POLICY BRIEFS

The United Nations and Environmental Security: Recommendations for the Secretary-General's High-Level Panel on Threats, Challenges, and Change

Calling this post-Iraq moment "no less decisive than 1945 itself," in 2003 UN Secretary-General Kofi Annan convened a High-Level Panel on Threats, Challenges, and Change to improve how the United Nations prevents and removes threats to peace. Eminent world citizens like Brent Scowcroft, Gro Harlem Brundtland, Sadako Ogata, and Nafis Sadik were asked to recommend clear and practical measures for ensuring effective collective responses to the world's security problems, ranging from terrorism and weapons of mass destruction to "soft threats" like extreme poverty and disease.

Environmental issues are firmly on the UN agenda, but they tend to remain discrete topics that lack sufficient coordination across agencies. The secretary-general has repeatedly maintained that environmental issues must be integrated into the UN's larger development and security agenda, as outlined in his 2003 interim report on the prevention of armed conflict. In preparation for its December 2004 report, the High-Level Panel sought recommendations that, if adopted, would inject environmental issues into the security dialogue and transform speech into results.

As part of the UN Foundation's United Nations and Global Security Initiative, the Environmental Change and Security Project (ECSP) invited international experts to provide the panel with fresh intellectual insights into environmental security. Leading thinkers in the fields of water, climate change, and natural resources prepared three short policy briefs (included here with permission of the UN Foundation) that seek to answer three questions posed by the panel:

- What is the link between environment and security?
- What can be done about it?
- What contributions can be made by collective action mechanisms such as the United Nations?

A select group of scholars, policymakers, and practitioners discussed these papers at the Woodrow Wilson Center on June 2, 2004. A report summarizing the group's recommendations to the High-Level Panel can be downloaded from ECSP (http://www.wilson center.org/ecsp). For more information on the UN Foundation's United Nations and Global Security Initiative and a complete listing of input papers to the High-Level Panel, please visit http://www.un-globalsecurity.org.

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U.N. flag (Credit: Corbis)

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Linkages Between Environment, Population, and Development

MICHAEL RENNER and **HILARY FRENCH**

What Is the Problem?

Environmental problems—the overuse of natural resources and the degradation of ecosystems—are increasingly understood to play an important role in increasing human vulnerability, undermining livelihoods and human well-being, creating instability, and potentially generating or exacerbating violent conflict. The depletion of water resources, overfishing, degradation of arable land, decimation of forests, and alteration of natural cycles and ecosystems are among the principal concerns. Climate change is likely to augment these challenges. Different environmental problems can be traced to various roots, but common underlying causes typically include overconsumption in the world's richer nations and communities, demographic pressures in poorer societies, and distributive inequities in both the global North and South.

Although environmental change threatens all of humanity, people living in the developing world are often the most vulnerable to its effects, as large portions of these populations are directly dependent on activities such as agriculture, forestry, and fishing for their well-being and survival. These activities depend on healthy ecological systems, and there are few buffers to protect the poor from the repercussions of environmental decline.

In at least some cases, environmental change can be a factor in generating or exacerbating violent conflicts. But scholarly research shows that environmental change is never a single cause of conflict. Environmental issues are part of a complex mix of factors and pressures that vary in composition and dynamics from country to country. Persistent poverty, growing income inequality, population growth, job shortages, and disease burdens are key additional concerns. This potent combination is placing severe stress on the social fabric of many communities, leading to political strife in a number of countries, and even to devastating violence in some.

Environmental challenges do not respect human-drawn boundaries, and indeed some—air pollution, climate change-related repercussions, and water scarcity among them—are international or even global in nature. Many analysts have cited rising water demand and conflicting claims to this increasingly scarce resource as a possible cause of future interstate armed conflicts over shared rivers. But it is by no means a foregone conclusion that violence,

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rather than negotiated solutions (e.g., working out water-sharing agreements and joint watershed management), will result. On the whole, environmentally induced conflict is more likely to occur within, rather than between, countries. Growing water scarcity, for instance, has caused internal disputes and, in a few cases, even violent confrontations in several countries, including China, India, the Central Asian states, Mexico, the United States, and Spain.

There are a number of pathways through which environmental degradation can translate into greater vulnerability, instability, and conflict:

Security Conflicts: Scarcity-related disputes may arise over access to renewable natural resources such as water, arable land, forests, and fisheries. This may be the result of tight supplies (depletion or degradation of natural resources), an unsustainable increase in demand owing to population pressures or increased per capita consumption, distributive inequities, or a combination of these factors. Disputes may arise among different communities and regions, and among contending groups that depend directly, though in different ways, on the health and productivity of the natural resource base. Farmers, nomadic pastoralists, ranchers, and resource extractors may find themselves in competition with one another, as happened in a number of recent cases, including conflicts in Rwanda, Sudan, the Chiapas state of Mexico, and elsewhere.

Different social groups and communities experience the effects of environmental degradation unevenly. These divergences can reinforce social and economic inequities or deepen ethnic fault lines, thereby exacerbating existing polarization. It is not a given that the repercussions of environmental degradation will lead to armed conflict. But they do sharpen hardships and burdens, heighten the desperation of those affected, and reinforce the perception that many disputes are of a "zero-sum" nature.

Resource Wealth Conflicts: At the other end of the spectrum from environmental scarcity, resource wealth is also a potential source of conflict. Control over petroleum deposits has

been a factor in the sequence of wars that have afflicted Iraq and its neighbors since the late 1970s. Access to oil will likely continue to be a contentious issue as industrialized and industrializing nations grow increasingly dependent on imports. Oil, along with other commodities such as timber, diamonds, and various metals and minerals, has fueled armed conflict in Colombia, Angola, Sierra Leone, Sudan, the Democratic Republic of the Congo, and Burma, by providing governments, rebels, and warlords with the funds necessary to buy arms and maintain fighting forces.

Natural resources play a role in violence in other ways as well. Large-scale mining and logging projects are often characterized by a highly unequal distribution of benefits and burdens. Typically, a small group of domestic elite and foreign investors capture the bulk of the revenues, whereas local communities (often indigenous groups) bear the potential burdens, including expropriation of land, disruption of traditional ways of life, destruction of arable land, forest clear cutting, and disruption of fishing and hunting grounds. Typically, local communities are neither consulted during the planning of such projects nor compensated for their losses, and their grievances often go unheard. Frustration over this situation has led to a number of skirmishes in recent years, such as those in Nigeria and Indonesia.

