry of National Defense on Military Environmental Protection" and the July 12, 2000 "Agreement Between the Department of Defense of the United States of America and the Ministry of National Defense of the People's Republic of China Concerning Exchange of Environmental Protection Research and Development Information" (both in Appendix 3). The original agreement reads:

> The Department of Defense of the United States (hereafter referred to as US DOD) and the Ministry of National Defense of the People's Republic of China (hereafter referred to as China's MND) are concerned with the quality of the ecological environment, and recognize that environmental quality is of great importance to national stability and security.
>
> The US DOD and China's MND recognize the importance of the military's role in environmental protection, including monitoring the environment and eliminating the threat posed to the nations by environmental degradation.
>
> Accordingly, the US DOD and China's MND are prepared to cooperate on military environmental protection. The US DOD and China's MND intend to exchange technical representative groups, and intend to discuss signing a technical document on exchange of information on military environmental protection.[36]

Both countries, judging from their public pronouncements, acknowledge the value of military-to-military cooperation as a general instrument of engagement. The Defense Department's position is that it is critical to continue to engage China "in order to promote regional stability and economic prosperity while securing China's adherence to international standards. . . . The United States also seeks greater transparency in China's defense program . . . and will continue to engage China in dialogue aimed at fostering cooperation and confidence-building."[37]

China, in turn, states that it

> . . . is enthusiastic for expanding military relations with the United States and other Western countries in Europe. Proceeding from the obective of safeguarding world peace and the fundamental interests of the people all over the world, Chinese armed forces have successively resumed and improved their relations with the armed forces of those countries on the principle of increasing dialogue and narrowing differences, resulting in the deepening of mutual understanding.[38]

The major test ahead, given the Cold War residue of secretiveness, wariness, and even confrontationalism that characterizes both military establishments, will be to use the non-threatening arena of environmental remediation, protection, and prevention as a test bed for broad-based collaboration.

**COOPERATIVE INTELLIGENCE.** As a complement to expanded military-to-military environmental cooperation, there also should be a concerted effort to make greater and more open use of U.S. intelligence assets to monitor environmental conditions and provide forewarning of potential environmental disasters.

The precedent—and perhaps the principal continuing vehicle—for such intelligence sharing is the Environmental Task Force and follow-on MEDEA group established in 1992 at the urging of then-Senator Al Gore. MEDEA (Measurements of Earth Data for Environmental Analysis) is a group of roughly sixty scientists, cleared for access to top secret material, who have sought to determine whether the technical assets of the intelligence community can be used productively by the scientific community to deal with natural disasters and track such problems as global warming, ozone depletion, deforestation, desertification, and oceanic degradation.[39] Over the next decade, as former CIA director John Deutch has pointed out, the intelligence community will periodically image selected sites of environmental significance to give scientists an ongoing record of changes in the earth that will improve their understanding of environmental processes and enhance their ability to provide strategic warning of potentially catastrophic threats to human health and welfare.[40]

Accentuating the use of such capabilities to *help* China anticipate, diagnose, and respond to environmental problems would have the substantive effect of heightening transparency, demonstrating good faith and U.S. leadership, building mutual confidence, and thereby prompting greater openness by the Chinese themselves (even if they don't intend to). It also would have the symbolic effect of redefining intelligence in more contemporary, non-adversarial, non-provocative terms. The move to transparency also would signal a definitive move by the United States to move beyond an industrial-age environmental protection regime defined by surveillance and coercion to one of willful disclosure and accountability.[41]

**ENVIRONMENTAL TECHNOLOGY PLOWSHARES.** One of the most enduring and paradoxical legacies of the Cold War is the continuing prevalence of the international arms trade. The United States is far and away the leading conventional arms exporter in the world today, accounting for 45% of the world total—roughly equal to the combined arms exports of China, France, Germany, Israel, Russia, and the United Kingdom. China accounts for slightly more than 2% of the world total, but also is the leading source of banned (nuclear, chemical, and biological) weapons technologies to the developing world.[42] Moving away from this inherently escalatory and provocative competition by substituting more strategically productive and economically remunerative pursuits is an urgent task ahead.

A recent report from the non-profit National Commission for Economic Conversion & Disarmament provides telling insight into America's continuingly misplaced preference for arms traffic over the potentially more lucrative and strategically remunerative export of environmental technologies. The comparisons are striking. There is a $400 billion-plus market for environmental technologies, twice the size of the world market for all types of military hardware. The dramatically growing environmental technology export market (about $45 billion) exceeds the steadily declining (yet still troubling) arms export market ($32 billion) by 50%. The U.S. government spends about $12 promoting arms exports for every dollar it spends promoting environmental technology exports. This helps explain why, even though the world environmental technology market is twice as large as the arms market, U.S. export revenues from the two industries are about equal. Arms manufacturers argue that near-Cold War levels of military spending and increased arms export subsidies are necessary to save jobs. Yet twelve times the subsidy is currently supporting only about as many arms export-related jobs—an estimated 350,000—as are derived from environmental technology exports. Meanwhile, the U.S. environmental technology industry as a whole employs an estimated 4.3 million people, up from 2.8 million in 1985, compared to the arms industry's 2.3 million, down fom 3.7 million in 1987.[43]

Such figures provide powerful ammunition for viewing the environmental situation in China as a justifiable opportunity for the United States to move boldly beyond the Cold War, to lead the way toward true global demilitarization, and to challenge China to follow suit by taking a systematic, strategically focused approach to the export of environmental technologies in lieu of arms.

