

TAKING UP THE SECURITY CHALLENGE OF CLIMATE CHANGE

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PREFACE

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ABSTRACT

Climate change, in which man-made global warming is a major factor, will likely have dramatic and long lasting consequences with profound security implications, making it a challenge the United States must urgently take up. The security implications will be most pronounced in places where the effects of climate change are greatest, particularly affecting weak states already especially vulnerable to environmental destabilization. Two things are vitally important: stemming the tide of climate change and adapting to its far-reaching consequences. This project examines the destabilizing effects of climate change and how the military could be used to mitigate global warming and to assist at-risk peoples and states to adapt to climate change, thereby promoting stability and sustainable security. Recommendations are made on the importance of U.S. leadership on the critical issue of global warming, on defining and dealing with the strategic dimensions of climate change, and, as a case in point, on how Sino-American cooperation in Africa would not only benefit areas where climate change effects are already pronounced, but also strengthen a crucial bilateral relationship.

TAKING UP THE SECURITY CHALLENGE OF CLIMATE CHANGE

Climate change is real, serious, and inescapable, and its looming effects, certain and uncertain, may prove to be destabilizing on a massive scale. Stemming the tide of climate change and adapting to its far-reaching security implications must therefore rank among the most vital U.S. strategic priorities this century.¹ The military instrument of national power should be used innovatively to mitigate manmade contributions to global warming, to assist especially vulnerable peoples and states to adapt to climate change, and to promote stability and sustainable security in places where climate change effects are most likely to occur.

The time is ripe, perhaps overdue, for the United States to take up the security challenge of climate change. Ways and means for mitigating and adapting to climate change, and its security implications, must be incorporated artfully into the National Security Strategy, National Defense Strategy, Quadrennial Defense Review, and Guidance for the Employment of the Force. The nature and number of destabilizing effects demand that the right moves be made now and in 2050 and beyond, when the impacts of climate change intensify and multiply.

Sustainable security, an expanded concept of national security in which diplomacy and development play prominent roles, is the policy that should overlie these new strategies. The challenges of climate change in all facets of life will be long-lived and its burdens heavy, in some regions much more so than others. Sub-Saharan Africa dramatically illustrates these challenges, but also poses a unique opportunity for the United States and China.

The United States, which has already begun to engage China vigorously on climate change, should explore regional climate change-related military cooperation in Africa. Sino-American military-to-military cooperation in Sub-Saharan Africa would benefit a region where climate change effects are already pronounced and will almost certainly worsen, while strengthening a crucial bilateral relationship between two mostly peaceful but still uneasy competitors. China, the world's fastest rising power, is the largest emitter of greenhouse gases overall. The United States, the world's leading power, is the largest emitter of greenhouse gases per capita.

GLOBAL WARMING AND CLIMATE CHANGE

Adverse climate change is happening, will continue to happen, and may worsen. Manmade global warming,² produced by accumulation and persistence of "greenhouse gases" in the atmosphere, is a major, if not the major, cause or contributor. Greenhouse gases, principally carbon dioxide (CO₂), are by-products of the combustion of fossil fuels (e.g., petroleum, coal, and natural gas) for purposes such as transportation, industry, heat, and electric power generation.³ Reducing the level of greenhouse gases in the atmosphere is imperative,⁴ as is adapting to climate change, particularly in places where climate change is or likely will be destabilizing.⁵

The Science of Global Warming.

Even as recently as 2006, the year in which the Academy Award winning film *An Inconvenient Truth*, narrated by former Vice President, unsuccessful 2000 presidential candidate, and 2007 Nobel laureate Al Gore,⁶ was released, climate change as a consequence of manmade global warming was hotly debated and deeply politicized in the United States and elsewhere.⁷ The following year, 2007, the United Nations' (UN) Intergovernmental Panel on Climate Change (IPCC) released its long-awaited Fourth Assessment. The IPCC report is of signal importance because it is well-balanced and moderate. It did not quell all controversy surrounding the subject; but because of it climate change is generally accepted, scientifically speaking, to be a product of manmade global warming, even though uncertainties remain as to where, when, and how much.⁸

The IPCC report concludes that manmade global warming is “unequivocal” and that all continents are being affected by the resulting climate change.⁹ The air, the oceans, and the land are all warming with “likely” to “virtually certain” impacts on ecosystems, water resources, human health, industry, settlement, and society.¹⁰ These effects will vary from region to region, and will prove to be difficult to predict, but in general, climate change will be greater by far in this and subsequent centuries.¹¹ In sum, climate change will continue, will likely accelerate, and its effects will last for centuries, perhaps millennia, even if precipitous and dramatic action on global warming is taken.¹²

Present and Predicted Climate Change Effects.

Climate change is already causing significant effects in the United States and around the world.¹³ Among the current and predicted consequences are more frequent and more severe weather-related natural disasters, intensifying heat waves, wider and more rapid desertification, longer-lasting and more intense drought and other water shortages, more unpredictable and more damaging floods, wider ranging and more destructive wildfires, irreversible sea level rise, and accelerating biodiversity loss.¹⁴ Sea level rise threatens hundreds of millions of coastal residents and billions of dollars in property in the United States alone; elsewhere, entire island nations are possibly imperiled by inundation. The number of persons affected by weather-related natural disaster in the last decade has tripled.¹⁵ These phenomena, set against a back-drop of accelerating population growth, may lead to large-scale displacement of peoples, particularly unsustainable rural-to-urban migration. Competition may ensue over scarce resources. Some states will fail; others will aggressively exploit dwindling resources. Both routes may eventually spawn conflict.¹⁶

As Thomas Friedman put it, the world has entered an “Energy-Climate Era” in which “global warming, global flattening, and global crowding” are converging.¹⁷ Observed and predicted climate change effects have sparked grave concern in many quarters; human death toll estimates are in the millions.¹⁸

SECURITY IMPLICATIONS OF CLIMATE CHANGE

The idea that the environment has security implications is not new.¹⁹ Environmental security, including the issue of greenhouse gas emissions, was, to varying degrees, part of the national security strategies of Presidents Bill Clinton and George W. Bush.²⁰ Also not new is the idea that the military instrument of power should be used by combatant commanders to address environmental threats at the theater level.²¹ What is new is that climate change poses security threats unmatched among environmental phenomena.²²

Climate change is a multifaceted threat to America’s well-being, and the world’s.²³ The life-sustaining capacity of our planet may be in jeopardy.²⁴ Fears are growing that climate change, that which is already occurring and the even more dire consequences that may lie ahead, will generate instability and lead to conflict. The most violent conflict is foreseen in and near areas that become uninhabitable, for example, due to desertification or sea-level rise.²⁵ The nature, underlying uncertainty, growing prevalence, and possible intractability of climate change exacerbate its tensions, risks, and threats.²⁶

In 2007, the Center for Naval Analyses, under the leadership of former Deputy Undersecretary of Defense for Environmental Security Sherri W. Goodman, issued a report entitled “National Security and the Threat of Climate Change.” Authored by a Military Advisory Board consisting of former Army, Navy, Air Force, and Marine general and flag officers, the report, which cites IPCC, National Oceanic and Atmospheric Administration (NOAA), and National Aeronautical and Space Administration (NASA) peer-reviewed scientific data and analyses, makes four findings:

(1) projected climate change is a serious threat to America's national security; (2) climate change will make some of the most volatile regions of the world even more unstable; (3) projected climate change will increase tensions even in stable regions of the world; and (4) climate change, national security, and energy dependence are related, global challenges.²⁷

Based on these findings, the panel had five recommendations: (1) the security implications of climate change should be fully incorporated into national security and national defense strategies; (2) the United States should play a stronger role, nationally and internationally, in the mitigation of climate change; (3) the United States should build partnerships that help less-developed nations adapt to climate change; (4) the Department of Defense (DoD) should enhance its operational capability through more energy efficient combat power; and (5) DoD should assess the impact on U.S. military installations worldwide of rising sea levels, extreme weather events, and other projected climate change impacts over the next 30 to 40 years.²⁸ The panel's findings and recommendations are compelling.