Food Insecurity: A substantial portion of the world's farmland, estimated at 10 percent to 20 percent worldwide, is degraded to varying degrees. In developing countries, cropland degradation has accelerated in the past 50 years and now affects about one-quarter of total arable land. In many areas of the world, groundwater is pumped at unsustainable rates and groundwater quality is deteriorating. Portions of sub-Saharan Africa, Asia, and the Middle East are already suffering from water scarcity. Climate change is expected to intensify these problems by shifting vegetation zones and increasing the frequency and intensity of droughts.

These pressures translate into reduced agricultural productivity and greater food insecurity, and thus to increased malnutrition in the

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poorest countries. These effects are particularly pronounced where population growth is strong and land distribution is highly unequal. In such situations, small-scale and landless farmers are often compelled to cultivate steep slopes, areas cleared from rainforest, or other unsuitable patches of land. The soil productivity of these areas tends to be exhausted relatively swiftly, forcing people to seek opportunity elsewhere, sometimes in distant cities or even in other countries.

Disease: Illness and death from disease can in some cases be sufficiently severe to undermine economies and threaten social stability. Environmental factors play an important role in the transmission of and human susceptibility to a range of lethal diseases. It is estimated that more than three million people currently die each year from water-borne diseases. Societies across the planet are confronting a resurgence of infectious diseases. Exposure to previously unknown diseases is growing as human encroachment on tropical forests brings people closer to disease vectors. Logging, road building, dam construction, and climate change also enable known diseases to spread to previously unaffected areas. The building of large-scale dams encourages the spread of schistosomiasis. Warmer temperatures and increased precipitation related to climate change facilitate the bac-

teria that cause diarrheal diseases and are helping to extend the geographic reach of mosquitoes that transmit malaria and dengue fever.

Environmental factors are not at work alone. The spread of pathogens is also facilitated by growing international travel and trade, migrant populations, and the social upheaval inherent in refugee movements. And drug-resistant strains of certain diseases are developing in part because of the overuse of antibiotics in human medicine and animal husbandry. In many developing countries, infectious diseases such as malaria, tuberculosis, and HIV/AIDS, along with respiratory diseases, are overburdening fragile health systems and weakening families and communities.

Disasters, Inhabitability, and "Environmental Refugees": Population movements—induced in part by environmental change—can contribute to instability and conflict. The influx of people into another region or state often imposes a considerable burden on the receiving area through increased pressures on land, water, jobs, communal facilities, and social services. This is especially true if the influx is sudden and massive, and if political leaders or challengers are eager to capitalize on the situation by stirring up xenophobic resentments.

The decay of ecosystems has set the stage for more frequent and more devastating "unnatural" disasters: natural disturbances made worse by human actions. The poor, especially, have inadequate protection against extreme weather events. The past 50 years have seen a dramatic increase in major disasters. More than two billion people worldwide were affected in the 1990s, and the economic toll during that decade was more than that of the previous four decades combined. The experiences of the last few years suggests that the pace is likely to accelerate, especially as climate change translates into more intense storms, flooding, heat waves, and droughts.

The effects of disasters and environmental degradation may in some cases be sufficiently extreme to undermine the habitability of a given area, triggering an exodus of "environmental refugees." Environmental calamities are

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already contributing to the displacement of large numbers of people, though reliable numerical estimates do not exist. In addition, huge numbers of people are being uprooted by large-scale infrastructure projects. During the 1990s alone, tens of millions of people worldwide lost their homes to make way for dams, roads, logging operations, and other projects. The World Commission on Dams estimates that 40 million to 80 million people have been displaced by dams.

What Can Be Done?

Countries, communities, private enterprises, and civil society actors can employ many strategies to address the complex linkages between environment, population, development, and security. A multifaceted strategy is needed, including the following elements:

Promote renewable energy and energy efficiency. More aggressively promoting renewable energy and energy efficiency could substantially reduce reliance on oil and other exhaustible energy resources that contribute to global climate change and fan geopolitical tensions and civil wars. Renewable energy technologies are developing rapidly, with global wind power capacity tripling since 1998 and climbing more than tenfold over the last decade. And people living in developing countries could save up to 75 percent of their energy by incorporating more energy efficient cooking and heating technologies.

Combat land degradation and improve water productivity through sustainable agricultural practices and other techniques. A range of sustainable agriculture practices can be employed to combat land degradation, including improving fertilization practices, planting tree crops, and shifting to "no-till" farming practices. With agriculture using about 70 percent of all the water taken from rivers, lakes, and underground aquifers, less water-intensive farming methods could greatly improve water productivity. In general, water scarcity can be reduced by increasing the efficiency of private water use, decreasing leakage during water dis-

tribution, and reforming agricultural practices to lower water inputs.

Reduce population growth rates by providing widespread access to family planning, encouraging girls' education, and empowering women. Slowing population growth rates can help reduce local pressures on natural resources, and thereby reduce scarcity-induced tensions. Countries that go through a demographic transition—from high birth and death rates to lower birth and death rates—are marked by higher life expectancies and smaller family sizes. They have a lower likelihood of civil conflict and tend to fare better economically. This transition can be encouraged by expanding girls' educational opportunities, improving maternal and child health, and providing the resources necessary to allow women to choose the timing and frequency of pregnancy.

Safeguard ecosystems on which the poor depend, such as forests, watersheds, arable land, and fisheries. The poor are extremely dependent on local resources for their well-being and survival, as they cannot afford to purchase adequate shelter, food, and fuel. Safeguarding ecosystems ensures that vital ecosystem services such as air and water purification, pollination, climate stabilization, and erosion control are protected, thereby minimizing the potential for conflict over resource scarcity.

Develop certification systems for natural resources that use consumer power to discourage illegal trade and promote sustainable harvesting. Recent years have brought a heightened sensibility on the part of individual consumers to the ties that bind them, through global product chains, to people and communities in distant lands, along with the development of new tools that aid them in acting on this awareness, such as international labeling and certification systems. One example is the impact of the Forest Stewardship Council (FSC), established in 1993 to set standards for sustainable forest production. A decade later, the FSC had certified over 39 million hectares of commercial forest in 58 countries, more than 6 times as much area as in 1998, although this still only amounts to 2 percent of the world's

Working together to protect shared resources could build a spirit of cooperation rather than competition and conflict even among traditional adversaries, possibly advancing regional cooperation.

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forests. A Marine Stewardship Council that certifies fish products was established a few years later, and similar efforts are underway for other resources and economic sectors, such as the Kimberley Process certification program that seeks to ensure that diamond revenues do not finance armed conflicts. In the years ahead, greater efforts will be required to integrate conflict prevention and sustainability goals in Natural Resource Certification Initiatives.

What Is the Appropriate Role for the UN and Other International Organizations?

