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Southeast Asia and the Americas in  
Comparative Perspective**

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# THINKING ABOUT ENVIRONMENTAL SECURITY: SOUTHEAST ASIA AND THE AMERICAS IN COMPARATIVE PERSPECTIVE

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## Introductory Note

This paper is styled a “work-in-progress” with good reason. It is the latest, not entirely ripe fruit of a North-South Center project, the “commonalities” study, about the shared challenges facing the developing nations of Latin America and the Caribbean and the developing nations of Asia, particularly those of Southeast Asia. These views have taken their shape, over more than three years, from the authors’ reflections about their extensive interviews in both regions with policy “influentials” and knowledgeable academics, as well as through participation in occasional conferences.<sup>1</sup>

In the beginning, the interviews were open-ended. The first question was simple: “Do you believe there are commonalities in the developmental experiences of Latin America and the Caribbean and Southeast Asia?” To say “yes” then, which most did, was not the obvious response, though it is today. Samuel P. Huntington’s notion of a “clash of civilizations” was receiving much attention, particularly in the United States (Huntington 1996). Three years later, with respect to East Asia, though perhaps not with the Middle East, his Kiplingesque vision has receded in importance. This happened in East Asia because events sapped the “clash of civilizations” of its vigor.<sup>2</sup> These events included the Asian financial crisis, the failures of “top down” governance and institutions and, of course, spreading environmental damage. Today, Asia — Japan and Singapore excepted — appears to have more in common with Latin America than supposed in the heyday of the “Asian way.”

As time went on, the authors, guided by their interlocutors’ views, narrowed the scope of inquiry to two large, intimately related issues:

- The growing role of civil society in Latin America and the Caribbean and in many parts of Southeast Asia.
- The spread of environmental damage, particularly in tropical and subtropical climes, and its economic, social, and political consequences, which amount to a hidden tax on growth and, increasingly, serve as a spur to instability within and among nations.

To be sure, few interviewees failed to mention the financial crises that, at one time or another, have wracked both regions. As one distinguished Thai economist said, referring to Latin America’s currency crisis in 1994-1995, “Even though the causes of the Asian financial crisis were different, we probably did not pay enough attention to what happened earlier in Latin America.” Today, however, economists are seeking to derive insights of general applicability from the respective financial troubles of each region.

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To the vast majority of the people with whom we spoke, the parallels with respect to civil society and the environment seemed a more interesting object of study, precisely because they were largely terra incognita insofar as comparative analysis is concerned. For example, though “top down governance” is not as familiar a usage in Latin America as it is in Southeast Asia, the failures of authoritarian rule sparked the rise of civil society in Latin America, just as they did in Southeast Asia, notably in the Philippines, a bit later in Thailand, and, in the post-Suharto confusion, Indonesia. While civil society may be a headache for governments, it is a fact of life. Few believe that an effective address to the problems of development is possible, absent civil society participation.

Similarly, though international conservation organizations have global lists of “hot spots,” places where rich ecosystems are at grave risk from spreading environmental damage, little social or political analysis of a comparative nature is evident in their publications. Understandably, they are given over to descriptions of the “hot spots” and the programs to help preserve them from devastation.

The environment is a huge subject. Our interlocutors, however, concentrated particularly on issues related to environmental security. As they saw it, environmental security meant the relationship between ecosystem damage and conflicts and major economic, political, and social tensions of various sorts, including contention among stakeholders over the use of environmental assets. We found this a useful point of departure, and we have sought to build upon it.

### **Environmental Security: Is It Real? Does It Matter?**

From the air, on a clear day you can see Borneo forever, but from mid-1997 through early 1998, you could not see it at all. Fires, set to clear forests for palm oil plantations in Borneo and Sumatra, had raged out of control, leaving a pall of smoke over much of Southeast Asia. Most of this huge island, one of the world’s last great extensions of tropical forest, is Indonesian territory except for the large Malaysian province of Sarawak and the small nation of Brunei, located on its northern reaches.

For some years, the Suharto regime had promoted immigration from the land-poor island of Madura to colonize Kalimantan (Indonesia’s name for the territory) and to work for logging, palm oil, and resource interests. The natives of Borneo, the Dyaks, had lived for millennia as nomads of the forest and the riverbanks, fishing, hunting, and growing crops for food. The Dyak way of life persisted fairly undisturbed under Dutch and, later, Indonesian rule, until the coming of the Madurese.

Working for business interests in Jakarta, the colonists made deeper and deeper inroads into the forest and along the rivers, pushing numbers of Dyaks from their traditional habitat into shantytowns. Tensions began well before the first real clash, sparked by an incident in the summer of 1997, near the time the forest fires began. The Indonesian press, treading around Suharto’s censors, discreetly reported the fighting, suggesting that 20 to 30 people had died. Indonesians privately said the numbers of dead were more like 200. Suharto’s ouster in 1998 did not put a stop to the conflict, which continues. The Indonesian military, stretched thinly by strife in regions intrinsic to national survival, guards only key sites. The official story puts the cumulative death toll in the hundreds, but in Jakarta one privately hears a much higher figure, in the thousands.

Reportedly, the Dyaks have had the better of the fight. In the old days, the Dyaks were headhunters. They have sporadically renewed the custom to get the Madurese to leave. Many colonists have fled Kalimantan to other islands. Some Dyaks talk of independence, but most seem to want something simpler, to be left alone in their forests. Working with Indonesians, major international conservation organizations seek to persuade the government to declare Kalimantan a forest preserve in return for international support. Strange as it may seem, making the Dyaks into the world’s most feared forest rangers may be the only sure way to preserve Indonesian sovereignty, with provisions to grandfather into legislation certain long-standing economic activities. No one, for example, wants to close the oil fields (Dyak leaders talk of revenue sharing).<sup>3</sup>

In the so-called real world, the foreign affairs and national security community do not wake up each day thinking about the environment. For them, however, Kalimantan ought to be a wake-up call; it is representative of a pattern, evident in the developing world, in which environmental change has become a contributing factor to conflicts and tensions short of war or rebellion.

More than two decades have passed since Lester Brown of World Watch startled national security experts with the novel proposition that there was such a thing as environmental security. In 1989, the timing and venue were better than now. Just as the Cold War ended, Jessica Matthews revived the concept in a seminal article in *Foreign Affairs*, which commands an audience in the foreign affairs and national security establishments. Even so, there is still no agreed-upon framework for considering environmental security. Surely, the first source of discord lies in the fact that environmentalists take an expansive view of security, while the national security community, military and civilian strategists alike, have a restricted definition. For them, the search for a “new paradigm,” to include the environment and “human security” (in vogue in Japan and Canada) represents thinking too far “out of the box.” In contrast, authoritative statements about environmental security, such as the UN’s Brundtland Commission report (*Our Common Future* 1987), venture out of that box, to fix on “planetary” threats, over long-term horizons, for example, climate changes, population pressures, and biodiversity losses.

The U.S. Department of Defense (DOD) does not ignore environmental security but customarily defines it in a narrow way as the military’s responsibility for environmental remediation (recently, about 1.5 percent of DOD’s budget). The Department of State and the United States Agency for International Development (USAID) have offices that deal with the international environment, but they are not the people who deal with international security issues. Exceptions exist, among them, two regional U.S. military commands, The United States Central Command and The United States Southern Command (CENTCOM and SOUTHCOM), and a few scholars who have examined links between the environment and conflict; however, except for the pioneering work of Thomas F. Homer-Dixon, director of the Centre for the Study of Peace and Conflict at the University of Toronto, these studies are little known. The academic literature is diverse and, in our view, suffers from an excessive reliance upon deductive argumentation.<sup>4</sup> No wonder many policymakers think that environmental security is not ready for prime time.

In the international arena, security is primarily about violence, tension, and instability. This will not change, but what has changed as the world changes are some of the causes of instability. The drug war, once seen as a distraction by the coldest of the cold warriors, rose to the top of the security agenda in Latin America with startling rapidity. No one now contests that the violence spawned by the drug trade is the largest threat to Western Hemispheric security; today the raging argument is about the proper strategy. In less dramatic fashion, the authors expect the environment will force its way onto the global security agenda because of the accelerating pace of environmental change and its increasing costs to economies and societies. Disruptions of societies produce instability, and the environment is not an exception.

### *Canary in the Mine*

In the metaphor that environmentalists favor, environmental security is a “canary in the mine,” warning of conflict or disruptive tensions within nations and across borders. We need to mesh strategic and operational knowledge with academic and policy research to illumine the links between the environment and domestic and international tensions.