Destabilizing Effects on Failed and Failing States.

Food and water shortages, health crises, population displacement (rural-to-urban and across borders), resource and territorial conflict, damage to infrastructure, and greater poverty (real and comparative) are likely to erode confidence in governments too weak or too poor to ameliorate these conditions.²⁹ The infertile, inhospitable climes created by climate change may prove fertile and hospitable to extremist ideology; inviting to transnational crime; and insuperable to their impoverished, weakened, and disenfranchised inhabitants.³⁰

Climate change and other environmental phenomena have not yet caused major war,³¹ but low-level regional conflict is an increasing possibility.³² The new Army field manual on operations, in describing the operational environment, foresees that climate change will exacerbate already difficult conditions in many developing countries, setting off massive humanitarian crises.³³ The U.S. Joint Forces Command's "Joint Operating Environment 2008" also identifies ponderous climate change related threats.³⁴ By one prediction, there will be as many as 50 million environmental refugees in 2010, 200 million or more by 2050.³⁵

Pandemic disease, mass starvation, and loss of habitable land brought on, in short order, by drought, desertification, loss of biodiversity, sea level rise, and other climate change-related effects, will create conditions of fear, resentment, panic, and mistrust. Governments, weak and strong, alone and in combination, will be hard pressed to maintain order, deliver humanitarian relief, and create economic opportunity on the scale that may be required. The effect on individual states, regions, and even the entire international system may be profoundly negative.

Climate change, to which even highly developed states are vulnerable,³⁶ will overwhelm weaker, less developed states that lack capability and capacity to adapt.³⁷ Already such groups as the Center for a New American Security, which in July 2008 conducted a war game entitled "Clout and Climate Change: A New Global Agenda for the 21st Century," are striving to find solutions to mitigate and adapt to climate change.³⁸ Within the U.S. Government, Congress, DoD, and the State Department, among others, are also very concerned by climate change's destabilizing effects.³⁹ The State Department, for example, now has an Environmental Security Working Group within its Bureau of Oceans, International Environmental and Scientific Affairs.⁴⁰ Like State, the U.S. Agency for International Development (USAID) is increasingly attuned to climate change issues, seeking opportunities with DoD to bring hard power and soft power solutions to bear on the intricate interdependencies of security, stability, and sustainable development.⁴¹

Grand Strategy and Military Strategy for Climate Change.

The United States needs to quickly and broadly confront the full strategic implications of climate change – political, economic, and military – and not merely react to its humanitarian and other consequences. Climate change must therefore be a subject of grand strategy and military strategy.⁴² At present, the National Defense Strategy (June 2008) conceives of climate change merely as cause for uncertainty in the strategic environment.⁴³

The Obama administration has not yet produced a National Security Strategy,⁴⁴ but several signs suggest that President Obama embraces the view that the security dimensions of climate change must be addressed.⁴⁵ In his inaugural address and in defense and environment agenda items posted on the White House website, the President speaks of a global climate crisis and 21st century security threats that require new military capabilities, whole-of-government approaches, and mutual security alliances.⁴⁶ For their parts, Secretary of State Hilary Clinton made climate change a “centerpiece of a broader, more vigorous engagement with China”;⁴⁷ Environmental Protection Agency head Lisa Jackson has aggressively embraced anti-global warming initiatives;⁴⁸ and Director of National Intelligence Dennis Blair, in his first Annual Threat Assessment, revived the term “environmental security,” saying:

Climate change, energy, global health, and environmental security . . . [are] critical issues . . . in a future where global warming and resource shortages will have destabilizing effects on many regions, threatening the vital interests of the United States.⁴⁹

Defense Secretary Robert Gates has not made any detailed pronouncements on the subject.⁵⁰ Undersecretary of Defense for Policy, Michèle Flournoy, however, speaking at the Center for Strategic and International Studies on April 29, 2009 about the upcoming Quadrennial Defense Review (QDR), listed climate change as one of five key trends affecting the strategic environment. Climate change, she suggests, is an “accelerant” of state failure, humanitarian crises, and other tensions that could lead to conflict.⁵¹

On the same day Undersecretary Flournoy addressed the Center for Strategic and International Studies, Dr. Geoff Dabelko of the Woodrow Wilson Center for Scholars spoke to the Johns Hopkins University Applied Physics Laboratory as part of the “Rethinking the Foundations of the National Security Strategy and QDR” series.⁵² Using Darfur as an example, Dabelko outlined how climate change can be an underlying cause of conflict.⁵³ Among the impacts on military roles and missions he sees are opportunities for Phase 0 shaping operations, especially in Africa, to pursue environment-related development goals, and to use environment-related activities around the world as military-to-military confidence-building opportunities.⁵⁴

Another high-powered group, the American Security Project, which includes current and former political leaders, former military leaders, and major think tank representatives, issued a report in 2008 entitled “A New American Arsenal.”⁵⁵ This work, building on the 2007 Center for Naval Analyses report, cites climate change as one of four “grave challenges” for the United States.⁵⁶ Among its recommendations are entreaties to advance sustainable development and environmental stewardship, to develop capabilities to deal with the consequences of climate change, especially “climate refugees,” and to formulate environmental conflict resolution mechanisms.⁵⁷ The report advocates a collective, collaborative view of security and strategies that combine all instruments of national power, placing the economic and diplomatic instruments above the military.⁵⁸

A keener recognition is growing and a deeper consensus is emerging within the U.S. Government⁵⁹ and more broadly around the world that climate change has security implications; challenges that must be addressed with dispatch.⁶⁰ The level of effort required is commensurately

great and, although it necessarily includes a significant military dimension, the economic and diplomatic instruments of power must play the greater role. Equally important, the effort must be international, the meaning of which may be very different in 2050 than 2009.

The Future Security Environment.

A time is coming, measured in decades, not centuries, in which American military superpower status may remain, but its relative economic power may be less and its resulting political prerogatives may be fewer, that is, a “post-American” world of increasing multipolarity.⁶¹ For nearly 300 years, world order has been shaped by the hegemony of Western liberalism, first in the form of *Pax Britannica*, and then *Pax Americana*.⁶² But a post-American world, though globalized, may also be more non-Western.⁶³ It will be a world of evolving modernity to which the United States must adapt, not a world the United States will dictate.⁶⁴ It will be a world in which China, already the second-most-important country in nearly every respect, will take a decidedly American tack, though not by employing American methods, to expand its influence in hopes of molding the international system to suit its interests.⁶⁵ Further, it will be a world in which a healthy international community will still be a vital U.S. interest.⁶⁶

The most important bilateral relationships China and the United States have today are with each other. Strenuous efforts must be made to keep the U.S.-China relationship nonconfrontational and to encourage China to broaden its responsibility for promoting and maintaining peace and stability.⁶⁷ American grand strategy and military strategy must include ways and means to achieve these ends.⁶⁸ Because the effects of global warming-related climate change are of as great, if not greater, concern to China than the United States, the two countries will find much common ground in this arena.⁶⁹ China, like America, will perceive the security implications of climate change, but it remains to be seen whether it will play a constructive or discomfiting role. The United States must focus intently on this issue.⁷⁰

MITIGATION OF GLOBAL WARMING BY DOD AND THE IMPORTANCE OF U.S. LEADERSHIP

On the issue of climate change, U.S. leadership is widely seen as critical to achieving an effective global solution.⁷¹ Other key players, the European Union, Japan, Brazil, Russia, India, and China among them – who together with the United States account for 75 percent of all greenhouse gas emissions – must be included.⁷²

Adapting to and mitigating climate change and the security implications of climate change is a mammoth undertaking. The challenges associated with cutting greenhouse gas emissions are themselves immense, with intricate political and economic considerations. The United States should demonstrate its readiness and willingness to assume the mantle of leadership in climate change and environmental security, to stabilize and strengthen the international system, and relieve anxiety over American intentions.⁷³ Progress achieved on climate change will redound to America’s advantage in other arenas.⁷⁴

An International Problem Requires an International Solution.