The UN and other international institutions have critical roles to play in spearheading these strategies and initiatives at the international level, including through the following activities:

Facilitate the negotiation and implementation of international environmental treaties and promote regional environmental cooperation. Existing international environmental treaties cover a broad range of issues relevant to environmental security, including climate change, cooperative water management, land degradation and desertification, and biological diversity. But most environmental treaties contain few specific targets and timetables, and provisions for monitoring and enforcement are generally weak to nonexistent. And several important environmental treaties have not yet been ratified by enough countries to enter into legal force, including the 1997 Kyoto Protocol to the UN Convention on Climate Change.[1] The UN Environment Programme (UNEP) and other UN agencies can continue to assist countries with negotiating and implementing relevant international agreements and actions plans, and encourage them to move forward with ratification. The UN can also promote greater regional environmental cooperation to protect shared river basins and other ecosystems. Working together to protect shared resources could build a spirit of cooperation rather than competition and conflict even among traditional adversaries, possibly advancing regional cooperation.

Accelerate efforts to achieve the Millennium Development Goals (MDGs) and the sustainable development targets contained in action plans from the World Summit on Sustainable Development (WSSD) and other major UN conferences. Recent years have seen governments adopt a number of important goals and targets related to poverty reduction, environmental sustainability, population stabilization, and women's empowerment that would help promote greater human and environmental security. The MDGs, for instance, call for eliminating gender disparity in primary and secondary education and halving by 2015 the share of the world's people living in extreme poverty and lacking access to clean drinking water. The WSSD Plan of Implementation reiterated the importance of the MDGs and contributed a number of new international targets, including halving the proportion of people without access to basic sanitation by 2015, restoring fisheries to their maximum sustainable yields by 2015, and reducing the loss of biological diversity by 2010. The UN has an important role to play in working in concert with civil society and other actors to galvanize action to achieve these goals.

Fund environmental and social initiatives in the developing world. Translating existing environmental treaties and sustainable development action plans into greater on-the-ground action will require funding for international environmental institutions and initiatives such as the Global Environment Facility (GEF) and UNEP. The GEF commits an average of $300 million per year to grants for global environmental protection initiatives in the developing world and UNEP has an annual budget of roughly $100 million. But raising even these relatively small sums from donor governments has proven to be a continuing challenge. Other relevant international institutions and initiatives have also suffered from scarce funding, including efforts to provide universal access to basic reproductive health services for all by 2015, as called for at the 1994 International Conference on Population and Development in Cairo. Meanwhile, global military expenditures

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currently add up to more than $800 billion annually.

Build environmental initiatives into post-conflict reconstruction efforts. Environmental damage incurred during armed conflicts slows the delivery of humanitarian aid and can also hinder redevelopment efforts. UNEP has documented the environmental damage in post-conflict Serbia and Montenegro, Afghanistan, and Iraq. Using such information, environmental protection should be integrated into the post-conflict reconstruction process. Methods for encouraging environmental protection include conducting environmental impact assessments, using environmentally friendly technologies, and maximizing information exchange between key stakeholders to avoid further risks to human health and the environment.

Promote open and transparent governance. Protecting environmental security requires open and transparent governance systems that discourage corruption and allow people affected by environmental damage to have a voice in decision-making. Toward this end, Principle 10 of the Rio Declaration on Environment and Development that emerged from the June 1992 Earth Summit stipulates that individuals are entitled to access information and judicial proceedings, as well as to be involved in decision-making. Six years later, this concept was enshrined in the legally binding June 1998 Aarhus Convention on Access to Information, Public Participation in Decision-making, and Access to Justice; other regional initiatives on public participation are under way in Latin America and in East Africa. The UN could encourage countries to abide by Principle 10 and take steps to ensure that UN processes and institutions themselves operate in a transparent and participatory manner.

Notes

1. Editor's note: Russian President Vladimir Putin signed the Kyoto Protocol on November 5, 2004, clearing the way for the international treaty to take effect in February 2005.

Water, Conflict, and Cooperation

Fierce competition for fresh water may well become a source of conflict and wars in the future.
Kofi Annan, March 2001

But the water problems of our world need not be only a cause of tension; they can also be a catalyst for cooperation....If we work together, a secure and sustainable water future can be ours.
Kofi Annan, February 2002

ALEXANDER CARIUS, GEOFFREY D. DABELKO, and **AARON T. WOLF**

Water poses both a threat and an opportunity for the UN system. Increasing scarcity of clean fresh water impedes development, undercuts human health, and plays critical roles along the conflict continuum between and within states. While rarely (if ever) starting a war between states, water allocation is often a key sticking point in ending conflict and undertaking national and regional reconstruction and development. Within states, water scarcity can assume an increasingly contentious and violent role when, for example, water-dependent sectors such as irrigated agriculture can no longer sustain farm-ing livelihoods, leading to destabilizing migration flows. Conflict prevention, conflict resolution, and post-conflict reconstruction efforts ignore water at their peril in key regions of the world (e.g., Southern and East Africa, including the Great Lakes region; the Middle East; and Central, Southeast, and South Asia).

Water has also proven to be a productive pathway for confidence building, cooperation, and arguably, conflict prevention. Cooperative incidents outnumbered conflicts by more than two to one from 1945-1999 (Wolf, Yoffe, & Giordano, 2003). The key variable is not absolute water scarcity, but the resilience of the institutions that manage water and its associated tensions. In some cases, water provides one of the few paths for dialogue in otherwise heated bilateral conflicts. In politically unsettled regions, water is often essential to regional development negotiations that serve as de facto conflict-prevention strategies. The UN system and its partners have ripe opportunities to capitalize on water's cooperation promise while undercutting its conflict potential.

Water-Related Violence: What, Where, and How?

Water-related violence often occurs on the local rather than international level, and the intensity of conflict is generally inversely related to geographic scale (Wolf, 1999). Even if international disputes over water-related issues do not typically cause violent conflict, they have led to interstate tensions and significantly hampered development, such as along the Nile, Mekong, Euphrates, Amu Darya, Syr Darya, and Ganges rivers. And while conflicts often remain local, they can also impact stability at the national and regional levels.

The Basins at Risk project's analytical tool helps identify areas where hydrological and

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political conditions suggest a higher likelihood of conflict over water (Wolf et al., 2003). Based on extensive analysis of the world's 263 international river basins, the project hypothesizes that "the likelihood of conflict rises as the rate of change within the basin exceeds the institutional capacity to absorb that change." Sudden physical changes or reduced institutional capacity are more conducive to disputes. Key examples include uncoordinated development of major projects that affect flow (e.g., dams) *in the absence* of a treaty or commission; basins that suddenly become "internationalized," as occurred in post-Soviet Central Asia; and general animosity among parties. This approach provides a set of indicators for monitoring potential hot spots, thus allowing us to get ahead of the "crisis curve" and promote institutional capacity in advance of intractable conflict.