## A STRATEGIC ENVIRONMENTAL TECHNOLOGIES INITIATIVE

As of 1996, the global environmental market represented $452 billion in revenues. By some estimates, that market could be on the order of $640 by the year 2010. Asia has the highest environmental market growth rate, projected to average 14–16% annually over the next few years. While there has been noticeable improvement in U.S. environmental exports (rising from $9.6 billion in 1993 to $16 billion in 1996), only 9% of the industry's revenues are generated outside the United States, placing the United States behind all but two (Italy and Spain) of the top thirteen environmental industries in the world. Germany and Japan, for example, export 18–22% of their environmental industry capacity.[44]

The Chinese market for environmental technologies is widely considered to be one of the largest potential markets in the world. Chinese authorities hope to boost environmental spending to 1.5% of GDP by the year 2000, more than $15 billion annually based on official growth projections, and say that $54 billion would need to be spent during the 1996-2000 period to truly address the country's most pressing environmental needs. As the State Department's country commercial guide states: "Early next century, as income levels rise in a huge country with acute environmental needs, China's environmental market may grow to become one of the world's largest." Yet, as the commercial guide further notes: "American companies may find that their competitors have already gained firm beachheads because these firms are now winning contracts with the help of concessional financing, grants, and other tied aid from third country governments."[45]

The Clinton administration's own national environmental technology strategy similarly describes the disadvantageous position of U.S. firms in the international environmental market:

> The tepid export performance of U.S. environmental technology firms stands in marked contrast to the export-oriented industries in Germany, Japan, France, and the United Kingdom. The environmental industries of these nations are mounting a competitive challenge with active government support that combines political, technological, financial, and commercial resources. . . . The United States, on the other hand, lags significantly behind its competitors in committing public resources to trade promotion. Among the world's major trading nations, the United States ranks last or next to last in export promotion indicators. . . .[46]

But mere export promotion is not the answer. In fact, as Yale University's Daniel Esty and the Worldwatch Institute's Seth Dunn contend, it may be a central part of the problem in current U.S. environmental policy toward China. The current ad hoc, unfocused policy approach (which focuses on trade promotion, often at the expense of true environmental protection) serves neither Chinese nor U.S. environmental interests and keeps U.S. firms one step behind the competition:

> Restoring the environmental equilibrium in U.S.–China policy will require a change in attitude from pure trade promotion toward broader consideration of U.S. interests. Instead of the current spotty list of environmentally aware policies, U.S. development assistance to China could form the core of a focused, long-term and flexible environmental policy. Government-wide, a new U.S.–China Environmental Initiative could be designed to address the global environmental implications of China's economic development; steer the private sector toward more careful consideration of the environmental impacts of the projects they undertake; and strengthen China's framework of laws and policies for environmental protection and the Chinese public's support for environmental investments.[47]

Key among the well-recognized reasons the U.S. environmental industry has generally not been as competitive abroad as it could or should be are (a) the lack of adequate financing and access to hard capital, especially for penetrating markets in developing countries, and (b) the comparable lack of U.S. government support in the way of business development, finance, tied aid, and the like.[48]

What is needed is a coherent strategic approach to the export of U.S. environmental technologies in which government, industry, and financial institutions work in consonance toward common strategic ends. Whether or not one agrees with consultant Peter Evans that the U.S. government must prioritize the technologies that offer the best sales opportunities in China and provide appropriate assistance to U.S. companies to adapt their technologies to the Chinese market, he certainly is correct in saying: "The longer the United States dallies [especially vis-à-vis its Japanese competitor], the harder it will be for U.S. firms to participate fully in what could one day become the world's largest market for environmental goods and services."[49]

## REINVIGORATING AID AND FINANCE

Government assistance is crucial to an integrated approach that would enhance the ability of the U.S. environmental industry to serve America's strategic aims by competing effectively in Chinese markets. It therefore is imperative that extant legislative prohibitions against the presence of the U.S. Agency for International Development (USAID), the U.S. Trade and Development Agency (TDA), and the Overseas Private Investment Corporation (OPIC) inside the country be lifted.

USAID presence—in the form, especially, of its United States-Asia Environmental Partnership (US–AEP)—is particularly crucial. AID is currently precluded from providing assistance to China in accordance with its interpretation of Section 116 of the Foreign Assistance Act, which states that no country shall receive assistance where there is a "consistent pattern of gross violations of internationally recognized human rights."[50]

US–AEP is a public–private initiative, currently operating in 13 Asian cities, that promotes environmentally sustainable development throughout the region. Its mission, in fact, is "to promote a 'clean revolution' [the continuing development and adoption of less-polluting and more resource-efficient products, processes, and services] in Asia." US–AEP focuses on four activities: strengthening and expanding the incentives and public policies for environmental quality in the industrial sector, introducing environmental management systems to the industrial sector, reducing the barriers to the transfer of environmental and clean process technologies, and increasing the investment in environmental infrastructure. The program emphasizes the formation of partnerships involving government, business, non-governmental organizations, and academe, rather than more traditional donor–client relationships. This approach facilitates leveraging other public and private sources of funding.[51]

With a current annual budget of merely $18 million, US–AEP to date has contributed to the export sales of approximately $500 million worth of U.S. environmental goods and services and participation in infrastructure projects valued over $500 million. Its presence inside China would provide an invaluable focal point for leveraging strategically targeted environmental change and facilitating the penetration of U.S. business and technologies. Regrettably, precisely because US–AEP's natural bureaucratic home is in AID, the program is hamstrung by its affiliation with that agency. So long as AID continues, for largely ideological reasons, to be precluded from being in China, there is every reason to consider placing US–AEP under Department of

Commerce or Environmental Protection Agency purview to ensure that a crucial strategic opportunity to establish coordinated environmental presence is not lost.