In a globalized world almost all problems cross borders, and environmental issues have long been recognized as among the most international, the most transnational, of all.⁷⁵ Climate change is affecting polar regions, sea coasts, and vast interior spaces; it extends to all points of the compass. It can be found in the developed world and in the developing world.

Mitigating global warming is perhaps the most efficacious way to slow or lessen (but not likely stop or reverse) climate change.⁷⁶ The international community, including the United States, should therefore expeditiously set and implement meaningful long-term emission reductions for greenhouse gases.⁷⁷ To accomplish this, the developed world must assist the developing world, both in technology and money.⁷⁸

The U.S. military, a very large emitter of greenhouse gases in its own right, can play two very significant roles. First, the United States should demonstrate resolve and leadership by taking action to reduce greenhouse gas emissions and prepare itself, doctrinally and in technology and infrastructure, to adapt to climate change-related constraints on how it will operate and where it will be based. Second, the United States should conduct military-to-military operations with foreign militaries to help them reduce greenhouse gas emissions, and even more importantly, to promote stability and security directly, through military operations, and indirectly, through climate change-related development assistance.

Reducing DoD's Carbon Footprint.

The military, America's single largest consumer of petroleum, should lead the way for America and the world in reducing its carbon footprint, that is, consumption (combustion) of fossil fuels.⁷⁹ No better, more impactful example of America's commitment to ameliorating climate change could be set. Many initiatives are now underway toward that end under the leadership of the DoD Director of Operational Energy Plans and Programs – the Strategic Environmental Research and Development Program, for example.⁸⁰

A second, even more important, direct and concrete consequence of reducing DoD's carbon footprint is that a cut in America's dependence on foreign oil resulting from greater energy efficiency and development of alternative fuels and energy sources, will lessen the human, financial, political, and other costs of oil-related conflict.⁸¹ The more money spent on mitigating and adapting to climate change, the less must be spent in dollars and lives on oil and arms, as fewer energy-driven conflicts will arise.⁸² The resulting reduction in tensions over the scarcity of this resource will contribute greatly to stability and security.

The strategic challenges of climate change come sharply into focus in the global warming context. Competition over access to fossil fuels and the environmental effects of their consumption (combustion) have long been and may long continue to be virulent sources of conflict. A new, more environmentally sound security paradigm is needed.

SUSTAINABLE SECURITY AND ADAPTATION TO CLIMATE CHANGE

The challenge of climate change in the 21st century is a four-sided conundrum. Poverty, population growth, ineffective civil government, and environmental crises are the four main elements that combine to produce instability and conflict. It is where this quartet of calamities can be found that the military instrument of national power is needed most.

Many have decried what has been characterized as militarization of U.S. foreign policy.⁸³ Whether or not it is true and despite recent efforts to encourage whole-of-government approaches to foreign policy and national security, the U.S. military is, and for some time will remain, the most capable instrument of U.S. national power. More than any other component of government, the U.S. military, despite the demands of Iraq and Afghanistan, has the furthest reach and the greatest resources to create and sustain conditions favorable to peace and stability and thereby promote sustainable development. In short, what is needed for adapting to and mitigating climate change and its destabilizing effects is less kinetic, more peripatetic.⁸⁴

Sustainable security is that paradigm.⁸⁵ It is well-suited to this new century of intensifying globalization (good and bad), and the accelerating political, economic, institutional, and environmental changes and challenges that lie ahead. It reflects keenly the reality of the times: the U.S. military must be as adept at making friends as it is at killing enemies.⁸⁶

The U.S. armed forces, the Army in particular, have long been involved in development-related activity, but largely abandoned such doctrine and capabilities in the aftermath of Vietnam.⁸⁷ Using a whole-of-government approach, the U.S. armed forces must again become adept at mixing defense, development, and diplomacy.⁸⁸ This includes, but is by no means limited to, humanitarian disaster relief.⁸⁹ The juxtaposition of sustainable development and national security is sustainable security.

Sustainable Security.

Sustainable security is a blend of national security, collective security, and human security. It expands the traditional, inwardly-focused concept of state self-preservation, espousing a global perspective on transnational threats insidious to an ever more globalized international system.⁹⁰ Sustainable security is proactive and preventative, combining diplomacy and development with defense.⁹¹ It elevates moral suasion and American leadership, not at the expense of compulsion and force when needed, but to champion lasting, development-based solutions to root causes of global violence and instability. Citing the 2007 Center for Naval Analyses report, the Center for American Progress, a chief proponent of sustainable security, labels climate change one such root cause, calling it “a threat multiplier in some of the most volatile regions of the world.”⁹²

In practical terms, sustainable security is about sustainable development and the role of U.S. combatant commanders in it.⁹³ In short, the U.S. military must engage more broadly and deeply in development assistance.⁹⁴ Lessons learned in Iraq, Afghanistan, and the Horn of Africa, and lessons that may now be emerging from events unfolding in ungoverned tribal regions of Pakistan, show that meeting basic human needs and facilitating good governance are critical strategic capabilities the U.S. military, in conjunction with the Department of State, USAID, and other U.S. agencies, must have.⁹⁵

Adapting to and mitigating the effects of climate change will require a hybrid of sustainable security and sustainable development, linked by grand strategy and military strategy.⁹⁶ Climate change effects will strike at the heart of political, economic, and military institutions by imposing heavy human, economic, and environmental costs on all societies, especially fragile ones already in crisis for those and other reasons.⁹⁷ Africa may be the best case in point.⁹⁸

Climate change, particularly in Sub-Saharan Africa, provides immediate and compelling context for sustainable security.⁹⁹ The scope of the problem, however, and the many and varied national interests at stake, make this issue one the United States cannot and should not address alone.¹⁰⁰ In addition to the individual and regional interests of African states themselves, the United States must pay careful attention to China’s interests.¹⁰¹ Moreover, as Dr. Kent Butts of the U.S. Army War College Center for Strategic Leadership recently observed, the fact that China has substantial interests in Africa provides a unique and promising opportunity for the United States to not only advance its security interests in Africa, but also with China.¹⁰²

Another consideration is that U.S. influence in Africa may be eroding relative to China. China is already seen in several parts of Africa as a global power.¹⁰³ Some Africans perceive that China’s presence should be encouraged, not out of love for China, but as a check on unpalatable, overly-aggressive U.S. policies.¹⁰⁴

Sino-American Cooperation in Africa.

If the furnace of Chinese economic growth is to continue to roar, it must be fueled, and that fuel is natural resources, especially energy resources like oil that China must import in vast quantities. It is China's growing appetite for resources that undergirds its foreign policy, a policy that has launched China head-long into Africa in a rush to grab timber, oil, natural gas, and other commodities. In fact, China's trade with Africa may be growing by 50 percent per year.¹⁰⁵

China is feverishly buying billions of dollars worth of friends and influence in Africa,¹⁰⁶ and provides military support to such repressive regimes as Zimbabwe and Sudan, in contravention of U.N. proscriptions.¹⁰⁷ "Business is business," a Chinese diplomat is reported to have said,¹⁰⁸ and China seems bent on keeping business booming, no matter the human or environmental cost. In other words, China's exploitative presence in Africa may be good for China, but not for Africa, and it is not good for the United States.¹⁰⁹ Left unchecked, it will exacerbate the destabilizing effects of climate change, making things even worse for Africa, the United States, and eventually, China, too.¹¹⁰ Stability and security in Africa are in everyone's best interests.