Consider four fundamental propositions that link traditional security concerns with a set of relatively new causes for violence and tensions:

- In the recent past, environmental changes have contributed to armed conflicts and tensions short of war in several parts of the world.
- In the next decade, accelerating environmental changes may increasingly act as a spur to conflict and, particularly, to tensions short of war within and among nations.
- Environmental security is a two-way street. Damage to ecosystems fosters tensions, but instability also feeds environmental damage, often attaining the characteristics of a vicious cycle.
- Poverty is a known source of conflict. Environmental change has joined the list of causes of poverty and tension.<sup>5</sup> Some cases examined in this paper also suggest a reciprocal relationship between instability and environmental change, particularly where the legitimacy or authority of the state has been put at hazard, as in Colombia.

### *The Kalimantan Test*

Kalimantan is a stark example of how environmental damage can stimulate conflict. As long as the Christian Dyaks were more or less left alone in their forests, they coexisted with a quite different culture, that of Muslim Indonesia. Only after the Madurese colonists severely disrupted the environment did serious conflict break out.

In a given situation, does environmental change contribute significantly to violence or to important societal tensions? The evidence is conclusive that environmental changes or stresses contribute to conflicts and tensions within and among nations.<sup>6</sup> The examples span the globe, from Southeast and Central Asia and the Middle East to Latin America and Africa. If the reader is looking for reassurance that this is a temporary factor, it will have to be found elsewhere. The accelerating pace of environmental damage suggests that in the decade ahead, “environmental scarcity” (Homer-Dixon’s phrase) and the disruptions it provokes will become increasing sources of tension.

### *New Sources of Tension*

Most commentators treat the environment — forests, reefs, and so on — as distinct from other resources. The standard explanation is that environmental assets are *renewable*, in contrast with nonrenewable resources such as petroleum. Perhaps the most important distinction lies in another quarter. Environmental assets, once thought limitless, are not. Their scarcity, in certain locales, is a new source of tension.

Take, for instance, water sustainability. From Karl Wittfogel until recent days, freshwater was thought to stimulate cooperation, not conflict (Wittfogel 1957). Not so, with the seas. After all, the civilizations of the Middle East and Asia were built on irrigation, then and now a cooperative enterprise. Today, water is recognized as a *new* source of conflict, contradicting optimism that environmental scarcity will not provoke much transborder tensions. Watersheds, riverine boundaries, upstream-downstream contention, water takings, silting, and pollution all have the potential to stimulate contention within and among nations.

Water is not solely a problem for regions where freshwater deficits are certain, such as the Near East, continental Asia (including China), and Africa. In the monsoon lands of Southeast Asia, concern exists about how much water China will take upstream from the great Mekong River, which waters the rice basket of Southeast Asia.

By common consent, the greatest risk to the Panama Canal has nothing to do with traditional security threats but with the watershed, the source of water for the canal and locks. Panama has done a fine job of managing the “traditional” watershed, but scientific studies show more water is needed to meet projected demands for the Canal and for municipal and industrial uses.<sup>7</sup>

### *Cumulative Environmental Damage*

Major natural disasters are huge, sudden environmental insults. We can judge fairly quickly their impact on immediate security concerns, though their long-term effects are less visible. Mostly, however, environmental degradation is a cumulative process — the exhaustion of a fishery, the serial destruction of forests, and urban air and water pollution. While environmental degradation’s costs are hard to calculate, they amount to a certain tax on future growth.

Even less understood is the push from cumulative environmental damage to instability. It is not hard to find historical examples, but what about the future? Is environmental security a concept too elusive for forecasting conflicts and tensions? Research studies of a prospective nature to assess the risk of conflicts and tensions derived from environmental change are lacking. Presumably, this is because of the *newness* of the subject. Every day, experts seek to understand the course of tensions derived from well-known causes in the Middle East and elsewhere.

Major environmental change has become a rough predictor of instability. When coupled with extant territorial disputes, it can become a predictor of international tensions. Studies that mesh physical science with political economy are suitable vehicles for forecasting conflicts, derived in some measure from environmental stress. Though there is never enough science as far as scientists are concerned,

much is known about environmental trends, the rate of reduction of forest cover, water availability, reef damage, and so on. Following the facts, it is possible to forecast plausible impacts from environmental change on societies and instability. Here, we are not talking about hard predictions, which imply an unwarranted certainty, but bounding the possibilities for instability and tension in a realistic way.

Later in this paper, an experiment in science-based forecasting is briefly summarized. Scientists, policy experts, and academics looked at the effects of ecosystem damage on the Wider Caribbean (including Central America) and the Pantanal, the world's largest wetlands. Using a tested risk model, they projected for the next 10 years the impact of environmental trends on growth, society, and instability.

### *A Three-Dimensional View*

It may be helpful to visualize the relationship of environmental change to various sorts of conflict in three ways — two rather obvious, the third less so.

- *The Temporal Dimension.* Historical cases, current examples, and, more speculatively, forecasts of future troubles.
- *The Internal-External Dimension.* Conflicts or tensions limited to a single country versus those with demonstrable international ramifications.
- *The Violent-Nonviolent Dimension.* War, rebellion, and violent instability versus tensions short of war or systematic violence.

The conventional wisdom holds that environmental damage is far more likely to cause instability within nations than to feed cross-border conflict. Here, the news from the forests and the seas is not cheery. Transnational tensions, derived in part from environmental change, appear to be on the rise. For understandable reasons, historical treatments of the links between the environment and instability focus primarily on war and rebellion, for example, the links between Haiti's failed state and deforestation or the fall of Ferdinand Marcos in the Philippines. Conflictive relations that stop short of shooting also harm societies, and this is not a negligible risk in developing nations, where environmental damage goes hand in hand with economic distress, migration, stakeholder disputes over resources, rising crime, and political instability.

The Pantanal is an excellent illustration. No one will repeat Paraguay's nineteenth-century mistake and attack Brazil, but serious discord relating to the huge upstream-downstream ecosystem shared by Bolivia, Brazil, Paraguay, and Uruguay, would hurt these nations. Here, landscape conversion (primarily by large-scale agricultural interests), silting, and pollution already have had an impact. Local stakeholder, cattle, mining, and soybean interests vie with local communities, provincial officials, environmentalists, and indigenous groups over how much destruction is enough.

The stakes are high: economic activity; water quantity and quality; and, should the Pantanal shrink too far, damaging floods downstream in the confluence of the Paraguay and Paraná rivers. The Pantanal (and other cases) provide reminders of an established truth: Not every security problem has a military solution, a stipulation that particularly applies to environmental security.

The risk of environmentally derived conflict is interlaced with all sorts of vulnerabilities, such as water and mosquito-borne plagues, the destruction of forests and watersheds, and the exhaustion of great fisheries in places as widely separated as the South China Sea and the Caribbean.

To a great extent, these problems are the responsibility of civil authorities and civil society. If a military role means tying a soldier to every large tree, the answer is no. Still, the management of environmental security risks may have a military component. Disaster relief is a generally accepted mission. "Warning of war" involves the military; to some extent, so does preventive diplomacy. If international regimes are established to manage resources (for example, fisheries) modest military or Coast Guard participation may be warranted. More controversial, though occasionally likely, are requests for U.S. participation in peacekeeping operations to prevent or wind down conflicts, derived in part from environmental change. Less likely, but not impossible, would be the invocation of treaty obligations by a regional partner of the United States.



### *Sustainable Development*

Environmental security falls under the rubric of what the international community calls sustainable development, defined here as the conservation and wise use of the environment in the service of growth and national well-being. Hardly anyone now argues that developing countries can achieve growth in the *long run* by ignoring the environment. There is a Hobbesian calculus at work, in which the cumulative costs of environmental destructions, sooner or later, cancel out the growth from unrestrained exploitation.

In fact, the cycle is likely to be fairly short, as we have learned with respect to fisheries and many tropical forests. These assets, unless managed in sustainable fashion, all but disappear, ending the possibility of making much money from them. But what of the short run? Balancing short-term growth against long-term loss is not something that rich nations do well. For developing countries, it is a huge challenge. Still, growth will come easier for nations that nurture renewable resources and use biodiversity to stimulate growth and jobs.

### *Policy*

This paper is about risk analysis, not a prescription for policy. That said, our findings have policy implications. No one wants to be thrust into preventable conflicts. Sooner or later, the links between the environment and conflict will impel the United States and other nations to seek ways to contain the growing risks, through investments in preventive diplomacy. This will require a common understanding, missing today, among the United States, its Organization for Economic Cooperation and Development (OECD) partners, international institutions, and, above all, the developing nations regarding the nature of the threat. To curb the threat requires the international community to “act locally.” The reason is simple: the struggle for wise use of the environment is likely to take place forest by forest, watershed by watershed, and reef by reef.