There are three major linkages between conflict and water:

1) *Access to adequate water supplies:* Conflict is most likely to occur over water when disputes involve access to water of adequate quantity and quality. Even when water supplies are not severely limited, allocation of water among different users and uses (urban residents and agriculture, for example) can be highly contested. Degraded water quality, which can pose serious threats to health and aggravate scarcity, is also a source of potentially violent disputes. Finally, when water supplies for broadly irrigated regions decline either in terms of quantity or quality, those declines can spur migrations that could politically destabilize the receiving cities or neighboring countries.

2) *Water, livelihood loss, and civil conflict:* Water's importance in sustaining human livelihoods can indirectly link it to conflict. Water is a basic resource for agriculture, which is traditionally the largest source of livelihoods. If this livelihood is no longer available, people are often forced to search for job opportunities in the cities or turn to other, sometimes illicit, ways to make a liv-

ing. Migration—induced by lack of water, sudden droughts and floods, infrastructure construction (e.g., dams), pollution disasters, or livelihood loss—can produce tensions between local and incoming communities, especially when it increases pressure on already scarce resources. And poverty due to livelihood loss has been identified as a common denominator of the causes of conflict in most of the civil wars that emerged in Africa, South Asia, and Latin America during the last decade (Ohlsson, 2000).

3) *Water management and conflict:* In most cases, it is not the *lack* of water that leads to conflict, but the inadequate way the resource is governed and managed. There are many reasons why water management fails, including lack of adequate water institutions, inadequate administrative capacity, lack of transparency, ambiguous jurisdictions, overlapping functions, fragmented institutional structures, and lack of necessary infrastructure.

Water management is highly complex and extremely political. Balancing competing interests over water allocation and managing water scarcity require strong institutions. A reliable database, including meteorological, hydrological, and socio-economic data, is a fundamental tool for deliberate and farsighted management of water resources. Yet, reliable information is often difficult to obtain, especially in developing countries. Further, disparities among riparians' capacity to generate, interpret, and legitimize data can lead to mistrust and thus hinder cooperative action.

Water management in many countries is also characterized by overlapping and competing responsibilities among government bodies. Disaggregated decision-making often produces divergent management approaches that serve contradictory objectives and lead to competing claims from different sectors. And such claims are even more likely to contribute to disputes in countries where there is no formal system of water-use permits, or where enforcement and monitoring are inadequate. Controversy also

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often arises when management decisions are formulated without sufficient participation by local communities and water users, thus failing to take into account local rights and practices. Protests are especially likely when the public suspects that water allocations are diverting public resources for private gain or when water use rights are assigned in a secretive and possibly corrupt manner, as demonstrated by the violent confrontations in 2000 following the privatization of the water utility in Cochabamba, Bolivia.

Water as a Pathway to Peace

Transboundary cooperation around water issues, which stems from a drive for sustainable development in the face of shared stress, has a long and successful history. This development imperative—not the fear of conflict per se—motivates countries to pursue tough, protracted negotiations such as the Nile Basin Initiative (NBI).

Aggressively pursuing a water peacemaking strategy can provide dividends beyond water for stakeholders. It can build trust and serve as an avenue for dialogue when parties are stalemated on other issues. Transboundary water institutions have proven resilient, even as conflict is waged over other issues (e.g., the "Picnic Table Talks" between Jordan and Israel, Mekong Committee, and Indus River Commission). This strategy can also establish habits of cooperation among states, some with little experience, such as the states in the Kura-Araks basin in the Caucasus, or the Central Asian states of the former Soviet Union.

Water can also be a key point in negotiating the end of a conflict, even if water did not precipitate it. While water did not cause the wars between India and Pakistan, for example, an updated agreement on the Indus River has played a central role in recent bilateral negotiations to end the conflict. In addition, peacemaking through water issues can forge people-to-people links, as demonstrated by the Good Water Makes Good Neighbors programs of the NGO Friends of the Earth Middle East or expert-to-expert (Track II) linkages along the Jordan or Indus rivers.

Finally, a water peacemaking strategy can create shared regional identities and institutionalize cooperation on a broader range of issues. Examples of this dynamic include the institutionalized environmental cooperation around the Baltic Sea during the Cold War (Helsinki Commission) and the current cooperation in post-apartheid Southern Africa through the Southern African Development Community (Conca & Dabelko, 2002).

The United Nations and Water, Conflict, and Cooperation

Gaps

Water is a powerfully unifying resource, but because of its centrality to human life and our ecosystem, its management is generally diffused among the world's agencies and institutions. The UN is no exception: water-related expertise is spread throughout the system, including such bodies as UN Development Programme (UNDP), UN Environment Programme (UNEP), United Nations Educational, Scientific, and Cultural Organization (UNESCO), United Nations Children's Fund (UNICEF), Food and Agriculture Organization (FAO), and the UN Economic Commissions, along with partners like the World Bank and the Global Environment Facility.[2] The fragmentation of this impressive expertise has historically prevented the UN from taking the lead in water-related conflict mitigation. To redress this problem, the UN system must integrate policy and coordinate its extensive but diffuse expertise on water, conflict, and cooperation across its bodies.

International waters: The UN should develop an integrated, systematic program of preventive water diplomacy based on modified versions of the World Bank and Global Environment Facility frameworks. This program would (1) bolster early warning for regions with potential for water conflicts (conducted by, for example, UNEP's Division of Early Warning and Assessment); (2) develop a

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systematic program for enhancing institutional capacity between nations, including reconciling national legal frameworks (perhaps led by FAO's Development Law Service); and (3) craft, by unifying existing expertise, a "one-stop shop" for developing programs to enhance cooperation (such as UNESCO's recently launched Water Cooperation Facility). All these efforts should integrate traditional conflict-prevention bodies, such UNDP's Bureau for Crisis Prevention and Recovery, in both the design and use of these products and capacities.

The UN must address a number of gaps that impede the implementation of this systematic, integrated program. First, only a small number of experienced water-dispute facilitators are viewed as truly neutral. The World Bank has a few, but they are in short supply at other UN bodies. The UN system should rebuild its ability by recruiting and training facilitators in hydrology, international law, regional history, and conflict prevention (the Universities Partnership for Transboundary Waters offers a model for developing and executing this training).

Second, UN conveners and facilitators, and their bilateral funders, must be willing to support long processes without requiring instant or easily measurable results. The World Bank's 20-year commitment to the NBI is an exemplary model, which the bank is reproducing in other African basins. The UN should extend this model beyond Africa and encourage disparate UN bodies to cooperate as equal partners. Third, to achieve sustainable implementation, the UN must find ways to include all stakeholders throughout the process, in order to offset the secrecy that traditionally surrounds high-level negotiations. Unlike the NBI, this should not wait until state-to-state agreements have been reached.