Africa has long, but not consistently, been a focus of U.S. strategy and policy. Significant evidence of America's renewed interest is the recent establishment of Africa Command (AFRICOM).¹¹¹ One area in which stability and security in Africa could be better served is through bringing—and keeping—more African military forces under civilian control. In other words, it is in the best interests of African states as well as the United States, and others, that more African military forces be encouraged and provided opportunity to help build greater capability and capacity for good civil governance and stability.¹¹²

The 2007 Center for Naval Analyses report¹¹³ and the 2007 IPCC report¹¹⁴ detail how sea-level rise, water stress, and loss of arable land will affect Africa's peoples and governments, burdens that will push civil society past the breaking point in places already "just short of anarchy."¹¹⁵ Here, too, millions will be displaced; malaria and cholera epidemics will break out.¹¹⁶ Considering the extent to which Africa, especially Sub-Saharan Africa, will be affected by climate change, the United States and others should engage African military forces in activity that helps adapt to and mitigate climate change-related effects, easing human suffering, lessening further environmental degradation, reducing tensions and the potential for armed conflict, and strengthening challenged states.¹¹⁷

Clean drinking water supply projects are fruitful areas for Sino-American collaboration, even projects such as the ultimately ill-fated Shidley Well in Kenya, a little known Joint Task Force, Horn of Africa, undertaking involving military-to-military cooperation between Navy Seabees and the Kenyan army.¹¹⁸ First, clean water alleviates many of the conflict-inducing tensions that water scarcity instigates, and thus aids appreciably in adapting to climate change stresses. Second, clean water projects are well suited to the humanitarian aspects and long-term development orientation of sustainable security. And third, these projects have legal and funding mandates and an organizational mechanism.

The Senator Paul Simon Water for the Poor Act (2005), Public Law 109-121, requires the Department of State, USAID, and other federal agencies, e.g., the Centers for Disease Control, to aid poor countries to achieve clean water and sanitation. Billions have been spent on such projects; 16 Sub-Saharan countries have been identified as high-priority for future funding. AFRICOM is well positioned to play an enabling role for this undertaking, not just in the U.S. interagency process, but through outreach to African militaries and China's People's Liberation Army (PLA). Like AFRICOM, the PLA also has a presence in Sub-Saharan states through its own military-to-military relations.¹¹⁹ The synergism of multilateral collaboration would yield greater benefit for all.

How significant it would be, for Africa and the world, if the United States and China worked cooperatively, between themselves and among African states, to promote peace, sustainable security, and sustainable development. China and the United States, under the auspices of the UN and through the African Union, must provide critical leadership and resources to peoples and states that will likely perish without them.¹²⁰ If China and the United States do so, it will serve more than altruistic motives; it will advance vital interests.

CONCLUSIONS AND RECOMMENDATIONS

From a national security perspective, too much and too little can be made of climate change. Thus far, too little has been made. Conversely, the Obama administration must avoid the pitfall of making too much of climate change, lest its response be perceived as yet another pretext for American hegemony. The security challenge of climate change must be taken up, however, and soon, while options are more numerous, the prospects for success are greater, and the likelihood of major conflict is far less.

Climate change will have dramatic, accelerating, and long lasting consequences with profound security implications. Adapting to and mitigating climate change and its destabilizing effects are vital efforts the United States must undertake earnestly and remain committed to indefinitely. The security implications will be most pronounced in places where the effects of climate change are greatest, particularly weak states already especially vulnerable to environmental destabilization. Two things are paramount: stemming the tide of climate change and promoting stability.

At first blush, adapting to and mitigating climate change does not sound like a military mission. Reluctance on the part of the U.S. armed services to pursue yet another nontraditional mission, perhaps at the further expense of their preeminent warfighting skills, would be understandable. But by law, climate change is now an essential consideration in DoD planning and operations.¹²¹ Planning, of course, cannot succeed in a vacuum of strategic guidance.

The National Security Strategy, the National Defense Strategy, and the Quadrennial Defense Review must address the environmental security considerations of climate change. The current National Security Strategy is outmoded, and the National Defense Strategy is inadequate. Climate change is more than merely cause for uncertainty in the strategic environment. It is, rather, one of the four sides of the environmental security conundrum of the hot, flat, and crowded Energy-Climate Era.

Building on the work of the National Intelligence Council, the Center for Naval Analyses, the American Security Project, the Center for a New American Security, and others,¹²² DoD should champion a necessary and central, but measured and balanced role for American forces. Preparing for and responding to the security challenges of climate change must be part of a whole-of-government approach toward sustainable development and security.

Climate change, as Undersecretary Flournoy described it, is indeed an accelerant of destabilization and conflict, but that is not all. If some or all of the more dire predictions of climate change come true, especially in Sub-Saharan Africa, the impact of climate change will be much more, and much worse. The region and the international state system will suffer.

Addressing environmental security and climate change more concretely and more prominently in the National Security Strategy, National Defense Strategy, and Quadrennial Defense Review is an essential foundation for an effective, U.S.-lead, multifaceted, multilateral approach. Diplomacy and development are not DoD's primary mission, but DoD, not without historical precedent, must widen and strengthen its capabilities in these areas. For this, something more robust and permanent than an interagency working group is required for leadership, planning, and coordination.

The U.S. military is the best vehicle, most notably in areas in which conflict is occurring or where civil government is ineffective or not present, for enabling diplomacy, development, and defense, as part of a preventative, collective security construct. The military's reach, capability, and durability in these circumstances are obvious (but not limitless) advantages.¹²³ So, too, is the military's capacity to connect and coordinate external and internal entities, not merely indigenous and foreign security forces, but also regional and international governing organizations and non-governmental organizations.

Sub-Saharan Africa would be a particularly good place to address the challenges that climate change is causing and will produce. It is also a particularly good place to take advantage of opportunities that environmental engagement offers. Working together with African militaries, AFRICOM and the PLA can enable security and stability projects focused on global warming and other climate change phenomena.¹²⁴ This would not only alleviate human suffering, aid sustainable development, and contribute to good governance, it would at the same time promote regional stability, enhance Sino-American relations, and improve U.S. security. Phase 0 stability operations and theater security cooperation projects are good ways to integrate military capabilities with development assistance.¹²⁵

How such projects would be selected and implemented is a complex strategic question in its own right, one that needs extensive further study. Working with the combatant commands, the U.S. Army War College Strategic Studies Institute; the National Defense University Institute for National Strategy Studies, Energy and Environmental Security Program; and the Center for Naval Analyses, would all be good choices for this effort.¹²⁶

ENDNOTES

1. Carolyn Pumphrey, ed., *Global Climate Change: National Security Implications*, Carlisle Barracks, PA: Strategic Studies Institute, 2008, www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=862, accessed May 6, 2009. This book compiles presentations from a March 2007 colloquium entitled "Global Climate Change: National Security Implications," conducted by the Strategic Studies Institute and the Triangle Institute for Security Studies. The book is a must-read for anyone interested in the security implications of climate change. A consensus of the colloquium is that climate change strategy must have three foci: mitigation of global warming, adaptation to climate change, and stability (social, economic, and political).

2. Man-related might be a more apt descriptor, since methane (CH₄) emissions from cattle and reduction in CO₂ absorption due to deforestation are also significant contributors to the "greenhouse" warming effect.