Environmentalists talk of a “grand bargain” between “first” and “third” worlds, an endeavor that is certainly relevant to global warming. However, the realm of environmental security demands something else, a series of small bargains, built on science and tailored to local situations to mitigate and arrest environmental damage. Working from the ground up, perhaps a strategy can be built that links the environment, growth, and security in the service of peace and growth. Here is where the work of political economy lies, at the intersection of traditional security concerns and broad national and international policy. In time, environmental security as a field of study may bridge traditional security concerns and sustainable development; that is the way, in fact, that a number of scholars from Asia and Latin America visualize it. In its present diffuse state, however, environmental security remains a bridge too far.

## **Environmental Change and Environmental Security in Southeast Asia, Latin America, and the Caribbean**

There is now more recognition in Southeast Asia, Latin America, and the Caribbean than in the power centers of Western Europe and the United States of the increasing role of environmental damage in conflicts and tensions short of war, both within and among states. While environmental security is by no means a household industry, there is growing interest, which is by no means circumscribed by civil society. In Latin America and the Caribbean, the authors know of at least five international conferences that have taken place or are planned in various parts of the region focusing on the subject. Two are mixed government and civil society meetings (with high-level government participation), while the others are NGO-driven meetings.

Similarly, in Southeast Asia, in 2001, almost everyone interviewed for this study in Indonesia, Thailand, and the Philippines highlighted the consequences of spreading environmental damage for national security. Further, there is the South China Sea, where disputes over islands, reefs, territorial waters, and exclusive economic zones involve not only nonrenewable hydrocarbons but also a great fishery that is now in decline. In these regions, people have become converts to environmental security because they are living the problem, experiencing firsthand the consequences of environmental change.

### *Getting Down to Cases*

This paper touches upon two regions that, notwithstanding different cultural traditions, face certain common developmental challenges, among them, the linkages that run both ways between environmental damage and various types of conflict.<sup>8</sup> The best way to proceed, we think, is to examine with the brevity necessary for a short paper a series of cases from both regions that have been treated more amply elsewhere by the authors and others.<sup>9</sup>

- *The Fall of Somoza.* Historians and other observers date the beginning of the end of the Anastasio Somoza kleptocracy in Nicaragua to the 1974 Managua earthquake. Mismanagement and corruption — particularly by Somoza's National Guard — hampered the international relief effort, angering the populace and an international community that had paid little attention to the sins of the Somozas, father and son. From this time forward, the Sandinista guerrillas began to gain popular support against what was previously thought an impregnable dictatorship.
- *The Fall of Marcos.* In the case of Marcos, for whom the title of kleptocrat was invented, cumulative environmental damage played a significant role in the decline of his regime. During his lengthy rule, many forests were devastated by logging and, on the island of Negros, by cutting trees for sugar plantations, uprooting the way of life of rural and forest communities and pushing their young men into the urban proletariat or the plantations. Numbers of them became recruits for the guerrilla New Peoples Army (NPA), which appeared to be winning a spreading civil war, until Filipino "people power" forced Marcos into exile in 1986, depriving the NPA of its *raison d'être*.
- *Haiti.* A century of deforestation stripped Haiti of its forests. Having gone without forest cover for so long, Haiti also lost much of its topsoil, washed down to bare rock by the annual rainy seasons and occasional hurricanes. Deforestation kept most Haitians permanently poor, spawning internal violence and tensions of one sort or another with the Dominican Republic, which shares the island of Hispaniola with Haiti. Without a major effort to reforest and restore arable land, no easy task with so little topsoil, Haiti is likely to remain a deeply debilitated state.

In Nicaragua and the Philippines, other factors, notably oppression and corruption, were most important in regime decline, more so than the Cold War, which was a complicating factor for both nations. None of this, however, contradicts the fact that Nicaragua is an object lesson of how a sudden, massive environmental insult can help set in motion a violent change of regime.

In the Philippines, which is perhaps the most studied example of how environmental damage contributes to violence and regime change, no hindsight is necessary. In contemporary analysis of the resuscitation of the NPA, defeated in its earlier incarnation as the "Huks," deforestation was recognized as a major contributor to the social disruption that fed the guerrillas.

Haiti, like the example of Kalimantan at the beginning of this paper, is a stark illustration of what environmental damage can do to a country's economy, society, and stability. If not the principal cause of Haiti's plight, as some assert, deforestation certainly shares top billing with the institution of caste distinctions, based on shadings of skin color, which has so distorted Haitian society.

### *Indonesia*

Indonesia is the world's fourth most populous country, after China, India, and the United States. The causes of Suharto's overthrow in 1998 are fairly easy to describe, so much so that one wonders why it took so long to realize that he was on the way out. They were, in order of magnitude, the familiar devils of corruption and oppression, the Asian financial crisis, and, as the end of the regime neared, the evident exhaustion of the man and his personal vision of a restored Javanese empire.

In Suharto's ouster, the environment played at most a minor role, but it did contribute to the decline of Suharto's legitimacy in his administration's last year. The fires that ravaged the forests of Sumatra and Borneo in 1997 were, in the main, set at the insistence of Suharto's "cronies" to clear land for palm oil plantations. In an El Niño year without rain, the fires raged for months. Indonesians blamed his regime for the fires and the months of choking smoke and for being powerless to bring the fires under control.

Today, of course, the situation is vastly more complex, with the return of separatist forces and communal and religious tensions, long suppressed under Suharto, notably in the Sumatran province of Aceh and in Irian Jaya, Indonesia's half of the island of New Guinea. No one knows whether Indonesia will hold together. What can be said and what knowledgeable Indonesians are saying is that environmental damage is exacerbating the violence.

This is true not only in Kalimantan but throughout Indonesia, even where the violence amounts to localized thuggery, which the authorities either tolerate or cannot control. Where violence occurs, disputes usually take place among national and local stakeholders over resources, not just hydrocarbons, including the exploitation of "green" assets, forests, fisheries, and reefs. Though it is more speculative, a case can be made that the pace of environmental destruction is reaching the point where it is becoming a threat to the integrity of the Indonesian state.<sup>10</sup>

Finally, it is worth noting the obvious — because of its proximity and importance to its neighbors, Indonesia's plight has international ramifications. These ramifications are primarily economic, but they also include unwanted migration to Indonesia's neighbors; an increase in piracy in nearby waters, including the Straits of Malacca; and the vacuum created in the Association of South-East Asian Nations (ASEAN), which had often depended for its cohesion on Indonesian leadership, now virtually absent.

### *Colombia*

Colombia has the unfortunate distinction of having the longest running active civil war in the world. The violence began in 1948, long before environmental change became a serious issue for Colombia. Today, however, there is a reciprocal relationship among the drug trade, the various insurgencies and "militias," and ecosystem damage, which together have taken on the characteristics of a vicious circle.

For years, toxic chemical runoffs from cocaine labs have polluted groundwater and nearby habitat, releasing a cumulative total of around 5.5 million gallons of toxic brew into the environment, according to U.S. estimates. With the shift of industrial farming of the coca plant northward from Bolivia and Peru to Colombia, numerous coca plantations, usually hidden among the forests, are damaging forests and watersheds. Year after year, these plantations use considerable amounts of pesticides, which the industry can well afford. Though on a far lesser scale, the aerial eradication campaign, which uses a glycolphosphate herbicide on the coca fields, is causing some degree of harm to nearby habitat, simply because of unintended oversprays and sudden wind shifts.

In the main, it is the war in Colombia that is damaging the environment, a phenomenon seen elsewhere in the world, but ecosystem damage appears to have reached the point where it has become, in some measure, a new contributor to instability in a nation where there is far too much conflict already. In this respect, Colombia deserves further study, to measure first the physical effects of ecosystem change and then to estimate their impacts on society and the civil war.

### *Rivers of Uncertainty*

The Mekong River, mentioned earlier, needs little discussion, except to say that it harbors the major points of contention with respect to rivers and the environment, the management of forest watersheds that govern both the quantity and quality of the Mekong's water, "upstream-downstream" issues of water takings, pollution and silting, and for part of its course issues of being a boundary river. Consider too, that the Mekong is a river that begins in China, which faces severe water deficits in certain regions, and ends in Southeast Asia, where the Mekong waters one of the world's great grain baskets.