Finally, the UN should seek to strengthen the capacity of parties to negotiate contested water issues. Disparities in capacity and knowledge have often led to mistrust between riparian countries, hindering cooperative action. Strengthening the negotiating skills of less powerful riparians can therefore help prevent con-
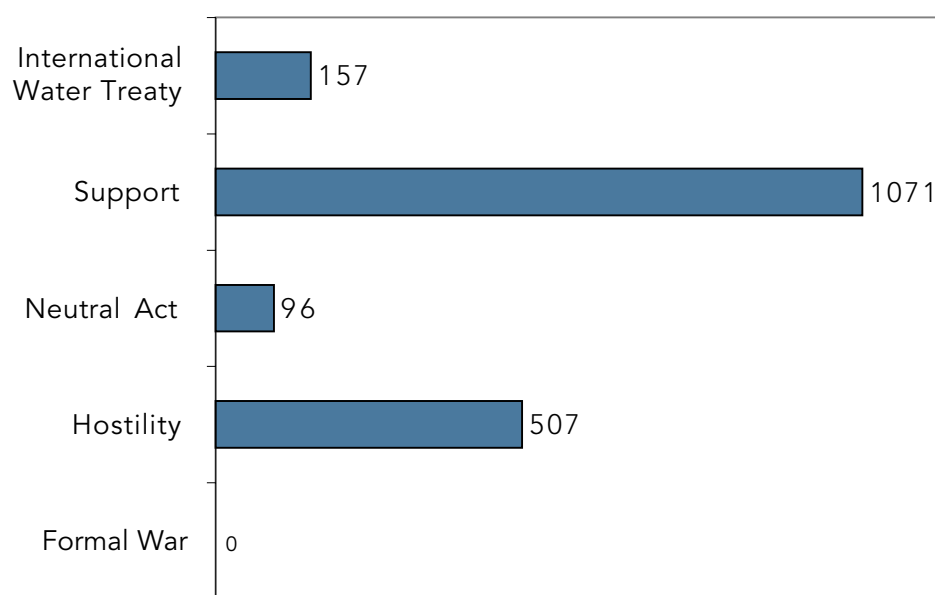

Headwaters of the Nile River, Uganda (Credit: Inger Andersen)

flict, as can strengthening their capacity to generate and authorize relevant data (Turton, 2003). A hydrological database that is accepted by all stakeholders is essential for any joint management efforts, as it builds trust and enables water-sharing parties to make decisions based on the same understanding of the situation.

While pursuing this integrated program, the UN must avoid falling back on media-friendly but historically inaccurate scare tactics like warning of impending "water wars" between states. This is not the appropriate frame for these issues because (1) most organized violence from water conflict occurs not between states, but at the subnational and local levels or between sectors; (2) the "water wars" angle discourages the engagement of key developmental and environmental partners in favor of security actors; (3) it does not easily lead to a program of action for conflict prevention and human development; and (4) we do not need to use violent conflict to prove that water is a matter of life and death. Indeed, by directly or indirectly contributing to two million to three million deaths annually, unsafe drinking water poses a primary challenge to human security, as recognized by both the Millennium Development Goals and the Johannesburg Plan of Implementation.

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State-to-State Water Interactions in Transboundary Basins, 1946-1999

International Water Treaty	157
Support	1071
Neutral Act	96
Hostility	507
Formal War	0

Source: Adapted from Wolf, Yoffe, & Giordano (2003)

Intranational level: Many countries need stronger internal policies to regulate water use and to enable equal and sustainable management of their water resources. The UN should help strengthen the institutional and legal frameworks for managing water resources at the national level. To ensure that these national frameworks are implemented, the local level—at which water is actually used—requires more assistance (e.g., developing management institutions on the catchment level and institutionalizing community-based cooperative management mechanisms).

Regardless of the level of analysis, building capacity for integrated water management and conflict prevention is a critical role for the UN. Developing the human, technical, and administrative capacity to generate and analyze data, to develop sustainable management plans, and to implement these plans is necessary to enable water institutions to fulfill their management tasks and to prevent water-related disputes over the long term. Building capacity in conflict-management techniques, such as mediation and facilitation, as well as in stakeholder participa-

tion, helps mitigate conflicts and prevent disputes from emerging during decision-making.

Options

What form would a systematic, integrated program of preventive diplomacy and water take? Since most initiatives dealing with water, conflict, and cooperation are substantially underfunded and rarely reach beyond the project level, the challenge for the international community is to create an obvious earmark for international water conflict and cooperation funds, as the Global Fund is for HIV/AIDS, tuberculosis, and malaria. Such a fund could utilize water to build confidence and prevent conflict, assess water facilitation skills to match capacity and opportunities, and reduce the number of overlapping and duplicative bilateral approaches.

As part of its program, the UN should create a forum to identify and articulate the needs of Southern stakeholders for transboundary water management, dispute resolution, and conflict transformation. Such forums as the

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World Commission on Water, Peace, and Security or the Water Cooperation Facility have already been proposed. The UN should also seek to integrate existing networks and platforms that address water and security linkages in the South.

In addition, water venues such as the 13th Commission on Sustainable Development in 2005, UN-Water, and the World Water Assessment Programme must move beyond technical management questions and situate water and development issues in a larger peace and security context, integrating lessons from ongoing efforts like UNESCO's Potential Conflict to Cooperation Potential (PCCP) program and UNEP's Post-Conflict Assessment Unit.[3] By collaborating with these water forums, UN bodies focused on conflict could support the environmental priorities outlined in the Secretary-General's 2003 interim report on prevention of armed conflict (United Nations, 2003).

Conclusion

By establishing a program of preventive diplomacy focused on water, the UN could coordinate its extensive but diffuse expertise. Such a program would assess basins at risk and bolster the early-warning process for regions with conflict potential. The program would also enhance institutional capacity between nations (by reconciling national legal frameworks over water issues, for example) and craft a "one-stop shop" with tools to develop programs that encourage transboundary cooperation. Through a Global Fund for Water—with special emphasis on understanding the Southern perspective and integrating conflict prevention units—the UN could improve water management and facilitation skills, reduce duplicate efforts, and use water to build confidence and prevent conflict.

Notes

1. This background paper builds on a policy brief on water and conflict commissioned by the Office of Conflict Management and Mitigation in the Bureau for Democracy, Conflict, and Humanitarian Assistance of the United States Agency for International Development (USAID); see Kramer (2004). For more information on USAID's Office of Conflict Management and Mitigation, visit http://www.usaid.gov/our_work/cross-cutting_programs/conflict/.