3. Thomas L. Friedman, *Hot, Flat, and Crowded*, New York: Farrar, Strauss, and Giroux, 2008, pp. 34-35.

4. By one estimate, 25 billion tons of carbon emissions must be cut. Bryan Walsh, "How to Win the War on Global Warming," *Time Magazine Online*, April 16, 2008, www.time.com/specials/2007/printout/0,28804,1730759_1731383_1731363,00.html, accessed November 25, 2008.

5. Use of the term "global" in describing atmospheric warming and climate change may be misleading. The best available information is that effects will vary, perhaps widely, from region to region, with Sub-Saharan Africa often cited as the most affected place. "Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change," Washington, DC: Center for a New American Security, www.cnas.org/node/184, accessed February 19, 2009.

6. Davis Guggenheim, *An Inconvenient Truth*, DVD, Hollywood, CA: Paramount Home Entertainment, 2007; Albert A. Gore, Jr., *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It*, Emmaus, PA: Rodale Press, 2006.

7. According to an op-ed piece in *The Washington Post* authored by the film's producer, 50,000 free copies of *An Inconvenient Truth* were offered to the National Science Teachers Association (NSTA), which reputedly declined to take them, a position NSTA vigorously disputed. *National Science Teachers Association Home Page*, www.nsta.org/about/pressroom.aspx?id=52977, accessed February 23, 2009.

8. The science of global warming and climate change is still hotly debated and deeply politicized. Compare Roy W. Spencer, *Climate Confusion*, New York: Encounter Books, 2008, which, like *An Inconvenient Truth*, made the *New York Times Best Seller* list. Mr. Spencer, now with the University of Alabama, Huntsville, was formerly a climate scientist with NASA. Note, however, that Encounter Books is a venture of Encounter for Education and Culture, Inc., which received more than \$8 million in grants from The Lynde and Harry Bradley Foundation, Inc., "the country's largest and most influential right-wing foundation," according to the website Media Transparency. *Media Transparency Home Page*, www.mediatransparency.org/funderprofile.php?funderID=1, accessed February 22, 2009. From a legalistic perspective, man-made global warming and resulting climate change have gained general acceptance in the scientific community. American courts have already found a connection between greenhouse gases and climate change, ruling that greenhouse gas emissions can be regulated by U.S. Environmental Protection Agency (EPA), and that federal agencies must consider climate change in their environmental impact analyses. *Massachusetts v. EPA*, 549 U.S. 497, 127 S.Ct. 1438, 2007; *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 9th Cir. 2008.

9. Rajendra K. Pachauri *et al.*, eds., *Climate Change 2007: Synthesis Report, Summary for Policy Makers*, Geneva, Switzerland: Intergovernmental Panel on Climate Change, 2007, pp. 2, 13. The Intergovernmental Panel on Climate Change (IPCC) and its scientific studies is an outgrowth of the 1992 United Nations Framework Convention on Climate Change, a treaty to reduce global warming, to which 192 countries, including the United States, are parties. The treaty's 1997 Kyoto Protocol, which commits countries to greenhouse gas reductions the treaty merely encouraged, entered into force in 2005; the United States, however, is not one of its 184 parties. The Kyoto Protocol expires in 2012, and negotiations are already underway on a replacement, the subject of the U.N. Climate Change Conference to take place in Copenhagen, Denmark in December 2009, where all eyes will surely be on the United States.

10. *Ibid.*, p. 13. The Bush administration endorsed the IPCC's findings. George E. Pataki and Thomas J. Vilsack, chairs, *Confronting Climate Change: A Strategy for U.S. Foreign Policy*, New York: Council on Foreign Relations, 2008, p. 29, Independent Task Force Report No. 61.

11. Pachauri, *Climate Change 2007*, pp. 3-7.

12. A newly-released NOAA climate study, also published in the Proceedings of the National Academy of Sciences, concludes that climate change will continue even 1,000 years after CO₂ emissions are completely stopped. National Oceanic and Atmospheric Administration, "New Study Shows Climate Change Largely Irreversible," www.noaanews.noaa.gov/stories2009/20090126_climate.html, accessed January 26, 2009.

13. Katie Howell, "Eroding Alaskan Coastline Threatens Wildlife Habitat, Cultural Resources, Oil and Gas Development," *Environment and Energy Daily Online*, February 26, 2009, www.eenews.net/ll, accessed March 2, 2009.

14. Global warming related climate change is not the only environmental condition of concern. Inextricably linked are interrelated environmental impacts (degradation) associated with population growth, natural resource depletion, anthropogenic pollution, and pandemic disease, among other phenomena, all of which pose significant environmental security risks in their own right. While each and all of these are important, global warming related climate change appears to be the most threatening, by far. That said, the response to climate change should not proceed in isolation. Environmental remediation and environmental security do not tolerate piecemeal solutions.

15. Jerome C. Glenn and Theodore J. Gordon, *2007 State of the Future*, Washington, DC: World Federation of the United Nations Associations and American Council for the United Nations University, 2007, p. 2.

16. Henrik Urdal, "Demographic Aspects of Climate Change, Environmental Degradation and Armed Conflict," January 16, 2008, www.un.org/esa/population/meetings/EGM_PopDist/P18_Urdal.pdf, accessed November 19, 2008.

17. Friedman, *Hot, Flat, and Crowded*, p. 26.

18. *Ibid.*, p. 44.

19. See, for example, Joe D. Manous, Jr., *Environmental Security: A Strategy for the Mitigation of Regional Instabilities?* Strategy Research Project, Carlisle Barracks, PA: U.S. Army War College, April 7, 2003; and Norman Myers "Environmental Security: What's New and Different?," www.envirosecurity.org/conference/working/newanddifferent.pdf, accessed May 3, 2009.

20. Manous, *Environmental Security*, p. 2.

21. *Ibid.*, p. 18. U.S. Southern Command, for example, hosted a two-day environmental security conference in September 2007. Participants included representatives of the Argentinean, Brazilian, Chilean, and Dominican militaries, along with representatives of EPA, USAID, and the U.S. Geological Survey, as well as Florida International University, the University of Miami, the American Council on Renewable Energy, and Science Applications International Corporation. *The U.S. Southern Command Home Page*, www.southcom.mil/AppsSC/files/0U101190120383.pdf, accessed May 22, 2009.

22. Environmental security (or climate security) is on the United Nations Security Council agenda, too. Glenn and Gordon, *2007 State of the Future*, p. 8.

23. Andrew J. Bacevich, *The Limits of Power*, New York: Metropolitan Books, 2008, p. 178.

24. "Unchecked climate change is poised to have wide-ranging and potentially disastrous effects over time on human welfare, sensitive ecosystems, and international security." Pataki, *Confronting Climate Change*, p. 3.

25. Sub-Saharan African, of which the long-suffering Darfur region of Sudan already is an example, is a place where conflict is and will be fueled appreciably by environmentally unsustainable conditions. It is possible, and may be likely, that worsening conditions in and around Sudan will further destabilize its already marginal state structure, with ever greater adverse effect on U.S. interests and security. Worsening environmental conditions should not be considered to be the only source of conflict, however. Some suspect that the well-publicized undersea land-grab now occurring in the Arctic, spurred by the prospect of year-round surface navigation, could lead to conflict. On the subject of its Arctic territorial rights Russia has sounded pugnacious, if not belligerent, and even Canada has been aggressive in asserting its interests.

26. Bacevich, *The Limits of Power*, p. 180.

27. Center for Naval Analyses, *National Security and the Threat of Climate Change*, Alexandria, VA: The CNA Corporation, 2007, pp. 6-7.

28. *Ibid.*

29. *Ibid.*, pp. 13-16.

30. Center for Strategic and International Studies and Center for a New American Security, "The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change," November 2007, www.cnas.org/node/126, accessed February 19, 2009.