As part of the U.S. response to the 1989 events in Tiananmen Square, OPIC and TDA programs in China were suspended indefinitely by the Foreign Relations Authorization Act for Fiscal Years 1990 and 1991, Public Law 101-246. These restrictions may be waived if (a) China has made progress on a program of political reform, or (b) it is "in the national interest" to do so. Additionally, OPIC is constrained from carrying out projects in China since it determined in 1990 that China did not meet the workers' rights standards of Section 231A of the Foreign Assistance Act. Here, too, the president may grant a waiver if he deems it to be in the national interest.[52]

OPIC is charged with facilitating and encouraging U.S. private investment in developing countries and emerging markets on a financially self-sustaining basis (that is, at no net cost to U.S. taxpayers). It assists U.S. investors abroad by (a) providing insurance against a broad range of political risks, (b) offering loans and loan guarantees, (c) financing private investment funds that provide equity to businesses overseas, and (d) advocating U.S. business interests. OPIC has supported investments worth nearly $112 billion, generated $56 billion in U.S. exports, and helped create some 230,000 American jobs. Since 1985, the corporation has been required by statute to assess the environmental impacts of all projects under consideration for political risk insurance and financing and to decline support for projects posing unreasonable or major environmental, health or safety hazards." OPIC currently is engaged in a cooperative pilot program with US–AEP to provide $1 million of funding to support innovative environmental management and technology projects in Asia.[53]

TDA helps American companies develop commercial opportunities in developing and middle-income countries by funding feasibility studies, training grants, technical assistance, orientation visits, and deal-making conferences. Promoting exports of U.S. environmental technologies and services is an important part of the program. To date, the agency has been associated with approximately $12.3 billion in exports. In fiscal year 1998, TDA obligated $56 million for U.S. firms in more than 62 countries, including $9.7 million to some 81 activities in the Asia–Pacific region.[54]

The one enterprise missing from this picture, of course, is the Export–Import (Ex–Im)Bank, which is not part of the Tiananmen sanctions or otherwise restricted from doing business with China. The bank, whose basic mission is to create jobs through exports, provides guarantees of working capital loans for U.S. exporters, guarantees the repayment of loans or makes loans to foreign purchasers of U.S. goods and services, and provides credit insurance that protects U.S. exporters against the risks of non-payment by foreign buyers for political or commercial reasons. Ex–Im has financed more than $300 billion in U.S. exports since its creation in 1934. China is the bank's largest single market, with roughly $6 billion in exposure. In 1998, the bank supported exports worth more than $1.3 billion there.[55]

Ex–Im has a major environmental exports program, which offers increased levels of financial support for exporters of environmentally beneficial goods and services, and for exporters participating in foreign environmentally beneficial projects. The bank's charter, revised by Congress in 1992, requires the establishment of environmental review procedures consistent with

the bank's overall export promotion objectives and authorizes the granting or withholding of financial support after taking into account the beneficial and adverse environmental effects of proposed transactions. One of the bank's most controversial recent decisions, driven largely by environmental considerations, was to deny support to U.S. firms seeking work on China's Three Gorges project. The decision has been the subject of criticism for the immediate effect of shutting U.S. firms out of lucrative contracts won by European firms and for the larger effect of further contributing to America's lagging competitiveness in Chinese markets. Ex–Im officials counter that their environmental policy actually wins more business than it loses for American companies, since in many cases foreign authorities are persuaded to buy more and better technology than they otherwise would. Moreover, there are major economic risks associated with the political and social tensions that may arise from pharaonic projects like Three Gorges.[56]

The Ex–Im example in general, and the Three Gorges decision in particular underscore how critically important it is that the United States respond in coherent strategic fashion to China's environmental situation. Only through a focused, coordinated approach, where strategic desiderata take precedence over domestic political expediency, and the diplomatic, commercial, intelligence, and military organs of the U.S. government operate in concert among themselves and with business, the financial community, and non-governmental organizations, can we have reasonable confidence that the environmental circumstances China faces will not become a strategic albatross for the rest of the world.

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## Appendix 1

## JOINT STATEMENT ON COOPERATION ENVIRONMENT & DEVELOPMENT BETWEEN THE UNITED STATES AND CHINA

1. The United States and China agree that meeting development needs in a sustainable manner is one of the most important challenges of the 21st century. They underscore the central role energy plays in economic development, as well as the human health and environmental risks associated with unsustainable use of energy and natural resources. They note that the development and deployment of cleaner and more efficient energy technologies will contribute significantly to improving local air quality and protecting the global environment. The United States and China recognize that countries can achieve sustained economic growth while protecting the environment and taking actions to combat climate change.

2. The United States and China note that their common desire to promote clean energy and protect the environment has guided past cooperation and joint initiatives. They accord high importance to the US-China Forum on Environment and Development and commit to further their cooperation in the fields of clean energy, environmental protection, science and technology and commercial cooperation. The two nations will also continue to cooperate on efforts to strengthen the Chinese environmental regulatory regime to encourage pollution control and abatement.

3. The United States and China recognize the potential of Chinese accession to the WTO to broaden and accelerate the transfer of environmentally-sound technologies, goods and services, thereby advancing clean energy and environmental protection goals.

4. The two countries are taking many initiatives on their own to mitigate the impact of energy production and use on the environment. China plans to expand significantly the use of natural gas in China's energy supply and increase the utilization of coalbed methane and clean coal technologies. China also plans to increase significantly the generation of power from renewable energy sources. China's recent structural reforms and removal of certain fossil fuel subsidies have already resulted in economic and environmental benefits; further economic reforms should result in additional environmental benefits.