No one will go to war with China over the Mekong, but it illustrates what we loosely call tensions short of war, derived in part from environmental change, which has the potential to harm societies and economies, even though no shot is ever fired in anger. The huge Upper Paraguay River Basin/Pantanal complex, which begins in the Andes and ends several thousand miles to the southeast in the Atlantic, is another such example.

In Thailand, Mahidol University is in the process of "adopting" (the authors' word) the Tachin River Basin, an internal river watershed, important to Thailand's economy. Under the rubric of environmental security, the university, with national and local encouragement, hopes to help (and study at the

same time) local stakeholders, communities, agricultural and industrial interests, religious groups, NGOs of various sorts, indigenous groups, and local authorities to move toward resolution of festering stakeholder disputes of the management of the basin.

Small nations have rivers, too. It is not widely known, but from Mexico's southern border with Guatemala to Panama in the south, there are 37 "international" rivers. A few are boundary rivers. The San Juan River, for example, marks most of the border between Nicaragua and Costa Rica. Cooperative efforts to manage the San Juan River Basin, a major part of which contains, by some accounts, the largest stretch of relatively undisturbed Latin American tropical forests north of the Amazon Basin, have been put on hold because of a complex dispute over river transit.

Most of these rivers, however, run through two countries. The Rio Lempa, which begins in El Salvador and ends in Honduras, is an exemplary case of "upstream-downstream" contentions over water takings, silting, and pollution from agricultural and industrial uses. In a worst-case scenario, involving a renewed conflict between the two countries, the Rio Lempa is a prime candidate for a causative agent. In the words of a respected former foreign minister from another country, "The Rio Lempa is a good example of environmental security. It shouldn't be allowed to run dry, but the governments on their own will never find a solution. Civil society will have to take a lead."

Under any circumstances, Hurricane Mitch would have been a disaster, but because of the wholesale prior deforestation of watersheds, Mitch assumed biblical proportions for Honduras and parts of Nicaragua. Deforestation significantly reduces the capacity of the soil to hold water by about one-third, according to some scientific estimates, making conditions more favorable for terrible landslides and floods from major hurricanes and typhoons. Honduras' economy, not robust to begin with, has been set back anywhere from a decade to a generation, depending on whose estimate one believes. Added to the human and monetary costs *in situ* are around US\$2 billion in reconstruction aid from the international community, plus migration from Honduras to the United States and from Nicaragua to Costa Rica, where Nicaraguans, after successive bursts of migrants, now make up about one-eighth of Costa Rica's total population after successive migrations.

### *The Gulf of Thailand and the South China Sea*

The Gulf of Thailand provides a striking example of how environmental security concerns play out in a largely enclosed maritime area, as defined by the Law of the Sea Treaty. Here, the territorial sea and the exclusive economic zones (EEZ) are shared by four countries: Thailand, Cambodia, Vietnam, and Malaysia.

At the International Studies Association (ISA) conference in Hong Kong in July 2001, where an earlier draft of this paper was presented, Carl E.R. Gundy-Warr of the National University of Singapore presented a comprehensive treatment of the Gulf of Thailand, buttressed by scientific data about the increasingly deplorable state of the fishery. His presentation led the authors to revise an earlier draft to stress three points about the Gulf of Thailand, all relevant to the comparative focus of this paper:

- Even though there is no territorial dispute — the boundaries for territorial waters and the EEZ in the Gulf of Thailand have been settled in accordance with the principles of the Law of the Sea Treaty — the lack of an international regime for fisheries is a major factor in the serial depletion of the fishery, which has reached alarming proportions.
- Today, each state is responsible for policing its share of the fishery. Thailand and Malaysia have somewhat effective maritime patrols, while Cambodia has no effective maritime presence at all. Moreover, "hot pursuit" is not part of the package, so that a Thai patrol, for example, cannot act against illegal fishing if the boat escapes to waters under the responsibility of another state.
- Stakeholder conflicts, particularly the contest between an endangered artisanal fishery and the industrial fleets, mar the prospects for saving the fishery, even within the EEZ of Thailand, relatively well endowed with patrolling capacity.

This pattern, with important local variations, occurs in the Caribbean Sea and the South China Sea, both of which boast huge, threatened fisheries, though the destruction is less advanced than in the much smaller Gulf of Thailand. In the South China Sea, the task of conserving and restoring the fishery is

complicated by territorial disputes among China and several of its Southeast Asian neighbors, notably Vietnam and the Philippines, but also involving Malaysia and Brunei with respect to the Spratly Islands.

Other papers at the Hong Kong ISA conference — notably those of Liselotte Odgaard of the University of Aarhus in Denmark; Stein Tonnesson of the International Peace Research Institute in Oslo, Norway; and Ian Townsend-Gault of the Faculty of Law of the University of British Columbia in Vancouver — outline major dimensions of the South China Sea disputes. Their papers reinforce the authors' earlier conclusion, expressed in other writings, that the comparison of the South China Sea with the Caribbean is particularly apt.

Though the world's attention focuses on the prospect of large hydrocarbon resources (which may not exist) in the South China Sea, the immediate danger lies in another quarter, in the progressive exhaustion of the fishery, a renewable resource that has been a huge source of protein for China, Southeast Asia, and the international fishery. Odgaard's and Tonnesson's papers explore certain possibilities for resolution of the territorial and maritime disputes, which might open the door to real maritime cooperation.

In the view of the authors of this paper, the prospects for settlement of these disputes have been largely stymied by China's position, which has treated the territorial issue as legally settled in China's favor and consequently not subject to negotiation. Still, one avenue, begun in "track two" talks (in the ASEAN idiom) among China and the nations of Southeast Asia, is worth noting in a comparative context. After initial reluctance, China has engaged with its neighbors in discussion of a "code of conduct" for the South China Sea among concerned states, in line with China's position that uses of the sea are a fit subject for discussion, independent of the "settled" territorial issue. The code of conduct was intended by ASEAN, which first proposed one in 1999 to reinforce international prohibitions against the use of force; the code also involves the fishery because its confidence-building measures focus on cooperative endeavors emphasized by China. Not yet an agreed-upon document, a code of conduct, if it becomes reality, may amount to no more than a useful expression of principles, without sufficient teeth to regulate overfishing.

Finally, China might show enough self-confidence and self-restraint to move to settle its maritime claims through negotiation, which would, under any conceivable scenario, leave China with the largest share of the South China Sea as its territorial waters or under its EEZ, though not with roughly 80 percent of the sea shown by China's maps as its territory. Indeed, Odgaard's paper suggests that there are reasons for cautious optimism.

It must be stressed, however, that a settlement, though enormously desirable, would do little by itself to conserve and restore the South China Sea fishery, absent effective international arrangements for policing it. The parallel with the Gulf of Thailand and the Caribbean is clear. Regardless of the state of demarcation of territorial waters and EEZs, the lack of effective regional arrangements to police the fishery has put each of these fisheries in peril. In each case, environmental degradation — expressed in serial overfishing, coastal and maritime pollution, and reef destruction — has immediate and long-term security implications.

Notwithstanding a growing recognition of the environmental danger, reflected in hortatory statements about cooperation in conservation and restoration of the fishery, most nations remain quite reluctant to enter into enforceable regional arrangements. There is no legal bar to them, even in the absence of delimited maritime boundaries, as Townsend-Gault points out in his paper. What holds governments back is the psychology of sovereignty. Governments are extremely cautious about agreements that might involve even modest adjustments in the traditional scope of sovereignty, through international regimes involving shared arrangements for policing the fishery across maritime boundaries and EEZs. In their absence, the outlook is for continued depletion of the dwindling fisheries in the South China Sea, the Gulf of Thailand, and the Caribbean Sea, with predictable effects upon regional economies and societies.

### *Lost at Sea: The Declining Fisheries of the South China Sea and the Caribbean Sea*

To the authors' knowledge, little if anything has been written by way of comparison about the South China Sea and Caribbean Sea, perhaps because their geopolitical situations are quite different, notwithstanding the presence of a great power in each region. Both regions, of course, harbor disputes over maritime and other frontiers, but they play out rather differently. In the Wider Caribbean, which includes Central America, the important disputes, a few of which have been cited in this paper, are among the

smaller nations and not with either the United States or Mexico, the other very large country watered by this huge ecosystem. In the South China Sea, China is a party to several disputes, notably with Vietnam and the Philippines.

Tourism supplies a significant part of the Caribbean economy, so that maritime and coastal pollution, which know no frontiers, present increasing concerns to the industry, itself a contributor, though to nowhere near the extent of urban and industrial runoffs. Maritime and coastal pollution are also harming part of the South China Sea, but the region is not a major tourist destination, except for Taiwan and Hainan Island (where, in particular, internal Chinese tourism plays a role in the island's economy). In the South China Sea, the prospect of significant deposits of oil or natural gas in the contested areas complicates territorial disputes. This is not true of the Caribbean, with one relatively small exception, a latent dispute between the island nation of Trinidad and nearby Venezuela.