31. Environmental problems do not themselves cause wars, but do exacerbate other problems and conflicts that can lead to war. Ken Conca and Geoffrey Dabelko, eds., *Environmental Peacemaking*, Washington, DC: Woodrow Wilson Center Press, and Baltimore, MD, and London, United Kingdom: The Johns Hopkins University Press, 2002, p. 5. An interesting treatment of the environmental aspects of armed conflict is contained in a World Future Society Global Strategies Forum entitled "Environmental Degradation as Both Consequence and Cause of Armed Conflict," www.wfs.org/fox.htm, accessed February 19, 2009. Forum participants include Arthur Westing, Michael Renner, and Warwick Fox.

32. National Intelligence Council, "Global Trends 2025: A Transformed World," November 2008, www.dni.gov/nic/NIC_2025_project.html, accessed April 19, 2009, 66-68, NIC 2008-003.

With water becoming more scarce in several regions, cooperation over changing water resources is likely to be increasingly difficult within and between states, straining regional relations. Such regions include the Himalayan region, which feeds the major rivers of China, Pakistan, India, and Bangladesh; Israel/Palestinian Territories; along the Jordan River, Israel/Jordan) and the Fergana Valley of Central Asia. Such dire scenarios are not inevitable even with worse-than-anticipated climate change impacts, however. Economic development, the spread of new technologies, and robust new mechanisms for multilateral cooperation to deal with climate change may foster greater global collaboration.

The Council identifies "(h)ow quickly climate change occurs and the locations where its impact is most pronounced" and the fact that "(c)limate change . . . [will] likely . . . exacerbate resource scarcities, particularly water" as key uncertainties in 2025. The Council, like many others, predicts a global multi-polar system, with China "poised to have more impact on the world over the next 20 years than any other country." *Ibid.*, p. vi. Also, "Sub-Saharan Africa will remain the region most vulnerable to economic disruption, population stresses, civil conflict, and political instability. Despite increased global demand for commodities for which Sub-Saharan Africa will be a major supplier, local populations are unlikely to experience significant economic gain." *Ibid.*, p. vii. On climate change:

Climate change is expected to exacerbate resource scarcities. Although the impact of climate change will vary by region, a number of regions will begin to suffer harmful effects, particularly water scarcity and loss of agricultural production. Regional differences in agricultural production are likely to become more pronounced over time with declines disproportionately concentrated in developing countries, particularly those in Sub-Saharan Africa. Agricultural losses are expected to mount with substantial impacts forecast by most economists by late this century. For many developing countries, decreased agricultural output will be devastating because agriculture accounts for a large share of their economies and many of their citizens live close to subsistence levels.

Ibid., p. viii.

33. Headquarters, Department of the Army, Field Manual 3-0, *Operations*, Washington, DC: U.S. Government Printing Office, February 2008, pp. 1-3.

34. "New US Military Report on Global Warming Raises Worry," *The Boston Globe*, December, 6, 2008, www.cnas.org/node/604, accessed February 19, 2009.

35. Glenn and Gordon, *2007 State of the Future*, p. 8.

36. Ban Ki-moon, "The Right War," *Time Magazine Online*, April 16, 2008, www.time.com/time/specials/2007/printout/0,29239,1730759_1731383_1731345,00.html, accessed November 25, 2008.

37. Pachauri, *Climate Change 2007*, p. 14.

38. "War Game: Clout and Climate Change," Washington, DC: Center for a New American Security, www.cnas.org/node/149, accessed February 19, 2009.

39. Stew Magnuson, "Climate Change Fears Spill Over to the Defense Community," *National Defense Magazine*, August 1, 2008, www.cnas.org/node/312, accessed February 19, 2009.

40. An inaugural meeting was held August 7, 2008, attended by representatives of DOD, the Joint Staff, USAID, the Central Intelligence Agency, the Defense Intelligence Agency, the U.S. Forest Service, the U.S. Geological Survey, and others. The focus of the meeting was the link between environmental security and foreign policy, and how to improve interagency and multilateral coordination. Interest appears to exist at high levels as to how environmental security could be used to promote strategic foreign policy objectives. This monograph is geared toward that end. Doug B. Campbell, e-mail message to Major General Robert M. Williams, U.S. Army, August, 8, 2008. For additional background, see www.state.gov/g/oes/climate/index.htm, accessed January 25, 2009.

41. Henrietta H. Fore, "Aligning 'Soft' and 'Hard' Power," *Parameters*, Vol. 38, No. 2, Summer 2008, pp. 14-24.

42. Kelly Hearn, "Washington Times Exclusive: U.S. Military Worries about Climate Change," *Washington Times*, November 13, 2008, www.cnas.org/node/535, accessed February 19, 2009. Even before climate change came to the fore, environmental issues were deemed worthy of incorporation into the National Security Strategy. Elizabeth M. Damonte, *National Security Strategy: What about the Environment?* Strategy Research Project, Carlisle Barracks, PA: U.S. Army War College, March 15, 2006.

43. The June 2008 National Defense Strategy, describing the Strategic Environment, states: "Over the next twenty years physical pressures – population, resource, energy, climatic and environmental – could combine with rapid social, cultural, technological and geopolitical change to create greater uncertainty" and "Current defense policy must account for these areas of uncertainty. As we plan, we must take account of the implications of demographic trends, particularly population growth in much of the developing world and the population deficit in much of the developed world. The interaction of these changes with existing and future resource, environmental, and climate pressures may generate new security challenges. Furthermore, as the relative balance of economic and military power between states shifts, some propelled forward by economic development and resource endowment, others held back by physical pressures or economic and political stagnation, new fears and insecurities will arise, presenting new risks for the international community." Robert M. Gates, *National Defense Strategy June 2008*, Washington, DC: U.S. Department of Defense, 2008, pp. 4-5, www.defenselink.mil/news/2008%20national%20defense%20strategy.pdf, accessed February 19, 2009.

44. The 2006 National Security Strategy cites "(e)nvironmental destruction . . . caused by human behavior" as a destabilizing threat to national security, but does not mention climate change. George W. Bush, *The National Security Strategy-March 2006*, Washington, DC: The White House, March 2006, p. 47, www.globalsecurity.org/military/library/policy/national/nss-060316.htm, accessed February 19, 2009.

45. Excerpts from the inaugural address: "(N)ew threats . . . demand even greater . . . cooperation and understanding between nations;" and "(W)e will work tirelessly to . . . role back the specter of a warming planet." Transcript, "Barack Obama's Inaugural Address," January 20, 2009, www.nytimes.com/2009/01/20/us/politics/20text-obama.html, accessed May 3, 2009. Bryan Walsh, "Despite the Economy, Obama Vows to Press Green Agenda," *Time Magazine Online*, November 19, 2008, www.time.com/time/printout/0,8116,1860431,00.html, accessed November 25, 2008.

46. The White House, "Energy and Environment," www.whitehouse.gov/agenda/energy_and_environment, accessed January 21, 2009; The White House, "Defense," www.whitehouse.gov/agenda/defense, accessed January 21, 2009.

47. Mark Landler, "Clinton Paints China Policy With a Green Hue," *The New York Times Online*, February 22, 2009, www.nytimes.com/2009/02/22/world/asia/22diplo.html, accessed February 22, 2009.

48. Editorial, "Ms. Jackson Makes a Change," *The New York Times Online*, February 23, 2009, www.nytimes.com/2009/02/23/opinion/23mon3.html, accessed February 23, 2009.

49. InsideEPA, "Intelligence Chief Revives Environmental Security as High Priority," *Defense Environment Alert*, Vol. 14, No. 4, February 17, 2009. Dennis C. Blair, "Annual Threat Assessment of the Intelligence Community for the Senate Select Committee on Intelligence," February 12, 2009, intelligence.senate.gov/090212/blair.pdf, accessed February 19, 2009. Director Blair cites the 2007 IPCC report.