5. The United States is committed to a clean energy future and to the goal of reducing greenhouse gas emissions. To this end, the United States pursues a program of research and development, public education, promotion of energy efficient products and practices, and targeted tax incentives. Specific actions during the past year include issuance by the President of an Executive Order mandating reduction in energy use in federal buildings; issuance by the President of a directive that sets a target to triple the use of bio-energy in the U.S.; issuance by the President of a directive to reduce petroleum use in the federal

vehicle fleet; and establishment by the Department of Energy of new goals to increase the share of U.S. electricity generated by wind power.

6. The United States and China reaffirm their strong support for international efforts to combat global climate change under the UN Framework Convention on Climate Change and its Kyoto Protocol, in accordance with the principle of common but differentiated responsibilities. The two countries express the willingness to entertain new and creative thinking and approaches to cooperation between developed and developing countries on climate change. The two countries intend to work together and with other countries toward early agreement on the elements of the Kyoto mechanisms, including the Clean Development Mechanism, which could offer opportunity for mutually beneficial cooperation between developed and developing countries. They recognize, in particular, that the Clean Development Mechanism could provide
important opportunities for economic growth and environmental protection.

7. China and the United States reaffirm their commitment to sustainable management and protection of natural resources and endangered species. China is taking aggressive steps to combat deforestation, including banning of logging in southwest China and an ambitious tree-planting and reforestation program in the Yangtze basin, in the Beijing metropolitan area, and elsewhere. The two countries have a long history of cooperation in this area, and affirm their intention to work together to assure that any increased trade flows will not undercut natural resource management and species protection programs.

8. The United States and China believe that energy and environment constitutes one of the most important areas of cooperation between the two countries. The joint initiatives taken by the two sides will give practical shape to that vision. By making clean energy widely available through development and application of new technologies and strengthening efforts to protect our environment and this planet's biodiversity, China-US cooperation will contribute in significant measure towards further securing the welfare and quality of life of the peoples of the two countries. It will also be a vital contribution towards preserving the riches of our planet for future generations.

###

## Appendix 2

MEMORANDUM OF UNDERSTANDING
AMONG
THE ENVIRONMENTAL PROTECTION AGENCY
THE DEPARTMENT OF ENERGY
AND
THE DEPARTMENT OF DEFENSE
CONCERNING COOPERATION IN ENVIRONMENTAL SECURITY

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The Environmental Protection Agency, the Department of Energy, and the Department of Defense (the Parties), Recognizing that America's national interests are inextricably linked with the quality of the earth's environment, and that threats to environmental quality affect broad national economic and security interests, as well as the health and wellbeing of individual citizens;

Recognizing that environmental security, including considerations of energy production, supply and use, is an integral component of United States national security policy and that strong environmental security contributes to sustainable development;

Recognizing that environmental degradation can have global consequences that threaten the environment, health and safety in the United States:

Recognizing the central role of science and technology in promoting sustainable development and in responding to global threats to environmental security;

Recognizing the need to overcome the environmental legacy of the Cold War in order to promote prosperity and stability;

Recognizing that the Secretary of State has primary responsibility for the conduct of United States foreign policy;

Recognizing that each of the Parties has a different experience, expertise, and perspective and that their collaboration can uniquely assist in addressing international problems of importance for environmental security and can serve as a model for other countries;

Recognizing that each of the Parties has an important role to play in demonstrating and promoting approaches and technologies that achieve safe and effective environmental management in defenserelated activities in the United States and abroad;

Recognizing that the Parties have established cooperation with the private and public sectors as a basis for jointly addressing sustainable development and environmental security; and

Believing that enhanced cooperation on international environmental protection issues that is consistent with United States foreign policy and national security objectives is of mutual benefit,

Have agreed as follows:

## I. Purpose

1. The purpose of this Memorandum is to establish a framework for cooperation among the Parties to strengthen coordination of efforts to enhance the environmental security of the United States, recognizing the linkage of environmental and national security matters.

The Parties do not intend this Memorandum to create binding legal obligations.

## II. Scope

1. The Parties shall develop and conduct cooperative activities relating to the international aspects of environmental security, consistent with United States foreign policy and their individual mission responsibilities, utilizing their legal authorities and facilities appropriate to specific tasks directed at achieving mutually agreed upon goals.

2. Cooperative activities under this Memorandum may be conducted in areas contributing to improved environmental security, where such cooperation contributes to the efficiency, productivity, and overall success of the activity. Such activities include: information exchange, research and development, monitoring, risk assessment, technology demonstration and transfer, training, emergency response, pollution prevention and remediation, technical cooperation, and other activities concerned with radioactive and nonradioactive contamination and other adverse environmental impacts on terrestrial areas, the atmosphere, hydrosphere, cryosphere, the biosphere (including human health) and the global climate system; defense or defense (strategic) industrial activities, energy production, supply and use, and related waste management; or other such matters as the Parties may agree upon, according to criteria to be mutually developed by the Parties.

3. The forms of cooperation under this Memorandum may consist of the following: participation in joint projects addressing the activities cited in paragraph 2 above, including sharing of technical expertise; cooperative work to institute and enhance environmental management systems related to defense activities; information management and exchange; participation in relevant symposia, conferences and seminars; development of joint scientific and policy publications; provision of equipment and associated materials to foreign entities through the appropriate instrument, consistent with United States law; temporary assignments of personnel from one Party to another; and such other forms of cooperation as the Parties may agree upon.

4. Each Party may use the services of and enter into agreements with appropriate institutions, such as universities and governmental and nongovernmental organizations, to develop and conduct activities under this Memorandum, consistent with applicable law. Where required by law, applicable regulations or procedures, such agreements shall be subject to consultation with and the concurrence of the Department of State.