What unites the two seas is the progressive exhaustion of their great fisheries, abetted in each region by industrial-strength fishing fleets and the lack of effective international regimes to exercise stewardship over either of these fisheries. It is possible to conceive of international fisheries regimes even without a settlement of territorial disputes, as China has suggested, upon occasion, without admitting that there is any basis for a dispute over what are, in Chinese eyes, its territorial waters, for a variety of reasons, particularly the hold the classical notions of sovereignty retain upon politics in both regions. Yet, such regimes remain distant prospects.

Stakeholder states in the South China Sea are concerned about the future of the fishery because they see that it is being depleted. The extent may be arguable — it is not in the Caribbean — but the trend appears fairly clear. This is so much the case that, several years ago, the fishery became an item for the ASEAN-style “track two” informal discussion format, prompting talks among experts from China and concerned ASEAN nations over the state of the fishery.

Without attempting fine distinctions, it is reasonable to conclude that the two seas have two main points in common: 1) a declining fishery, primarily due to overfishing but also in varying degrees to maritime and coastal pollution and to reef damage, manmade and natural (such as the El Niño-prompted die-off of corals) and 2) maritime disputes that impede any effort at international management of the fishery.

Unless steps can be taken to arrest the decline and eventually restore the fisheries, their deterioration will have effects on societies and politics, beginning with losses of employment and a major source of protein, with the consequent need to replace it somehow in ways that may be far less cost effective.

In the end, a major disruption of these fisheries, once thought to be limitless environmental assets, is likely to increase poverty and tensions, as stakeholders scramble for a share of declining resources, before the money and the fish go away. We mention below alternative futures, contingent upon environmental trends, for the Wider Caribbean. It may be useful to conduct a similar exercise with respect to the South China Sea and, eventually, with respect to the seas of southeastern Indonesia, where there is great concern over the destruction of marine habitat in the area known as “Wallacea,” or the so-called Wallace line (named after Charles Darwin's contemporary, Alfred Wallace), which divides the flora and fauna of Asia from that of the Antipodes.

## Civil Society

Almost regardless of the particular issue under discussion during our interviews, the question of civil society participation was raised in virtually all of our many conversations with contacts in both Latin America and Southeast Asia. It seems clear, at least to us, that creative arrangements for structured dialogue between governments and civil society stakeholders are essential if concerns over environmental security are to be effectively addressed. Our discussions in the two regions have led us to believe that three powerful factors have converged to create this intense interest in the role of civil society.

First, an increased interest in the role of civil society is a natural outcome of the growth and deepening of democratic governance and culture — albeit with different patterns and rhythms — on both sides of the Pacific. More broadly, in the same way that analysts have been speaking for many years now of “international political economy,” it is increasingly necessary to take into account “international political culture.” Part of this international political culture, which interacts with specific countries in specific

ways, is a strengthening norm — and expectation — in support of meaningful civil society input in governmental conclaves at all levels. When governments meet to discuss issues of local, regional, national, and/or international consequence, organized sectors and interested citizens — from academia, research institutes, NGOs, and the private sector — seek and expect opportunities for dialogue. As seen in the experiences of the United Nations' mega-summits in Rio, Cairo, Copenhagen, Beijing, and Istanbul as well as in the Summit of the Americas meetings in Santiago and Quebec City, and the recent ASEAN People's Assembly in Batam, Indonesia, the growing presence of the forces seeking dialogue between governments and civil society organizations is an observable fact. Looking ahead, one of the main challenges for environmental policy will be the question of how to deal constructively with this reality.

Second, the intensification of the information and communications revolution has heightened citizens' awareness of a wide array of political, social, and economic concerns and has enabled them to see their own problems in relation to those of citizens in other countries. Our research has shown us that, while researchers and civil society policy experts from the respective regions lack detailed knowledge about each others' circumstances, they are well aware of the shared nature of many of their environmental problems. Generally speaking, a reasonably good baseline for fruitful discussion between and among regions already exists and is ripe for further development.

Similarly, advances in information technology have allowed civil society organizations to exchange information worldwide and forge innovative interest-based and advocacy networks to address key issues. While the authors are generally skeptical of linear projections, there are compelling reasons for expecting this trend to gather further momentum in the next few years, even in countries that are resistant to widespread access to the Internet and other information sources.

Third, there exists widespread dissatisfaction in both Latin America and Southeast Asia with the negative aspects of globalization, and this dissatisfaction, often experiencing inadequate responses through existing channels of expression in national contexts, frequently finds its outlet at international fora, where various types of dissent are accepted or at least tolerated. In part, this comes about because of the limited capacity of national governments to deal with such massive problems as financial crises, persistent poverty and inequality, and worsening environmental degradation. In part, this also results from frustration over weak domestic political institutions and long-standing problems of corruption and a lack of transparency and accountability. Yet, it should also be recognized that governmental fora often serve as lightning rods for a kind of free-floating resentment stirred up by the rapid changes and mixed results produced by globalization. Again, since this situation is (at least for now) an unavoidable fact of life, the challenge is how to address these frustrations in constructive ways.

In a more immediate sense, the growing interest in the role of civil society is clearly related to important political and economic developments that took place in the respective regions during the 1990s, and it is worth pausing to note these developments in order to put the issue in perspective.

In Latin America, the collapse of the "state-centric" model of development in the 1980s and the process of neoliberal economic restructuring in the late 1980s and early 1990s brought not only economic change but also political change, as networks of political representation were severely disrupted. Privatization, trade liberalization, deregulation, the elimination of subsidies, and reductions in public sector employment all helped to restore macroeconomic balance, but they simultaneously weakened private and public sector trade unions, disrupted the means by which political allegiances and constituencies were forged, and rendered inadequate or obsolete the thinking and programs of many political parties.

Traditional parties became increasingly fragmented and weak, voters deserted them in large numbers, and "neopopulist" presidents, such as Fernando Collor in Brazil, Carlos Menem in Argentina, and Alberto Fujimori in Peru, ascended to power. These presidents, however, tended to see themselves as above Congress and the courts; thus, their tenures in office were marked by corruption and abuses of executive power. With political parties held in low esteem and given little credibility by the public, civil society organizations, which have been growing in number since the democratic transitions of the early 1980s, have increasingly sought to fill the huge shortfall in effective political representation. While there is enormous variation among these groups in terms of competence and professionalism, many have emerged as key contributors to public discussions of important national and international policy issues.

In Asia, the development of civil society has been slower than in Latin America, but it is clearly gathering speed, especially in Southeast Asia. The growth of civil society organizations working on

environmental issues is particularly noteworthy, with a wide array of scientists, NGOs, and community associations actively engaged with problems of air and water pollution, sustainable forest use, watershed management, and the protection of marine and coastal areas.

The central event of the 1990s, however, was the financial crisis of 1997-1998, and here, too, economic change propelled political change. Charges of crony capitalism and a lack of transparency brought increased scrutiny of circuits of patronage and private gain from public resources.

During the course of the authors' latest research trip to Southeast Asia, the winds of political change were clearly in evidence. In Indonesia, President Abdurrahman Wahid, under parliamentary investigation and the target of street protests for two financial scandals, was on the way out.<sup>11</sup> In the Philippines, President Gloria Macapagal-Arroyo had just replaced Joseph Estrada, who had been effectively ousted from office by the mass protests of "People Power II." And in Thailand, the new Prime Minister, Thaksin Shinawatra, was under active investigation by the National Counter Corruption Commission for alleged concealment of assets prior to his election.<sup>12</sup>

These dramatic events, however, were matched by a less apparent but nonetheless evident increase in the number and strength of civil society organizations in the region. These groups potentially represent a valuable resource base of information and public perceptions relevant for officials involved in environmental decision-making processes.

It is sometimes feared that Southeast Asian countries are "not ready" for open discussions of civil society participation. In our view, while this may be true for a very few countries, a closer look at on-the-ground realities indicates that in most countries public opinion is running in the opposite direction, with the November 2000 ASEAN Peoples' Summit, which included participants from all 10 ASEAN countries, as the latest example.