50. For example, climate change was mentioned, but only in two words, in an April 14, 2008, speech to the Association of American Universities. Speech of Defense Secretary Robert M. Gates, April 14, 2008, www.defenselink.mil/speeches/speech.aspx?speechid=1228, accessed November 25, 2008.

51. Michèle Flournoy, "Rebalancing the Force: Major Issues for QDR 2010," April 29, 2009, www.csis.org/media/csis/events/090501_flournoy.pdf, accessed May 3, 2009.

52. Geoffrey Dabelko, "Climate Change and National Security," April 29, 2009, ftp.jhuapl.edu/nsadrethink/042909/Dabelkobrief.pdf, accessed May 7, 2009.

53. *Ibid.*

54. *Ibid.*; H. Allen Irish, "A 'Peace Corps with Guns': Can the Military be a Tool of Development?" in Joseph R. Cerami and Jay W. Boggs, ed., *The Interagency and Counterinsurgency Warfare: Aligning and Integrating Military and Civilian Roles in Stability, Security, Transition, and Reconstruction Operations*, Carlisle Barracks, PA: U.S. Army War College Strategic Studies Institute, 2008, www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=828, accessed May 3, 2009.

55. American Security Project, "A New American Arsenal," May 1, 2008, americansecurityproject.org/issues/reports/new_american_arsenal, accessed April 30, 2009, p. 4.

56. InsideEPA, "High-Level Coalition Stresses Climate, Energy as Major Security Issues," *Defense Environment Alert*, Vol. 16, No. 10, May 13, 2008.

57. American Security Project, "A New American Arsenal," p. 11.

58. *Ibid.*, pp. 14-15. Note the similarities to sustainable security.

59. Bryan Walsh, "Does Global Warming Compromise National Security," *Time Magazine Online*, April 16, 2008, www.time.com/time/specials/2007/article/0,28804,1730759_1731383_1731632,00.html, accessed November 25, 2008.

60. Conca and Dabelko, *Environmental Peacemaking*, p. 2.

61. Fareed Zakaria, *The Post-American World*, New York: W. W. Norton & Co., 2008, p. 43.

62. Zakaria, *The Post-American World*, p. 45.

63. In what he described as a “Third Turning,” Shawn Brimley, a Fellow at the Center for a New American Security, forecasts that the international system will be “almost unrecognizable by 2025.” Also,

Along with the rise of new great powers such as China and India, the future is likely to see increased conflict driven by climate change, resource scarcity, and continued proliferation of nuclear technology. This geopolitical turn is not complete nor is it fully understood, but that it has begun is undeniable. The core undertaking for the Obama Administration will be to address the challenges of today while preparing the United States to adapt to a world in which power is more diffuse and the sources of danger more distributed.

Shawn Brimley, “Crafting Strategy in an Age of Transition,” *Parameters*, Vol. 38, No. 4, Winter 2009-09, p. 31.

64. Colin S. Gray, *After Iraq: The Search for a Sustainable National Security Strategy*, Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 2009, pp. 14-16, www.strategicstudiesinstitute.army.mil, accessed March 17, 2009. Dr. Gray, who sees climate change as a “leading threat” argues that the United States should maintain hegemony. *Ibid.*, pp. 16, 59-60.

65. Zakaria, *The Post-American World*, pp. 93, 115.

66. Brimley, “Crafting Strategy,” p. 35.

67. China, Defense Secretary Gates said to a National Defense University audience in September 2008, is a competitor, not an enemy. Speech of Defense Secretary Robert M. Gates, September 29, 2008, www.defenselink.mil/transcripts/transcript.aspx?transcriptid=4295, accessed November 25, 2008. Care must be taken not to adopt policies or strategies that will turn China from the former to the latter.

68. Environmental cooperation is “an effective general catalyst for reducing tensions, broadening cooperation, fostering demilitarization, and promoting peace.” Conca and Dabelko, *Environmental Peacemaking*, p. 9.

69. Pataki, *Confronting Climate Change*, pp. 42, 54. Highlighted by air pollution concerns at last summer’s Olympic games in Beijing, China’s many environmental problems have been widely reported, not the least of which is its own growing problem of desertification. Many sources document the causes, consequences, and China’s responses.

70. A February 6, 2009, panel discussion report on China’s sixth defense white paper, released January 20, 2009, observes that China sees itself as a key player in an interdependent world of growing multipolarity, asserting that it will be an active and constructive participant. Center for Naval Analyses and National Defense University Institute for National Strategic Studies, “China’s National Defense in 2008 Panel Discussion Report,” February 6, 2009, www.cna.org/documents/PRC%20White%20Paper%20Report.pdf, accessed May 3, 2009.

71. National Intelligence Council, “Global Trends 2025,” p. xi.

72. Pataki, *Confronting Climate Change*, p. 42.

73. Gray, *After Iraq*, p. 66.

74. Pataki, *Confronting Climate Change*, p. 22.

75. Zakaria, *The Post-American World*, p. 31.

76. Pachauri, *Climate Change 2007*, pp. 14, 18-19.

77. Blair, "Annual Threat Assessment," p. 43. The financial burden the developed world must bear has been contentious throughout the life of the Kyoto Protocol. It will assuredly be front-and-center during negotiations in Copenhagen this December.

78. Pataki, *Confronting Climate Change*, p. 7.

79. Executive Order 13423, entitled "Strengthening Federal Environmental, Energy, and Transportation Management," requires all federal agencies to be leaders in energy efficiency and other measures the effect of which would be to reduce greenhouse gas emissions and otherwise lessen global warming. George W. Bush, *Executive Order 13423*, Washington, DC: The White House, 2007, edocket.access.gpo.gov/2007/pdf/07-374.pdf, accessed February 19, 2009. The operational impact of making DOD a leader in climate change must be carefully considered. The second- and third-order effects of resource constraints and legal restraints should not be ignored.

80. 10 U.S. Code §§ 139b, 2901, 2914, 2916, 2917, 2918, 2922, 2922b, 2922c, 2922d, 2922e, 2922f.

81. Bryan Walsh, "Does Global Warming Compromise National Security?," *Time Magazine Online*, April 16, 2008, www.time.com/time/specials/2007/article/0,28804,1730759_1731383_1731632,00.html, accessed February 19, 2009.

82. *Ibid.*; Pataki, *Confronting Climate Change*, p. 37.

83. Gayle E. Smith, "In Search of Sustainable Security: Linking National Security, Human Security, and Collective Security to Protect America and Our World," June 19, 2008, www.americanprogress.org/issues/2008/06/sustainablesecurity.html, accessed February 19, 2009.

84. Note that AFRICOM's mission is to strengthen stability and security in Africa, and also to professionalize African militaries. It is geared toward nonkinetic, preventative approaches. In other words, it is tailor-made for whole-of-government type sustainable security. According to its website, AFRICOM's mission is to conduct, in concert with other U.S. government agencies and international partners, sustained security engagement through military-to-military programs, military-sponsored activities, and military operations designed to promote stability and security. *U.S. Africa Command Home Page*, www.africom.mil/AboutAFRICOM.asp, accessed May 3, 2009.

85. Environmental security, climate security, and environmental peacemaking, as the concept has variously been called, is "post-Westphalian," focusing on transnational linkages related to "ecosystemic interdependencies." Conca and Dabelko, *Environmental Peacemaking*, p. 10.

86. A recently seen bumper sticker: "We're making enemies faster than we can kill them."

87. Irish, "A 'Peace Corps with Guns'," pp. 56-58. Undersecretary Flournoy's April 29, 2009, remarks underscore the point: "(M)ilitary power is necessary but not sufficient to deal with 21st century challenges." The six core principles for U.S. strategy she enunciated are: pragmatism, engagement, selectivity, example, alliance, and integration, whole-of-government. Flournoy, "Rebalancing the Force."