## III. Funding

1. Unless otherwise agreed, each Party shall provide the resources for its participation in activities under this Memorandum. The ability of each Party to carry out activities under the Memorandum shall be subject to the availability of appropriated funds, personnel, and other resources.

2. The details of any interagency transfer of funds will be set forth in specific interagency agreements. This Memorandum shall not be used to obligate or commit funds or as the basis for the transfer of funds between or among the Parties.

**IV. Management**

1. Activities undertaken under this Memorandum will be consistent with applicable authorities and, where required, in consultation with and/or concurrence of the Department of State.

2. Each Party shall designate in writing a Program Coordinator and a Deputy to manage activities under this Memorandum. Each Party may designate a replacement Program Coordinator or Deputy at any time upon written notice to the other Parties. The Program Coordinators shall meet at least semiannually, and at other occasions as deemed necessary and at the request of any Party, to discuss and evaluate the progress of activities under the Memorandum or to review other matters concerning the Memorandum, such as future policy and programmatic direction.

3. The Parties may enter into agreements under this Memorandum to undertake specific activities. Each agreement will specify: the scope of the activity; expected project period; responsibilities of the implementing agencies, including those related to funding and personnel assignments; anticipated results; reporting procedures, if appropriate; and any other relevant matters.

3. Each Party shall make available to the other Parties all technical information obtained through the implementation of this Memorandum and such information will be made available to third parties, except that nothing in this Memorandum shall be construed to require a Party to make available or allow access to information

(a) the disclosure of which would impede law enforcement; or

(b) that is protected from disclosure by U.S. law governing business or proprietary information, personal privacy, the confidentiality of internal government decision making processes, or protection of national security.

4. In the event that any activity undertaken by the Parties to implement the purposes of this Memorandum involves access to and sharing or transfer of technology subject to patents or other intellectual property rights, such access and sharing or transfer will be provided on terms which recognize and are consistent with the adequate and effective protection of intellectual property rights.

**V. Effective Date, Renewal, Amendment, Withdrawal and Termination**

1. This Memorandum shall become effective upon signature by all Parties and shall remain in effect for a period of five years. Unless one of the Parties notifies the other Parties in writing of its intent to terminate this Memorandum ninety days prior to its expiration, the Memorandum shall be automatically renewed for an additional five year period. Thereafter, it may be renewed for successive five year periods by written agreement of the Parties.

2. This Memorandum may be amended at any time by written agreement of the Parties, including to add new parties. Any Party may withdraw from this Memorandum after consultation with the other Parties. The Memorandum may be terminated at any time after consultations among the Parties. Unless otherwise agreed in writing, any Party's withdrawal from, or the termination of, this Memorandum shall not affect the validity or duration of activities undertaken pursuant to the Memorandum that have been initiated prior to, but not completed at the time of, such withdrawal or termination.

IN WITNESS WHEREOF, the undersigned have signed this Memorandum of Understanding.

DONE this 3rd day of July, 1996.

FOR THE ENVIRONMENTAL PROTECTION AGENCY

Carol M. Browner
Administrator

FOR THE DEPARTMENT OF ENERGY

Hazel O'Leary
Secretary

FOR THE DEPARTMENT OF DEFENSE

William J. Perry
Secretary

APPENDIX 3

**Joint Statement on the Exchange of Information by the United States Department of Defense and the Chinese Ministry of National Defense on Military Environmental Protection**

The Department of Defense of the United States of America (hereafter referred to as US DOD) and the Ministry of National Defense of the People's Republic of China (hereafter referred to as China's MND) are concerned with the quality of the ecological environment, and recognize that environmental quality is of great importance to national stability and security.

The US DOD and China's MND recognize the importance of the military's role in environmental protection, including monitoring the environment and eliminating the threat posed to the nations by environmental degradation.

Accordingly, the US DOD and China's MND are prepared to cooperate on military environmental protection. The US DOD and China's MND intend to exchange technical representative groups to study military environmental protection, and intend to discuss signing a technical document on exchange of information on military environmental protection.

Signed in duplicate at Washington, D.C. on the 15th day of September 1998.

William S. Cohen
Secretary of Defense
Department of Defense
United States of America

General Zhang Wannian
Vice Chairman
Central Military Commission
People's Republic of China

AGREEMENT

BETWEEN

THE DEPARTMENT OF DEFENSE OF THE UNITED STATES OF AMERICA

AND

THE MINISTRY OF NATIONAL DEFENSE OF THE PEOPLE'S REPUBLIC OF CHINA

CONCERNING

EXCHANGE OF

ENVIRONMENTAL PROTECTION RESEARCH AND DEVELOPMENT

INFORMATION

(Short Title: U.S. DoD – China MND
Environmental Protection R&D Information Exchange Agreement)

## PREAMBLE

The Department of Defense of the United States of America and the Ministry of National Defense of the People's Republic of China, hereinafter referred to as the Parties;

Acknowledging that the quality of the ecological environment plays a significant role in the development, stability, and security of a country; recognizing that scientific and rationalized military environmental protection is beneficial; and desiring to improve their mutual conventional defense environmental capabilities through the application of emerging technology;

And having independently conducted research and development programs involving environmental protection technologies;

In order to conduct exchanges of Environmental Protection Research and Development Information, the Parties have agreed as follows:

## ARTICLE I
## DEFINITION OF TERMS AND ABBREVIATIONS

| | |
|---|---|
| Authorities | Government officials listed in this Agreement who are authorized to act on behalf of the Parties in matters pertinent to this Agreement. |
| Annex Authorities | Government officials listed in this Agreement who are authorized to act on behalf of the Parties in matters pertinent to implementation of this Agreement or Annexes thereto. |
| Classified Information | Official information that requires protection in the interests of national security and is so designated by the application of a security classification marking. |
| Contractor Support Personnel | Persons who are not Third Parties to this Agreement and are under contract to provide administrative and professional support services to the Parties. |
| Environmental Protection | Activities to prevent or reduce environmental pollution, to preserve natural and human resources, and to maintain or reestablish a harmonious relationship between man and the environment by employing managerial, legal, scientific, or technological measures. Military environmental protection refers to activities to prevent or reduce, by managerial, scientific, or technological means, the hazards on the environment resulting from military operations. |
| Environmental Protection Research and Development Information (Environmental Protection R&D Information) | Environmental Protection R&D information used in preventing or controlling environmental pollution or ecological damage that can be exchanged in accordance with this Agreement. |
| Establishments | Government organizations listed in an Information Exchange Annex which provide, or have an interest in, Environmental Protection R&D Information to be exchanged. |

| | |
|---|---|
| Information Exchange Annex (Annex) | An Annex signed under the provisions of this Agreement to exchange Environmental Protection R&D Information of mutual interest concerning specified technology areas or categories of weapons. |
| Liaison Officers (LOs) | Representatives of the Parties, normally personnel accredited to embassies or missions, who may assist in the implementation of this Agreement and specific Annexes. |
| Production Information | Information such as designs, drawings, chemical and mathematical equations, specifications, models, manufacturing techniques, software source code and related information (excluding Environmental Protection R&D Information) which is necessary to manufacture or substantially upgrade military material. |
| Proprietary Data | Data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data: are not generally known nor available from other sources; have not been made available by the owner to others without obligation concerning its confidentiality; and are not already available to the Government without obligation concerning their confidentiality. |
| Technical Project Officers (TPOs) | Representatives of government organizations who are specifically authorized to exchange Environmental Protection R&D Information under an Annex. |
| Third Party | A government other than the government of a Party and any person or other entity whose government is not the government of a Party. |

## ARTICLE II
## OBJECTIVE AND SCOPE

1. The objective of this Agreement is to conduct reciprocal, balanced exchanges of Environmental Protection R&D Information of mutual interest to the Parties.

2. The Parties may exchange Environmental Protection R&D Information under this Agreement upon conclusion of individual Annexes. Such information exchanged between the Parties shall be of approximately equivalent value, quantitatively and qualitatively.

3. Each Annex, upon conclusion, shall form an integral part of this Agreement and shall generally conform to the format outline provided in Appendix 1. Each Annex shall: specify the scope of Environmental Protection R&D Information exchange; identify the Annex Authorities, TPOs and Establishments; specify any applicable special disclosure and use provisions, when necessary; and establish a duration for the Annex of not more than three years.

4. Either Party may propose potential Annexes to be conducted under the provisions of this Agreement. The proposing Party may provide a written synopsis describing the proposed Annex to the other Party, and solicit its participation in concluding an Annex.

5. This Agreement permits the exchange of Environmental Protection R&D-related computer software. This Agreement does not permit the exchange of weapon or sensor related system computer software, or related computer software documentation.

6. Production Information shall not be exchanged or provided under this Agreement.

7. No defense articles or services may be exchanged or provided under this Agreement.

8. The activities of the Parties under this Agreement shall be carried out in accordance with their national laws, and the obligations of the Parties shall be subject to the availability of appropriated funds for such purposes.

9. In the event of a conflict between the provisions of this Agreement and any Appendix or Annex to this Agreement, this Agreement shall take precedence.

## ARTICLE III
## MANAGEMENT

1. The Parties hereby establish the following Authorities for this Agreement, or their equivalents in the event of reorganization:

United States: Deputy Under Secretary of Defense (Environmental Security) of the United States Department of Defense

China: Deputy Director of the General Logistics Department of the People's Liberation Army (Environmental Protection)

2. The Authorities shall be responsible for reviewing and approving recommended amendments to this Agreement and Appendix 1 and resolving issues brought forth by the Annex Authorities.

3. The Parties hereby establish the following Annex Authorities to coordinate their respective Annex efforts under this Agreement, or their equivalents in the event of reorganization:

United States: Principal Assistant Deputy Under Secretary of Defense (Environmental Security) of the United States Department of Defense

China: Representative of the Office of Environmental Protection of the People's Liberation Army

4. The Annex Authorities shall be responsible for: exercising executive-level oversight of Annex efforts; resolving issues brought forth by the TPOs; concluding new Annexes on behalf of the Parties; coordinating requests for Third Party transfers on behalf of the Parties in accordance with Article X; and approving the amendment and termination of Annexes in accordance with Article XII.

5. Each Annex shall identify a single TPO to represent each Party. Unless otherwise set forth in an individual Annex, TPOs shall be responsible for: exercising day-to-day management of Annex efforts; resolving Annex issues and problems brought forth by Establishments; referring issues to the Annex Authorities that cannot be mutually resolved by the TPOs; recommending the development of new Annexes to the Annex Authorities; recommending the amendment or termination of Annexes to the Annex Authorities; amending the list of Establishments in Annexes; establishing and maintaining annual Environmental Protection R&D Information exchange objectives for each Annex, as appropriate; maintaining oversight of the security aspects of the Annex in accordance with Article VIII and Article IX; maintaining lists of Environmental Protection R&D Information exchanged; and any other unique responsibilities required for management of the Annex.

6. Each IEA shall identify Establishments that may exchange Environmental Protection R&D Information and sponsor visits under the IEA.