2. UN programs on water include the following:
• The Global Environment Facility (a partnership between the World Bank, UNDP, and UNEP) has an extensive program on international waters; see http://www.gefweb.org/.
• UNDP, through its program in Sustainable Water Management, developed an extensive toolkit for efficient water use and shepherded the Global Water Partnership; see http://www.undp.org/water/resource.html for more information. Since 1999, it has worked with the World Bank in an International Waters Partnership to "seek complimentarity in support of management of transboundary fresh water resources" (http://www.undp.org/seed/water/region/partner.htm). UNDP's Transboundary River Basin Initiative (TRIB) aims to foster inter-riparian dialogue to strengthen emerging basin institutions, and is currently providing focused support in the Mekong, Niger, Rio Frio, and Senegal basins.
• UNESCO's International Hydrologic Programme (http://www.unesco.org/water/ihp/index.shtml) is now beginning its seventh cycle. More recently, UNESCO coordinated the World Water Assessment Programme, designed to assess the state of the world's water resources (http://www.unesco.org/water/wwap). For international waters, UNESCO launched its Potential Conflict to Cooperation Potential (PCCP) program, designed specifically to collect, assess, and disseminate the world's experience in sharing international waters (http://www.unesco.org/water/wwap/pccp/index.shtml). It is investigating the possibility of a Water Cooperation Facility to help stakeholders manage international water disputes.
• UNEP's Division of Early Warning and Assessment (http://www.unep.org/dewa) provides early warning of environmental change; its mandate is to "help increase the capacity of governments to use environmental information for decision-making and action planning for sustainable human development."
• The World Bank is the lead agency in water resources development for poverty alleviation in the developing world; see http://lnweb18.worldbank.org/ESSD/ardext.nsf/18ByDocName/WaterResourcesManagement for more information. Through its regional desks and its International Waters Window, it has developed a comprehensive program for the management of international basins, including legal and political frameworks.

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• The FAO Development Law Service and various UN Economic Commissions—notably the Economic Commission for Latin America and the Caribbean (http://www.eclac.cl) and the Economic and Social Commission for Asia and the Pacific (http://www.unescap.org)—have taken the lead in building legal capacity for water-related issues, both within nations and internationally. In addition, the International Court of Justice has decided on one case regarding international waterways, and the Permanent Court of Arbitration has recently broadened its expertise to include the arbitration of environmental disputes.

3. For a summary of PCCP's actions and recommendations to the Ministerial Conference of the Third World Water Forum in May 2003, see PCCP's *From Potential Conflict to Co-operation Potential: Water for Peace* brochure at http://www.unesco.org/water/wwap/pccp/pdf/brochure_2.pdf

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The Security Implications of Climate Change for the UN System

This article explores the security implications of climate change, including a summary of the adverse impacts of climate change, an analysis of their security implications, and policy recommendations for strengthening the United Nations' capacity to respond to climate-related security threats.

Adverse Impacts of Climate Change

While significant uncertainties remain regarding the extent and speed of climate change, the overwhelming global scientific consensus is that the Earth's atmosphere is warming rapidly, perhaps at an unprecedented rate, and that much of this warming is due to human activity. The UN Intergovernmental Panel on Climate Change (IPCC), the multilateral body charged with assessing the implications of climate change, predicts that global warming will trigger enormous physical and social changes. The panel identified the following physical and socio-economic effects.

Physical effects

The likely physical effects of climate change include: (1) higher average surface and ocean temperatures; (2) more rainfall globally from increased evaporation; (3) more variability in rainfall and temperature, with more frequent and severe floods and droughts; (4) rising sea levels from warming water, expanded further by run-off from melting continental ice fields; (5) increased frequency and intensity of extreme weather events such as hurricanes and tornadoes; and (6) extended ranges and seasons for mosquitoes and other tropical disease carriers (IPCC, 2001a, 2001b). These changes are most likely to happen gradually, but scientists are increasingly concerned about the possibility of abrupt and catastrophic climate change, such as a sudden shift in the Gulf Stream that would leave Western Europe without the warm waters that keep its climate hospitable. The risk of abrupt climate change was serious enough to induce the U.S. Department of Defense to commission a 2003 report on the potential consequences for U.S. and international security (Schwartz & Randall, 2003; Woods Hole Oceanographic Institution, n.d.).

Socio-economic effects

Not all societal effects of climate change will be negative, but a number of adverse socio-economic impacts are anticipated. These effects include: (1) shortfalls in water for drinking and irrigation, with concomitant risks of thirst and famine; (2) changes and possible declines in agricultural productivity stemming from altered temperature, rainfall, or pest patterns; (3) increased rates and geographic scope of malaria and other diseases;

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(4) associated shifts in economic output and trade patterns; (5) changes and possibly large shifts in human migration patterns; and (6) larger economic and human losses attributable to extreme weather events, such as hurricanes.

Security Implications

The security implications of these physical and socio-economic changes are significant. We must first consider the nature of the threats and then consider where those threats are most likely to occur.

What kinds of threats?

Violence and Armed Conflict: Climate change will alter the distribution and quality of natural resources such as fresh water, arable land, coastal territory, and marine resources. Some researchers have speculated that these changes could cause or prolong armed conflict, although these arguments are often overstated. Indeed, the general link between the environment and armed conflict is well-established: competition for natural resources (e.g., diamonds, timber, oil, water, and even narcotics) has motivated violence in such disparate places as Kuwait, Colombia, and Afghanistan. Natural resources have also helped finance insurgencies in Angola, Sierra Leone, and elsewhere. The connection between climate change and the

outbreak of violence will unlikely be as strong as when natural resources can be exploited for quick financial reward. And because climate change happens gradually, global warming is unlikely to be the primary cause of any particular armed conflict, nor will its contribution to conflict be particularly visible. Nevertheless, regional climate changes, as with other causes of environmental degradation, could make armed conflict more likely.

Natural Disasters and Humanitarian Crises: As explained above, a warmer world will generate more natural disasters and therefore more humanitarian crises. Indeed, natural disasters are already a major security threat: between 1990 and 1999, an estimated 188 million people per year were affected by natural disasters, 6 times more than the 31 million annually affected by armed conflict.[1] Many people affected by natural disasters become refugees or internally displaced persons (IDPs). Both refugees and IDPs are vulnerable not only to the physical and socio-economic effects of disease, malnutrition, and loss of income, but they can also become personally insecure and subject to crime, violence, and broader militarized conflict. Natural disasters become wider security challenges when a country lacks the capability or willingness to help affected populations, undermining the government's legitimacy and increasing popular grievances.