## Concluding Comments

Our conviction of the increasing relevance and urgency of environmental security as a pressing policy issue was arrived at not deductively, but inductively, the product of listening to the observations and concerns of numerous governmental officials and nongovernmental representatives in both Southeast Asia and the Americas. That experience, in conjunction with quite apparent global trends, also convinced us of the need for the governments of these regions to make much more serious efforts than they have to date to institutionalize mechanisms for dialogue with civil society organizations in relation to worsening environmental problems that have the potential to lead to conflict.

How can governments be pushed in this direction? What are the research challenges to be faced as we try to identify potential environmental security threats before they lead to violence or heightened social tensions? Our view is that, as a practical matter, the answers to these questions tend to converge. Governments will not be spurred to action by theoretical or conceptual arguments, no matter how finely crafted, and will only respond to threats that can be explained empirically, with reference to specific locales, based on well-argued scenarios, within a time horizon of a decade or less.

The research challenge is similar. It calls for inductive investigations, and it is interdisciplinary in nature. Much more intensive efforts are needed to compile existing data and gather new data concerning such ecosystems as the Caribbean, Pantanal, Mekong River, South China Sea, and many others. At the same time, a full understanding of the threats to security in these ecological zones can only be achieved through analysis of the political economy of each. This sort of analysis is largely lacking for ecosystems, as they do not conveniently correspond to manmade boundaries and borders.

Hence, putting these two challenges together — the need to spur governments to action and the need to marry scientific data with political economy — it is our view that the most useful way to proceed is to develop a series of case studies that produce forecasts of value to policymakers, while building a comparative database useful to physical and social scientists. Toward that end, the North-South Center and the Rosenstiel School of Marine and Atmospheric Science of the University of Miami conducted an experimental two-day workshop in October 1999 to look at the cases of the Wider Caribbean and the Pantanal.

With the participation of approximately 20 environmental scientists, social scientists, and policy analysts and using a well-established environmental risk methodology, forecasts involving possible sce-



narios were generated for each ecosystem (Harwell, et al. 1999). These exercises, while very preliminary, proved useful, and both the methodology and the results were discussed at a conference in Wilmington, Delaware, that brought together U.S. and British officials working in their respective scientific, foreign policy, and national security agencies. By way of illustration, we have included an Appendix that touches very briefly upon these case studies as an example of the sort of approach to thinking about environmental security that we believe is necessary.

The preliminary effort described in the Appendix, however, is simply an initial, admittedly experimental step in the development of science-based, inductive case studies of potential environmental security threats affecting real people, in real places, and in real time. To have a lasting impact on the policy choices of decisionmakers, many more such studies will be needed, in greater depth and with the significant participation of experts from the regions in question.

## APPENDIX

### Two Preliminary Science-Based Case Studies

#### *A Framework for the Analysis of Environmental Security*

The environmental security framework (see Figure 1 below) used in our case studies of the Wider Caribbean and the Pantanal region builds upon an environmental assessment framework developed by the U.S. Environmental Protection Agency.<sup>13</sup>

The framework consists of three basic elements: 1) a planning and assessment phase that identifies the most probable causal linkages from human activities to environmental stressors that result in environmental effects, 2) a scenario and forecasting phase designed to link the likely environmental effects to vulnerable sectors of society and then to forecast the potential social impacts that might arise and become the causes of conflictive relations, and 3) a management and policy phase in which various interventions and options could be developed for minimizing the potential conflicts resulting from the societal impacts as well as modifying human activities to eliminate the causes of the problems.

**Figure 1.**  
**Framework for Conducting Environmental Security Assessments**



The application of this process to each case study involved first identifying and listing the human activities that are important sources of environmental stress. Each of these activities was examined to determine what types of stress they contribute to the environment. Each stressor was then examined to determine what component of the environment is most vulnerable (for example, wetland habitat, endangered fish, reefs) and what would be the most appropriate environmental indicator to use to assess its effects. The second phase of the environmental security framework focused on assessing which sectors of society were most vulnerable and what social impacts would occur if the environmental effects were to be realized.

These two phases of the framework help to provide policymakers tools they can use to examine the efficacy of various remedial actions. These actions and interventions can occur at various points on the environmental security framework. For example, decisions can be made to address the cause/s of the problems by modifying the human activities, thus eliminating the potential for environmental effects and societal impacts altogether. If that is not possible, interventions can reduce the impacts upon society from certain environmental effects, thus reducing the likelihood of conflicts.

The framework presented in Figure 1 is flexible, as it permits the exploration and evaluation by expert analysts and stakeholders of a variety of probable scenarios, using both quantitative and qualitative approaches. This forecasting capability can then be used to focus attention and resources on the most critical problems identified in the analysis.

### *Summary of the Wider Caribbean Case Study*

Politically, the Wider Caribbean encompasses the 37 nations of the Association of Caribbean States (ACS), that is, the island nations, Central America, Panama, Venezuela, Colombia, and Mexico. In scientific terms, the Wider Caribbean also includes much of Florida and the coastal ecosystems north to the Carolina coasts.

As of the year 2000, some 65 million people lived on the islands and coastal reaches of this vast ecosystem. By 2010, the area (excluding the United States) is projected to receive 28 million visitors per year by air and sea. Mining, industry, agriculture, and urbanization have led to high levels of sewage, pesticides, heavy metals, and solid wastes.

Chronic overfishing has depleted nearly every commercial stock. Near-shore ecosystems (such as mangroves, seagrass beds, and coral reefs) are at hazard. These ecosystems are at the point where natural and human drivers appear to be acting synergistically to produce severe habitat and resource degradation. The islands ("small island developing states," or SIDS, by UN definition) are especially vulnerable to environmental insults, natural and manmade. Balancing conservation with economic uses is increasingly complicated by troubled economies, rising populations, and greater demands for goods and services by residents and expanding tourism.

*The Caribbean Fishery.* One of the world's great fisheries, the Caribbean has been a major source of protein for the region, including the United States. The annual ex-vessel dollar value is conservatively estimated at several billion dollars. The fishery is tied to other services and activities, among them, tourism, which in the aggregate exceeds \$100 billion per year.

Today, coastal zones are at risk from explosive population growth and the sorts of development that pollute and degrade the environment. Pollution has damaged coastal and coral reef fisheries (habitat for many species). Sewage and/or industrial effluents have severely harmed reefs in Florida, Colombia, Venezuela, Jamaica, Barbados, Trinidad and Tobago, and Curaçao, among others. Serial overfishing, particularly by extra-regional, high-tech industrial fleets (where each ship's fishing power has quadrupled in a decade) has driven down stocks, even among pelagic fish. One after another, big fish in the reefs, bays, and fringing seas have disappeared, leaving smaller fish with lower reproductive value, threatening sustainability of many species.

The end result: Fish stocks have declined to critical or near critical levels in many locales. Local, artisanal fishermen are nearly out of business, often joining the unemployed. A decrease in the amount of available local fish means less revenues and less (relatively inexpensive) protein which, if replaced, is often imported at higher cost.

*Natural Disasters.* Everyone understands the power of a hurricane, more so than ever before after Andrew, Mitch, and Floyd. Less understood is the synergy between prior degradation of the environment and natural disasters and how their destructiveness is multiplied by human activity, from crowding shorelines and flood plains with dwellings, to cutting down forest watersheds. Not only the countries of Central America, but many of the islands are at risk from earthquakes, volcanoes, and the odd *tsunami*. Man has increased the risk, through a lack of building codes (or lack of enforcement) in earthquake zones and settlements on the sides of active volcanoes. Large nations with large economies can absorb a major disaster, but small countries suffer from environmental vulnerability in the sense that it is beyond the power of these states to cope with catastrophe.

Hurricane Mitch set back the economy of Honduras by a decade, and northern Nicaragua was similarly affected, leading to a mass exodus, not only to the United States but also to Costa Rica, where nearly 400,000 Nicaraguans now reside. At Stockholm, the OECD nations, including the United States, committed to funding massive aid for Central American reconstruction, but it remains to be seen whether that assistance will be sufficiently targeted to mitigate future disasters, as in reforestation and relocating bridges and settlements away from flood prone areas. The case study also discussed other vulnerabilities not treated here, among them, potable water, shipping, mining, agricultural runoff, and tourism.