## ARTICLE IV
## CHANNELS OF COMMUNICATION AND VISITS

1. Only those TPOs specified in individual Annexes to this Agreement are authorized to exchange Environmental Protection R&D Information related to that Annex on behalf of the Annex Authorities. Environmental Protection R&D Information exchanged between the Parties shall be forwarded by TPOs to their counterparts via government channels. Liaison Officers may also assist TPOs in the transmission of Environmental Protection R&D Information, as appropriate.

2. With the approval of both Parties, each Party may permit Annex visits by personnel of the other Party on a need to know basis. The visits shall be coordinated through official channels and shall conform to the established visit procedures of the host country. Requests for visits shall specify the name of the Annex and a proposed list of topics to be discussed. When requests for visits also include visits to contractor facilities of the host country, such requests will comply with that country's contractor visit procedures.

3. All visiting personnel shall be required to comply with security regulations of the host Party. Any Environmental Protection R&D Information disclosed or made available to visitors shall be subject to the provisions of this Agreement.

4. Lists of personnel of each Party required on a continuing basis to visit shall be submitted through official channels in accordance with recurring international visit procedures.

## ARTICLE V
## FINANCIAL ARRANGEMENTS

Each Party shall bear the full cost it incurs in making, managing, and administering any Environmental Protection R&D Information exchanges under this Agreement. No funds shall be transferred between the Parties. A Party shall promptly notify the other Party if available funds are not adequate to fulfill its responsibilities under this Agreement. If a Party notifies the other Party that it is terminating or reducing its funding for any Environmental Protection R&D effort covered by a specific Annex, the Parties shall immediately consult with a view toward termination or continuation of the information exchange on a changed basis.

## ARTICLE VI
## CONTRACTUAL ARRANGEMENTS

This Agreement provides no legal authority for one Party to place contracts on the other Party's behalf.

## ARTICLE VII
## *DISCLOSURE AND USE OF R&D INFORMATION*

1. Environmental Protection R&D Information exchanged pursuant to an Annex shall be specifically described therein. Only Environmental Protection R&D Information may be exchanged under this Agreement. Production Information shall not be exchanged under this Agreement.

2. Except as provided in paragraph VII.5, a Party, including its Contractor Support Personnel, may use the Environmental Protection R&D Information exchanged under this Agreement solely for information and evaluation purposes.

3. The receiving Party shall not use Environmental Protection R&D Information for any purpose other than the purpose for which it was furnished, or disclose such information exchanged under this Agreement to any other persons or entities, other than its Contractor Support Personnel, without the specific prior written consent of the furnishing Party.

4. The receiving Party shall ensure that any persons or entities to whom it discloses Environmental Protection R&D Information received under this Agreement are placed under a legally binding obligation to comply with the provisions of this Agreement and the relevant Annex concerning the use, control, and protection of such information.

5. The Parties may determine in a specific Annex that Environmental Protection R&D Information exchanged therein may be used for purposes other than for purposes of information and evaluation by their defense establishments. The Annex shall contain specific provisions for such use, which shall not extend beyond the defense purposes specified therein.

6. Under this Agreement, Environmental Protection R&D Information shall remain the property of the originating Party. No transfer of ownership of such information shall take place.

7. Environmental Protection R&D Information shall only be exchanged when it can be done without incurring liability to holders of proprietary rights, and where disclosure is in accordance with national disclosure policies and regulations of the furnishing Party.

8. All Environmental Protection R&D Information subject to proprietary interests shall be identified, marked, and handled in accordance with Article VIII.

9. Environmental Protection R&D Information that is exchanged under this Agreement shall only be disclosed to Third Parties by the receiving Party in accordance with Article X.

## ARTICLE VIII
## *PROPRIETARY DATA*

1. Except as otherwise provided in this Agreement or authorized in writing by the originating Party, Proprietary Data under this Agreement shall be controlled as follows: such information shall only be used for the purposes authorized for use of Environmental Protection R&D Information as specified in Article VII; access to such information shall be limited to personnel with a need to know; and each Party shall take all lawful steps available to it to keep such information free from further disclosure (including requests under any laws) unless the originating Party consents to such disclosure. In the event of unauthorized disclosure, or if the probability exists that the Proprietary Data may have to be further disclosed, then immediate written notification shall be given to the originating Party.

2. The originating Party shall ensure that Proprietary Data is appropriately marked.

## ARTICLE IX
## SECURITY

No Classified Information shall be provided in Environmental Protection R&D Information exchanges under this Agreement.

## ARTICLE X
## THIRD PARTY TRANSFERS

In accordance with Article VII, a Party shall not sell, transfer title to, transfer possession of, or otherwise disclose Environmental Protection R&D Information to any Third Party without the prior written consent of the Party which provided such information. Only the providing Party may authorize Third Party sales or transfers and, as applicable, specify the method and conditions for implementing such sales or transfers.

## ARTICLE XI
## SETTLEMENT OF DISPUTES

Any disputes between the Parties arising under or relating to this Agreement shall be resolved only by consultation between the Parties and shall not be referred to an individual, to any national or international tribunal, or to any other forum for settlement.

## ARTICLE XII
## AMENDMENT, TERMINATION, ENTRY INTO FORCE, AND DURATION

1. This Agreement may be amended upon the written consent of the Parties. Appendix I of this Agreement may be amended upon the written consent of the Authorities. The Annexes may be amended upon the written consent of the Annex Authorities.