Destabilizing Forces: Conditions of drought, disease, and economic stagnation may reach critical levels or tipping points beyond which state failure becomes more likely. The global HIV/AIDS pandemic, for example, has renewed international concern that widespread death from infectious diseases could destabilize vulnerable nations. In countries where one in four people is infected with HIV, failure to provide treatment could easily destroy the ability of government institutions to provide effective security, education, and health care. The spread of disease from climate change could have a similar effect, although perhaps at a slower rate. A recent study from the World Health Organization (WHO) and the London School of Hygiene and Tropical Medicine estimates

there may already be upwards of 160,000 deaths annually from ancillary effects of global warming such as malaria and malnutrition. The study's authors estimate those numbers could nearly double by 2020.[2]

Which states are most vulnerable?

Security risks related to climate change will not be evenly distributed and will affect some kinds of governments more than others. While local and regional consequences of climate change remain very difficult to predict, three types of nations seem particularly vulnerable to the security risks of climate change: least-developed nations, weak states, and undemocratic states.

Least-Developed Nations: Poor developing countries are the perhaps the most likely to suffer the effects of climate change. These states lack the economic, governance, or technical capabilities to adapt; for example, they lack the capacity to prevent or react to humanitarian disasters such as widespread flooding. Tropical developing nations face the most severe consequences of climate change, including extreme weather events, drought, and disease.

Weak States: Failed and failing states—those with weak government institutions, poor border control, repressed populations, or marginal economies—stand a higher risk of being destabilized by climate change. Weak states have almost no capacity to respond to climate change or prevent it from triggering a large-scale humanitarian disaster. Drought, crop failure, and subsequent state failure led to tens of thousands of deaths in Somalia in the 1990s. Vulnerability to drought in the Darfur region of Sudan is now exacerbated by the country's ongoing internal conflict. Whether these droughts are attributable to climate change is impossible to say, but the episodes are indicative of what one would expect with global warming.

Undemocratic States: Twenty years ago, economist Amartya Sen noted that democracies, in which leaders have to be responsive to people who can vote them out of power, do not produce famines. In contrast, the 20th century is replete with examples of undemocratic regimes failing to protect populations at risk of drought, floods, and other weather-related phenomena. While modern India has never suffered a famine, tens of millions died in China under Mao. North Korea is able to produce nuclear weapons but remains unable to meet its people's basic nutritional needs. Populations in undemocratic states will therefore be particularly vulnerable to the more numerous and more severe humanitarian crises induced by climate change.

Recommendations for the UN System

The United Nations' strategy for addressing climate change is to facilitate agreements among nations to: (a) mitigate those nations' greenhouse gas emissions, thereby stabilizing atmospheric concentrations of these gases at a safe level; and (b) help vulnerable nations adapt to the adverse consequences of global warming. While these goals are the right ones, the UN system is not acting with sufficient ambition or effectiveness to deal with the security risks posed by climate change. Several new approaches are discussed below.

Emissions mitigation

Global warming will continue until concentrations of greenhouse gases in the atmosphere stabilize, which will only occur after net global annual emissions of these gases decline to zero. Given that global emissions are still *rising* rapidly in the majority of nations, a major focus of the UN's climate-change security strategy must be to facilitate emissions abatement in both developed and developing nations. Global efforts to arrest climate change have been carried out largely in the context of the 1992 UN Framework Convention on Climate Change and its 1997 Kyoto Protocol. To date, those efforts have produced very modest results. Developed nations largely ignored the political commitment they made under the convention to return their emissions to 1990 levels by 2000. Even if the Kyoto treaty goes into force, it will cover only 25 percent of global emissions

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> The emerging early warning systems in the disaster reduction community must take political indicators of vulnerability, such as the repressive nature of political regimes and other governance factors, more fully into account.

and not those of the United States and China, the world's two largest national emitters.[3] By 2012, Kyoto will have reduced emissions in participating industrialized countries by only less than 3 percent below 1990 levels. Unless major new efforts are made to mitigate climate change, global warming will overwhelm most governments' adaptive efforts.

The climate architecture associated with the Kyoto Protocol has become increasingly divisive, not only among advanced industrialized countries, but also within the North-South dialogue. Since the 1992 Earth Summit, the environment has also lost ground politically, submerged under the broader sustainable development agenda. To speed mitigation efforts, the secretary-general must raise the visibility of climate change and play a more active role in overcoming obstacles to emissions mitigation. One complication is that while developed nations should take the lead in reducing emissions, emissions abatement in developing nations could be more cost effective. Until the international community develops the political will necessary for public and private financing of emission reductions, climate change is likely to continue indefinitely.

Raising the profile of climate change is easier said than done, particularly since imminent security challenges, such as Iraq, tend to crowd out long-term security threats. While the secretary-general should integrate climate change more fully into his own personal diplomacy, a more formal institutional mechanism would give the issue consistent attention. One option would be for the secretary-general to advocate the creation of a UN High Commissioner for the Environment. The high commissioner's mandate would be to raise global awareness about environmental degradation, including climate change, and to shine a spotlight on best and worst environmental practices. Climate would be only part of the agenda, as this official should also have a role in building political will to meet other international environmental goals, such as providing safe drinking water and sanitation for all. Locating the office in Geneva would help integrate environmental concerns and climate change into the UN system in a way that the UN Environment Program in Nairobi has been unable to accomplish. The position would be a compromise between nations that have advocated the creation of a World Environment Organization, such as France and Germany, and those that have opposed efforts to strengthen global environmental governance.

Adaptation

Concentrations of atmospheric greenhouse gases are higher than they have been for tens of thousands of years—and these concentrations will climb for many decades, even if the mitigation agenda succeeds. A two-part strategy is needed to deal with the inevitable adverse effects of climate change. First, the UN should strengthen those programs that handle disaster and humanitarian crises and that are already beginning to take climate change into account. Second, the UN should create a new effort focused on predicting, preventing, and handling climate change-related disasters in weak states and those with repressive governments.

1. Strengthening Ongoing Disaster Work

Shift priority from relief to prevention: Humanitarian organizations have become increasingly adept at emergency response to emerging catastrophes. However, very little money is spent on disaster risk reduction. Even

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among countries with responsive decision-makers, there is too little awareness of the priority of disaster-risk reduction. One strategy that has been proposed is to dedicate at least 5 percent to 10 percent of humanitarian relief monies to disaster-risk reduction. While the precise target should be resolved by member states, the secretary-general should take the lead in proposing the establishment of such a principle. The UN's Inter-Agency Task Force on Disaster Reduction (IATF/DR) and the Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UN/ISDR) are existing frameworks in which early-warning systems and vulnerability assessments are already embedded to some degree.[4] In January 2005, the Second World Conference on Disaster Reduction will take place in Kobe, Japan. The parties will review the 1994 Yokohama Strategy on natural disasters and establish the disaster-reduction action plan for the next decade. These processes provide opportunities to focus more prominently on prevention.