*Sources of Conflict.* A principal task for the case study was to identify potential sources of conflict that might arise from environmental vulnerabilities. Grouped under five headings for purposes of analysis, each of these factors may also be viewed as a prime *indicator* of possible conflicts:

- Disruption of Economic Structure
- Resource Degradation Leading to More Resource Competition
- Human Health
- Territorial Disputes
- Policy and Management

For example, environmental change is spurring a resurgence of malaria and transmission of dengue, cholera, and other intestinal illnesses. Will diseases stimulate conflict? Not by themselves, but they levy higher costs on fragile economies, stress health systems, and lessen productivity. Similarly, while environmental changes have not caused territorial disputes (such as those between Nicaragua and Costa Rica, Haiti and the Dominican Republic, Nicaragua and Honduras, Trinidad and Tobago and Venezuela, and Panama and Colombia), these changes appear to be worsening the disputes. A cycle may be underway in which disputes hamper environmental management across land and maritime frontiers, an outcome that, in turn, further aggravates tensions. And an absence of coherent national policies and international arrangements for wise use of environmental assets makes it difficult to achieve sustainable growth, manage resources, and provide accountability for sources of pollution.

*Two Scenarios.* In the best of circumstances, over the next five to 10 years, environmental degradation will increase in the region, but the extent of that increase will be contingent upon how the nations of the region and the international community deal with the challenge. This finding led the study to forecast two broad alternative scenarios for the Wider Caribbean:

- *Lower Probability.* More effective national and international strategies, underpinned by science and hard data, to contain environmental loss and limit its economic and political costs. Growing cooperation among the Small Island Developing States and within Central America, extending to the United States and other OECD nations. Illustrative measures: international arrangements to restore the Caribbean fishery, mediation/arbitration of territorial disputes and revitalization of cross-border conservation, steps to mitigate future disasters, and the achievement of sustainable growth in a majority of the states.
- *Higher Probability.* Business as usual, largely unchecked environmental damage, leading to spreading economic losses and, in some nations, political unrest that unhinges democratic institutions. Criminality and recurring flows of economic refugees from the Wider Caribbean. Territorial disputes undermine international cooperation on various fronts and, in some locales, prompt low-level violence, perhaps involving militaries. A rather disengaged United States, where policy is characterized by more talk than action.

### *Summary of the UPB/Pantanal Case Study*

The Upper Paraguay River Basin (UPB) covers an area of 496,000 square kilometers, shared by Brazil, Paraguay, and Bolivia. Some 80 percent of the area falls within the states of Mato Grosso and Mato Grosso do Sul in Brazil. The Pantanal, the largest wetlands in the world (*pântano* is the Portuguese word for swamp), falls within the UPB and is composed of 10 large rivers and their floodplains, extending over an area of 138,000 square kilometers. The upper part of the UPB is formed by an elevated plain or plateau (*planalto*) above 200 meters in altitude, while the Pantanal lies below 200

meters and is subject to both seasonal floods and periods of drought. The Pantanal lies at the crossroads of three main ecological zones (Amazon, Chaco, and Cerrado) and is marked by extraordinary biodiversity.

Roughly speaking, about 30 percent of the population of the UPB work in the primary sector (agriculture, cattle raising, and poultry farming); 15 percent in the secondary sector (mining of manganese, iron, and gold; industry; and construction); and about 55 percent in the tertiary sector (business, tourism, and services).

Until the 1960s, economic activities in the region were largely limited to cattle ranching and subsistence production. At the end of the 1960s, a development boom resulted from public incentives and a wave of immigration. Since the mid-1970s, the relative balance between agriculture and mining in the region has been disrupted by the steady expansion of the agricultural frontier in the upper river basin. This has entailed the highly mechanized production of soybeans (for export), rice, and sugar cane (for the production of alcohol fuel). In recent years, tourism and ecotourism have grown markedly in the region.

The current development model is associated with a number of serious environmental problems. Throughout the UPB, fish stocks have been threatened by overfishing, with specific studies showing a dramatic decrease in catch and size of the better-known species. Gold mining upstream has resulted in large quantities of mercury being released into the river, contaminating fish downstream and potentially posing a public health threat to sport and subsistence fishermen. Wildlife poaching (jaguars, maned wolves, caimans, and snakes) and live animal trade (parrots, macaws, and monkeys) are also widespread, and the majority of offenders are not caught.

Commercial production of soybeans leads to soil erosion, and the use of heavy machinery compacts the soil and reduces its drainage capacity. Soy farmers cut down all vegetation, drain and channelize rivers, and do not practice crop rotation. In combination with the clearing of vegetation upstream and along the riverbanks, these factors lead to increased sedimentation in the rivers and into the Pantanal, significantly altering flood patterns. This has created a large number of cuts in meanders and increased the flood period in the areas adjacent to the rivers. Agricultural and livestock properties in these areas now have only three or four months of dry pasture, compared with a previous average of seven months. Average flood levels have increased as well.

Urban and industrial wastes cause serious water quality problems. Heavy organic loads are produced by the industrial sector, especially the alcohol and sugar industries. Less than 3 percent of the domestic and industrial wastewater generated in the urban centers bordering the Pantanal is properly treated.

In recent years, there has been a growing recognition that addressing the challenge of sustainable development in the Upper Paraguay River/Pantanal region will require engagement and institutional coordination among many governmental and non-governmental actors. For example, the Brazilian government convoked three public workshops in late 1997 and early 1998 to bring together federal, state, and local government officials and a wide array of NGO and international agency representatives to work toward a comprehensive proposal for integrated management of the UPB. Similarly, a large-scale project to develop an integrated water information system for the Upper Paraguay River Basin is under consideration. These sorts of arrangements, which represent coping mechanisms for dealing with the problems of ecological zones that do not conform to man-made boundaries, are very likely to increase in number.

*The Hidrovía (Paraguay-Paraná Waterway).* The most controversial policy issue related to the environmental security of the Upper Paraguay River Basin/Pantanal region is the proposed development of the Paraguay-Paraná waterway — or the “Hidrovía.” This project would entail the widening, dredging, and channel straightening of the Paraguay and Paraná rivers to create a year-round, 3,440 kilometer, north-south navigable waterway stretching from Cáceres, Brazil, to Nuevo Palmira, Uruguay. The intention of the project is to create a commercial transportation artery equivalent to the Mississippi or Rhine waterways, with the aim of reducing transportation costs and providing a deepened channel for heavy barges to transport soybeans, iron, alcohol fuel, and other goods downstream. The project would deepen linkages among the five La Plata Basin countries (Argentina, Uruguay, Paraguay, Brazil, and Bolivia) and add dynamism to the regional integration taking place through MERCOSUR. It has been estimated that full development of the Hidrovía could take as long as 25 years and cost more than US\$1 billion.

Proponents of the Hidrovía see numerous potential benefits from the project. Lower transportation costs would result in more competitive products and lower prices for consumers. Exports of agricultural

products, minerals, and timber would be increased. Government revenues would increase through increased trade and collection of transport tolls. Poles of industrial development would be created through new and expanded port terminals. New growth opportunities would arise in the shipping, navigation, and construction industries. One estimate foresees an overall doubling of commercial activity along the waterway by 2020.

However, critics worry that the Hidrovía is being pushed by private interests and by the trade, transportation, and foreign ministries of the involved countries to the exclusion of a serious assessment of its potential environmental impacts. They worry that the Hidrovía will repeat the mistake that led to the channelization of the much smaller Kissimmee River in Florida, which, at large cost, is now being “dechannelized” in order to protect another great wetland, the Everglades. In fact, initial environmental impact assessments (EIAs) for the Hidrovía have been severely criticized, including a 1995-1997 study funded by the Inter-American Development Bank (IDB) and United Nations Development Programme (UNDP). Outside reviewers found the engineering studies did not address long-term implications of water-level changes likely to be produced by the Hidrovía, nor did they go beyond one-dimensional flow-routing models to examine the complex interactions of surface and groundwater, spatial and temporal variability, and effects on the flora and fauna of the Pantanal.

Critics point out that navigational improvements, such as dredging, river straightening, rock blasting, and dike construction, would accelerate the velocity of the water and disrupt the natural pulsing of the water flow into the flood plain. Water quality and drinking water might also be affected. Mineral uptake by plants, the settling of sediments, and microbial processing influence the chemical composition of the water that flows through the Pantanal and downstream. Such pulsing disperses nutrients and sustains productivity and diversity in the wetlands. Normally, the Paraguay River adds its flood stage to the Paraná River two or three months after the Paraná’s own flooding, but the Hidrovía may have the unintended consequence of bringing the flood peaks closer together, aggravating flooding downstream.

A 1993 study by Wetlands for the Americas catalogued a long list of potential problems resulting from construction of the Hidrovía. Possible physical effects include loss of the regulatory or “sponge” effect of the Pantanal, loss of landscape heterogeneity (lagoons, oxbows, and channels), loss of wetlands (especially benthic habitats), and water quality deterioration. Biological effects included loss of biodiversity through changes in the hydrological regime, disruption of the growth and movement of floating vegetation that sustains fish and bird communities (navigation can also be impeded by unnatural accumulations of floating vegetation), changes in food-chain patterns, loss of fish diversity and productivity, and negative impacts on migratory bird species.