2. This Agreement may be terminated by the written consent of the Parties. The Annexes may be terminated by the written consent of their respective Annex Authorities. In the event the Parties decide to terminate the Agreement, or the Annex Authorities decide to terminate any of the Annexes hereto, they shall consult at the appropriate level prior to the date of its termination to ensure termination on the most equitable terms.

3. A Party may unilaterally terminate its participation in this Agreement upon 180 days written notification to the other Party. A Party's Annex Authority may unilaterally terminate its participation in an Annex upon 60 days written notification to the other Party's Annex Authority. The terminating Party shall continue participation in this Agreement or an Annex until the effective date of termination.

4. The respective rights and responsibilities of the Parties regarding Article VII, Article VIII, Article IX, and Article X shall continue notwithstanding termination or expiration of this Agreement or its Annexes.

This Agreement, which consists of the Preamble, twelve Articles, and one Appendix, shall enter into force upon signature by the Parties and shall remain in force for ten years. The Parties shall consult no later than one year prior to the expiration of this Agreement and decide whether or not to extend its duration. It may then be extended by written consent of the Parties.

This Agreement is signed on July 12, 2000, in Beijing, in duplicate, both in English and Chinese, each being equally authentic.

| Secretary of Defense<br>United States of America | Minister of National Defense<br>People's Republic of China |
|---|---|
| William S. Cohen | Chi Haotian |

APPENDIX 1

"MODEL" INFORMATION EXCHANGE ANNEX

INFORMATION EXCHANGE ANNEX
U.S. DoD – CHINA MND
ENVIRONMENTAL PROTECTION RESEARCH AND DEVELOPMENT INFORMATION EXCHANGE AGREEMENT

CONCERNING

**(Provide Title)**

In accordance with the Environmental Protection Research and Development Information Exchange Agreement (the Agreement) between the Department of Defense of the United States of America and the Ministry of National Defense of the People's Republic of China, signed on July 12, 2000, in Beijing, the following Information Exchange Annex (Annex) is hereby established.

1. DESCRIPTION: **(Note: Provide a description of the scope.)**

a. The scope of this Annex comprises an exchange of Environmental Protection R&D Information in the following technology areas:

(1) **(Note: Provide a more specific description of the Annex's scope by listing pertinent technology areas where Environmental Protection R&D Information is to be exchanged.)**

(2) ***(Note: Specifically identify any proposed exchange of computer software within the scope tasks, if envisioned.)***

b. Exchanges of Environmental Protection R&D Information under this Annex shall be on a reciprocal, balanced basis. Such information exchanged between the Parties shall be of approximately equivalent value, quantitatively and qualitatively, in accordance with Article II (Objective and Scope) of the Agreement.

c. All Environmental Protection R&D Information exchanges under this Annex shall conform with the provisions of the Agreement, including the prohibitions against exchange of weapon or sensor related system computer software, or related computer software documentation; exchange of Production Information; and exchange or provision of defense articles or services.

d. Environmental Protection R&D Information shall not be used by the receiving Party for purposes other than the purposes specified in an Annex without the specific prior written consent of the originating Party in accordance with the Agreement. Such information exchanged shall only be used by the receiving Party for information and evaluation purposes.

2. ANNEX AUTHORITIES, TECHNICAL PROJECT OFFICERS, LIAISON OFFICERS, AND ESTABLISHMENTS:

a. For the U.S.:
(1) Annex Authority
(2) Technical Project Officer
(3) Liaison Officer(s) (where appropriate)
(a) _____
(4) Establishments
(a) _____

b. For China:
(1) Annex Authority
(2) Technical Project Officer
(3) Liaison Officer(s) (where appropriate)
(a) _____
(4) Establishments
(a) _____

3. SECURITY AND INFORMATION CONTROL:

a. Only UNCLASSIFIED information may be exchanged under this Annex.

b. All Environmental Protection R&D Information exchanges under this Annex shall conform with the information control provisions of the Agreement, including Article VII (Disclosure and Use of Environmental Protection R&D Information), Article VIII (Proprietary Data), and Article X (Third Party Transfers).

c. Annual Environmental Protection R&D Information objectives may be specified, if appropriate. These objectives may be established through exchange of correspondence by the TPOs and should be revised annually by the TPOs to reflect current technology considerations.

4. SPECIAL DISCLOSURE AND USE OF INFORMATION PROVISIONS:

**(Note: Most Annexes will not require the addition of any special provisions in this area. However, if the Annex Authorities desire to establish such provisions, such text should be inserted here. For example, use of Environmental Protection R&D Information may be authorized for use in designated defense programs of the Parties.)**

5. FINANCIAL RESPONSIBILITIES:

Each Party shall be responsible for its own costs in the performance of this Annex in accordance with Article V (Financial Arrangements) of the Agreement.

6. TERMINATION AND DURATION OF THIS ANNEX:

a. This Annex may be terminated by the written consent of both Annex Authorities. A Party's Annex Authority may unilaterally terminate its participation in this Annex upon 60 days written notification to the other Party's Annex Authority. Termination of this Annex shall be subject to the provisions of Article XII (Amendment, Termination, Entry Into Force, and Duration) of the Agreement.

This Annex shall remain in force for a period of ____* years from the date of the last signature unless amended or extended by written consent. **(*Period not to exceed three years)** Before the expiration of this Annex, the Annex Authorities shall review this Annex and may, by written consent, extend this Annex for additional periods of up to three years.

This Annex is signed on _____ ___in _____, in duplicate, both in English and Chinese, each being equally authentic.

| FOR THE DEPARTMENT OF DEFENSE OF THE UNITED STATES OF AMERICA: | FOR THE MINISTRY OF NATIONAL DEFNSE OF THE PEOPLE'S REPUBLIC OF CHINA: |
|---|---|