88. Irish, "A 'Peace Corps with Guns'," pp. 67-70.

89. Reuben E. Brigety, II, "Aid for the Future," July 31, 2008, www.americanprogressaction.org/issues/2008/brigety_testimony.html, accessed April 27, 2009.

90. Smith, "In Search of Sustainable Security," pp. 3-5.

91. Gayle E. Smith, David Sullivan, and Andre Sweet, "The Price of Prevention: Getting Ahead of Global Crises," November 2008, www.americanprogress.org/issues/2008/11/price_of_prevention.html, accessed February 19, 2009. This article makes seven recommendations: (1) fully integrate prevention into the national strategies that guide foreign policy formulation and implementation; (2) build an integrated, interagency mechanism for long-range strategic planning that is tied directly to the allocation of resources; (3) organize the government to support prevention and ensure coherence across the executive branch; (4) invest intelligence, diplomatic, and economic resources in the most vulnerable areas and regions; (5) re-engage with the international community, and improve and then support international treaties and norms; (6) develop new tools and capabilities for crisis management; and (7) address the resource and staff shortages of civilian agencies, particularly the State Department and the United States Agency for International Development. These overlap, somewhat, and otherwise harmonize nicely with the Center for Naval Analyses' five recommendations.

92. Smith, "In Search of Sustainable Security," p. 12.

93. *Ibid.*, pp. 20-21.

94. Brigety, "Aid for the Future."

95. *Ibid.* It is also useful at such times that the U.S. military can keep "an ear to the ground" from an intelligence gathering and situational awareness point of view. Ruben E. Brigety II, "Humanity as a Weapon of War: Sustainable Security and the Role of the U.S. Military," June 2008, www.americanprogress.org/issues/2008/06/pdf/sustainable_security2.pdf, accessed April 27, 2009.

96. Brimley, "Crafting Strategy," p. 36. "(R)obust development, economic, and military assistance missions will be a critical element of a grand strategy designed to sustain the twenty-first century international system."

97. Regional approaches are best, in that they are more tangible than global approaches and more efficacious than local approaches. Conca and Dabelko, *Environmental Peacemaking*, pp. 13-16.

98. Irish, "A 'Peace Corps with Guns'," pp. 73-74.

99. Africa, according to the 2009 National Threat Assessment is "falling further behind," thanks to seemingly intractable conflict. Blair, "Annual Threat Assessment," pp. 34-35.

100. The United States has already undertaken a number of regional and bilateral climate change initiatives, including a greenhouse gas reduction project with South Africa. *The Department of State Home Page*, www.state.gov/g/oes/climate/c22820.htm, accessed January 25, 2009.

101. An excellent treatment of China's involvement in Africa is contained in an April 2008 report to the Senate Foreign Relations Committee entitled "China's Foreign Policy and 'Soft Power' in South America, Asia, and Africa," prepared by the Congressional Research Service. The report contends that U.S. soft power in Africa must increase in response to China's many soft power initiatives, by which China is pointedly positioning itself as an alternative to Western/American dominance. Congressional Research Service, "China's Foreign Policy and 'Soft Power' in South America, Asia, and Africa," April 2008, [www/gpoaccess.gov/congress/index.html](http://gpoaccess.gov/congress/index.html), accessed February 19, 2009.

102. Two noted environmental security experts, Dr. Kent Butts, director of the National Security Issues Branch in the U.S. Army War College Center for Strategic Leadership, and Mr. Geoff Dabelko, director of the Woodrow Wilson Center Environmental Security Program, urged Sino-American military-to-military environmental collaboration in an April 21, 2009, opinion piece on *CSMonitor.com*. Noting that the Chinese People's Liberation Army has been engaged on climate change adaptation since the 1990s, Butts and Dabelko see eagerness in both countries to broaden their cooperation on environmental security issues.

Kent H. Butts and Geoffrey D. Dabelko, "One Way to Boost US-China Military Cooperation," April 21, 2009, www.csmonitor.com/2009/0421/p09s01-coop.html, accessed May 7, 2009.

103. Donovan C. Chau, *Political Warfare in Sub-Saharan Africa: U.S Capabilities and Chinese Operations in Ethiopia, Kenya, Nigeria, and South Africa*, Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 2007, p. 50, www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=766, accessed February 19, 2009.

104. Smith, "In Search of Sustainable Security," p. 1.

105. Zakaria, *The Post-American World*, 116; Blair, "Annual Threat Assessment," pp. 34-35.

106. Countries like Ethiopia, Kenya, Nigeria, and South Africa and the African Union. Chau, *Political Warfare in Sub-Saharan Africa*, pp. vi-vii.

107. Zakaria, *The Post-American World*, p. 118.

108. *Ibid.*

109. According to Dr. Donovan Chau, China has been waging "political warfare" against U.S. interests in Africa since the 1950s. He argues that DOD, USAID, and other U.S. agencies should also wage political warfare in Africa. Chau, *Political Warfare in Sub-Saharan Africa*, p. 18 *et seq.* Military-to-military and other climate change related activity in Africa, especially if conducted in concert with China, would serve U.S. interests while countering China's.

110. Carlton W. Fulford, Jr., "Thinking Through U.S. Strategic Options for Africa," *Naval War College Review*, Vol. 62, No. 1, Winter 2009, p. 41.

111. *Ibid.*, pp. 31-43.

112. *Ibid.*, p. 37.

113. Center for Naval Analyses, *National Security*, pp. 20-23.

114. Pachauri, *Climate Change 2007*, p. 11.

115. Center for Naval Analyses, *National Security*, p. 21.

116. *Ibid.*, p. 22.

117. A variety of environmental roles and missions have been envisioned for military forces for some time. Roberta B. Carr, *The Greening of Global Security: The U.S. Military and International Environmental Security*, Master's Thesis, Monterey, CA: Naval Postgraduate School, December 1993.

118. Brigety, "Humanity as a Weapon of War," pp. 1-2. Despite great expense, no producing well was established. A variety of benefits was nonetheless realized.

119. Chau, *Political Warfare in Sub-Saharan Africa*, pp. 25-26.

120. "Military-to-military environmental partnerships between the United States and countries in southern Africa are a domain pregnant with possibilities." Dan Henk, "The Environment, the US Military, and Southern Africa," *Parameters*, Vol. 36, No. 2, Summer 2006, p. 111. "The environment seemed to be one area in which the US military could collaborate effectively with regional militaries in spite of the vagaries of other political relations." *Ibid.*, p. 112.

121. The Fiscal Year 2008 National Defense Authorization Act, Public Law 110-181, section 951, amends

10 U.S. Code § 118 to require that the next national security strategy and national defense strategy include guidance for military planners on the risks of climate change, and that the next quadrennial defense review examine capabilities the armed forces will need to respond to climate change.

122. The list is illustrative, not inclusive, and is presented in no particular order.

123. Long duration stability and security operations place heavy sustainment burdens on armed forces which must be carefully considered. Thom Shanker, "Pentagon Rethinking Old Doctrine on 2 Wars," *The New York Times Online*, March 15, 2009, www.nytimes.com/2009/02/15/washington/a5military.html, accessed March 15, 2009.

124. Outside limited participation by the People's Liberation Army-Navy in the anti-piracy task force in the Northern Arabian Sea, China has little history of operating with Western forces, which suggests that China may be reluctant to engage robustly, if at all, in climate change related security and stability projects. On the other hand, these types of projects may prove to be attractive to China, for economic, environmental, and security reasons, if they enhance China's position on the continent and internationally.

125. Irish, "A 'Peace Corps with Guns'," pp. 71-72.

126. The list is illustrative, not inclusive, and is presented in no particular order.