Integrate disaster and climate planning: The UN system needs to integrate concerns about the consequences of climate change more fully into its security, natural disaster prevention, and humanitarian response activities; for example, the UN should make climate change a more explicit focus of UN/ISDR. In 2003, UN/ISDR launched a project to do just this, and its progress seems promising.[5] IATF/DR created a new working group in May 2004 on climate adaptation and disaster reduction, and the UN/ISDR Secretariat is coordinating an expert dialogue among disaster relief, climate, and development communities (UN/ISDR, 2004). As adaptation gains prominence in the global warming community, however, climate change bodies are in danger of reinventing the wheel on disaster prevention and response. The existing network of disaster experts should be more fully integrated into the IPCC reporting process to avoid this potential problem.

2. New Strategy Needed for Vulnerable States

While stronger UN early warning and disaster preparedness systems would help predict and address disasters, these systems still would not be entirely adequate to address the most dangerous security challenges, including massive migration, armed conflict, and state collapse, which are most likely to occur in undemocratic and weak states. A new multipart strategy is needed to address these challenges.

Improve early warning systems and vulnerability indices: The UN system needs better tools for predicting which states and regions are most vulnerable to severe security threats related to climate change. There is already a proliferation of early warning systems in the international community for dealing with different challenges. In the humanitarian realm, there are numerous systems; for instance, the UN's Humanitarian Early Warning System is an internal UN tool to identify countries in pre-crisis situations. Reliefweb, also overseen by the UN's Office for the Coordination of Humanitarian Affairs (OCHA), is an external system that focuses on natural disasters and complex emergencies. At the regional and country levels, OCHA has an Integrated Regional Information Network, primarily for sub-Saharan Africa. In agriculture, FAO has the Global Information and Early Warning System on Food and Agriculture, and USAID has its Famine Early Warning System. In terms of weather-related warning systems, UN Development Programme and UN Environment Programme/GRID have developed a Disaster Risk Index, and the World Bank and Columbia University have nearly completed a Global Disaster Risk Hotspots project.

Much of this work is positive. But the emerging early warning systems in the disaster reduction community must take political indicators of vulnerability, such as the repressive nature of political regimes and other governance factors, more fully into account (Brauch, 2003). In addition, coordination among the vulnerability indices mentioned above, along with other early warning systems like the European Union's Global Monitoring for Environment and Security initiative, is necessary to standardize risk assessments in a format policymakers can use (European Council & European Space Agency, 2004). The climate-

security nexus, moreover, should be analyzed systematically by the IPCC. As a first step, the IPCC should convene a conference that engages international security, climate, and disaster experts (German Federal Ministry for the Environment, 2002).

Preventative diplomacy: Once the UN has identified high-risk countries, it should develop contingency plans for the consequences of climate change. The extent to which the UN is already involved in systematic forward planning is not clear. As a first step, any contingency plans ought to be tailored to the individual circumstances of those countries and include plans for providing shelter, nutrition, medicines, and policing. At the same time, local UN staff (or, if necessary, special envoys) ought to open discreet channels of communication with decision-makers in high-risk countries to discuss and encourage risk-reduction strategies. UN officials should also share information concerning disaster prevention with relief agencies such as the UN High Commissioner for Refugees, the International Red Cross, and the broader NGO relief community.

Conflict and post-conflict engagement—Legitimacy and force: Sometimes, however, diplomatic preparedness will not head off humanitarian catastrophe, and the world will be faced with the prospect of using force to prevent mass starvation or destabilizing migrations. The security risks of climate change, therefore, need to be a factor in debates about a standing multilateral peacemaking or humanitarian intervention force. The international community needs to revisit norms and institutional arrangements concerning the use of force in response to disasters just as it is doing with respect to terrorism and weapons of mass destruction. The UN should be facilitating this dialogue while also including potential climate-induced catastrophes in its programs for post-conflict reconstruction.

Conclusion

Climate change will trigger profound global change, and these changes could pose genuine risks to international peace and security. Managing these changes well will require well-conceived actions within the UN system. While climate change could contribute to armed conflict and violence, that is not the primary risk. Preventing large-scale humanitarian catastrophes from climate-related droughts, floods, crop failures, mass migrations, and exceptionally severe weather remains the most significant policy challenge.

The UN needs to improve substantially the effectiveness of international efforts to mitigate emissions. Not only should the secretary-general incorporate climate change into his own personal diplomacy, he should consider advocating the creation of a new senior-level office (the High Commissioner for the Environment) that would be charged with building political support for addressing all global environmental challenges, including climate change, in ways that promote sustainable development.

Because significant climate change is already occurring and will continue for decades, the UN must place equal emphasis on helping nations adapt to global warming. In this regard, the UN system needs to work even harder to prevent and respond to humanitarian crises, which will increasingly be fueled by climate factors. Because disasters in which climate change plays a role will be difficult to predict, and because little will distinguish these disasters from traditional humanitarian crises, much of what the United Nations must do should not be specific to global warming. Many of the UN's existing disaster efforts are on the right track, but these efforts need to be strengthened by shifting emphasis from disaster response to prevention and by integrating awareness of the consequences of climate change into their work programs.

Yet the UN system must also launch a new effort aimed at dealing more directly with the security risks associated with humanitarian disasters in weak and totalitarian states, where climate change is most likely to trigger regional insecurity. Here, the UN needs to develop powerful analytic tools, such as a fully coordinated vulnerability index, that are capable of reliably flagging populations at risk of suffering the

Weak states have almost no capacity to respond to climate change or prevent it from triggering a large-scale humanitarian disaster.

worst consequences of climate change. The UN also needs to beef up its preventative diplomacy, possibly through the creation of a senior-level disaster prevention coordinator. Finally, the security risks associated with climate change need to be factored into any discussions about multilateral intervention and the development of new norms and institutional arrangements regarding the use of force.

Notes

1. The report defined people affected by natural disaster as those who for a time either lost their home, animals, crops, livelihoods, or health as a result of a natural disaster; see UN/ISDR (2003).

2. See Doyle (2003); Haines & Patz (2004); WHO (2002); and WHO (2003).

3. Editor's note: Russian President Vladimir Putin signed the Kyoto Protocol on November 5, 2004, clearing the way for the international treaty to take effect in February 2005.

4. The Inter-Agency Task Force is chaired by the Under-Secretary-General for Humanitarian Affairs. See UN/ISDR (n.d.).

5. The infolink is a collaboration between the International Red Cross/Red Crescent Centre on Climate Change and Disaster Preparedness, UNDP, and ISDR. See Red Cross/Red Crescent Climate Centre (n.d.).

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