These physical and biological problems may also be accompanied by effects that pose direct negative impacts on human populations. Local rural and indigenous riparian populations (poorly consulted during EIAs, according to critics) may be displaced. The tourism and recreation sectors could experience losses, both through biotic effects and increased development along the river. There is a potential for the expansion of vector-borne diseases, especially malaria and schistosomiasis, through changes in habitats and the migration of poor populations. Beyond these concerns, the overall anticipated economic effects of the Hidrovía — the opening of new lands for agricultural production, further forest exploitation, and urban and industrial development — would likely intensify environmental problems (especially pollution) cited above.

Discussions are continuing among the five studied countries concerning whether and how to proceed with the Hidrovía. No overall plan has been agreed upon, and many believe that in the interim the Hidrovía is likely to proceed through discrete dredging and channeling projects gradually linked together — although scientists and environmentalists argue that this is a particularly short-sighted approach, almost certain to overlook important systemic consequences. Brazil, the country with the greatest stake in the well-being of the Pantanal, has declared a cessation of further work on the Hidrovía. However, the case study tentatively concluded that it was likely that the Hidrovía project will continue to advance, albeit incrementally, over the next five to 10 years. The principal uncertainties appear to be the pace of the project and the seriousness with which environmental consequences — and their social and economic effects — are considered and planned for, as this project for transport and commercial development moves forward.

*Three Scenarios.* Based on preliminary findings, there is little reason to believe that the environmental degradation of the Upper Paraguay River Basin/Pantanal region of Brazil, Bolivia, and Paraguay

will slow markedly over the next five to 10 years. Not one of the human activities or “drivers” identified in this case study (landscape conversion, use of natural resources, expansion of agroindustry and commerce, nor the introduction of non-native species) is likely to slacken in intensity. In fact, they are likely to intensify. In the context of pressures for global competitiveness and trade expansion, plans for the Hidrovía are likely to move forward, although not at a rapid pace, given present controversies over its possible environmental impacts.

Despite recent developments of innovative and promising institutional arrangements in the UPB and among the MERCOSUR countries, social tensions are likely to increase between those benefiting (industry, transport sectors, timber and mining interests, and financial sectors) and those suffering losses (indigenous peoples, small producers, health care sectors, and ecotourism professionals) from current trends and the development of the Hidrovía. This assessment leads us to forecast or “bound the possibilities” over the near to medium terms of three scenarios, two of lower probability and one of higher probability.

- *Rapid Institutionalization.* The first scenario, which has a lower probability, would see the rapid elaboration of improved local, national, and regional institutions for consultation, collaboration, and implementation in relation to the Hidrovía and broader issues of sustainable development. International support, including funding from multilateral sources, would be an important part of this scenario. Tied to this would be an exhaustive environmental impact assessment for the Hidrovía and follow-up actions in accordance with the findings of that EIA.
- *Institutional Spillover.* The second scenario, also of lower probability, would see a significant hastening of environmental decline brought about by the negative synergies already evident in present trends. This would be accompanied by heightened social mobilization and conflict and “institutional spillover” — the moment when politics exceeds the limits of the political system. If this were to take place in the context of broader national difficulties such as have occurred in the past in the region (financial crises, unstable regimes), it could lead to full-blown domestic political crises. Further possibilities include serious interstate disputes among the concerned countries over migration, transborder pollution, and the use of resources.
- *Incomplete Institutionalization.* The third scenario, seen in the case study as the most likely outcome and of higher probability, is a protracted phase of muddling through, with poorly supported and underdeveloped institutions grappling with mixed success to accommodate the interests of contentious social groups and to ameliorate deteriorating environmental conditions. This scenario envisions spikes of not insignificant tension among the UPB and Mercosur countries and sporadic incidents of social conflict, but it does not anticipate extended episodes of ungovernability or a consistent pattern of violence. In this scenario, the Hidrovía project proceeds unevenly but steadily, and international support to help overcome environmental problems in the UPB/Pantanal region is limited and inconsistent.

Each of these projected scenarios would be predominantly fashioned by decisions made by policymakers and citizens in Brazil, Bolivia, Paraguay, Uruguay, and Argentina. However, at the margin, choices made concerning support from the international community could have a significant impact on whether the first, optimistic “rapid institutionalization” scenario or the last, muddled “incomplete institutionalization” scenario prevails. Should the second scenario of “institutional spillover” take place, conditions will not be propitious for constructive international support.

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## NOTES

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1. We are indebted to colleagues in Asia and Latin America — too numerous to list here — with whom we have consulted over the past three years and whose work has enriched and encouraged our own. We also would like to acknowledge support from the Foreign Ministry of Japan and the North-South Center at the University of Miami.

2. The September 11, 2001, terrorist attack on the World Trade Center in New York revived interest in the “clash of civilizations” theme in relation to the notion of “Islam vs. the West,” but the consensus appears to be that it is an inadequate and inaccurate frame of reference for even that more limited conceptualization.

3. Authors’ background interviews on Kalimantan, Jakarta (1997, 2001). Kuala Lumpur (1998) Singapore, Manila (1999). Tracy Dahlby, March 2001. “Indonesia,” *National Geographic*.

4. For an academic view that casts theoretical doubt on the work of Homer-Dixon and his colleagues, see Nils Pieter Gleditsche, “Armed Conflict and the Environment: A Critique of the Literature,” *Journal of Peace Research*, May 1998. Gleditsche, in assailing a lack of proof of causality, inadvertently illustrates the difficulty of translating much of the academic discourse about environmental security into terms readily intelligible for policymakers and concerned citizens.

5. To find authoritative statements about the relationship of poverty to instability, one need look no further than the public record of U.S. government documents and congressional testimony, dating from the beginning of the Cold War. They include explanations for the Marshall Plan, “Point Four” (the forerunner to the USAID), the Alliance for Progress, the Caribbean Basin Initiative, the Kissinger Commission Report on Latin America and the Caribbean, and, after the Cold War, the North American Free Trade Agreement (NAFTA).

6. See, for example, Alexander Lopez, “Environmental Security Regimes and Regional Integration in Latin America,” Documentos de Estudio (#11), National University, San José, Costa Rica, February 11, 2001. Lopez, in a view that is becoming more common outside the United States, highlights the environment as a new, transnational security issue.

7. See the “Panama Canal Watershed Monitoring Project,” produced by the Smithsonian Tropical Research Institute, Autoridad Nacional del Ambiente, USAID, June 1999.

8. Until recently, most Asian observers felt there was little to be learned from Latin America, even with respect to the environment, where similarities, if one looked for them, had long existed. As it turned out, the environment, particularly the 1997-1998 forest fires and their “haze” (the polite phrase in vogue among ASEAN nations) would play a role in changing Asian attitudes, in conjunction with the Asian financial crisis and the institutional failures that the crisis revealed.

9. This paper draws on the authors’ previous work, which includes five informal discussion papers prepared for various audiences and conferences, a published essay by Frank McNeil, “Making Sense of Environmental Security” (2000), and a volume co-edited by Jeffrey Stark (with Felipe Agüero, 1998), *Fault Lines of Democracy in Post-Transition Latin America*. Lastly, this paper draws on several draft chapters from a forthcoming book, tentatively entitled *Environmental Security: Is It Real, Does It Matter?*

10. What happens next in Kalimantan is contingent not only on the future course of the conflict, but upon the twists and turns of the Indonesian political system in the months ahead. In published accounts and in talking with Western experts, one finds differing estimates of how quickly the forests of Kalimantan may fall to the chainsaws, though it is universally accepted that the forests of Sumatra are in the most danger today because strife in Kalimantan has limited forest exploitation. This paper’s brief analysis of the conflict is consonant with Indonesian views, expressed in private, as of February 2001.

11. In late July 2001, Wahid was removed from office by a unanimous vote of the legislature and replaced as president by Megawati Sukarnoputri.

12. On August 3, 2001, Prime Minister Thaksin was acquitted by what the *Bangkok Post* reported the following day as a “knife-edge 8-7 verdict” of Thailand’s Constitutional Court.

13. We are indebted to our colleagues Jack Gentile and Mark Harwell of the Rosenstiel School of Marine and Atmospheric Science at the University of Miami for the framework for assessing environmental risk and for their collaboration in this pilot project to mesh science with political economy. We also wish to acknowledge support from the DCI Environmental Center for workshop costs and advice and assistance from the Organization of American States in choosing the cases that were examined.



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