

# Exploiting Natural Resources

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**Growth, Instability, and Conflict in the  
Middle East and Asia**

**Richard Cronin**

**Amit Pandya**

***Editors***

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The Henry L. Stimson Center  
1111 19th Street, NW, 12th Floor  
Washington, DC 20036  
Telephone: 202.223.5956  
Fax: 202.238.9604  
[www.stimson.org](http://www.stimson.org)

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The **Centre for Strategic and International Studies (CSIS)** based in Jakarta, Indonesia, and established in 1971, is an independent, nonprofit organization focusing on policy-oriented studies on domestic and international issues. Its mission is to contribute to improved policymaking through research, dialogue, and public debate. CSIS believes that long-term planning and vision for Indonesia and the region must be based on an in-depth understanding of economic, political, and social issues including regional and international developments. In the area of foreign policy, the center's research is complemented and strengthened by its relations with an extensive network of research, academic, and other organizations worldwide. CSIS's research is used by government, universities, research institutions, civil society organizations, media, and businesses.



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## Preface

Stimson's *Regional Voices: Transnational Challenges* project is devoted to enhancing the information and analysis available to US policymakers about emerging transnational security challenges in the Middle East, South Asia, Southeast Asia, and East Africa. The project draws on analysis by technical and subject experts, as well as by political and strategic thinkers.

The knowledge and analysis are developed by means of dialogue among experts from various disciplines and occupational backgrounds. Our work includes the organization of workshops in the regions, partnerships with regional institutions and individuals, interviews in the field, and research. We have sought the input of experts and practitioners who constitute new voices in the conversation with the US government. We have not shied away from perspectives that dissent from conventional wisdom, as long as they represent significant bodies of opinion in the countries of the regions.

In 2007, we organized our work by region and sought to arrive at an understanding of perspectives specific to each. This was reflected in our 2008 publication *Transnational Trends: Middle Eastern and Asian Views*. During 2008, we have engaged in dialogue and collaboration across all the regions and organized our work topically on themes as varied as the political economy of natural resources, climate change and river systems, maritime resources and security in the Indian Ocean, and the relationship between Islam and politics.

We have tried to integrate these varied inquiries by asking the following overarching questions:

- What are the key relationships among social, economic, environmental, technological, and political trends? How do these trends relate to traditional security concerns? What new sources of instability, crisis, or conflict are found in these, and with what consequences?
- How does the current public policy debate address the technical, governance, and cultural challenges of these specialized subject areas?
- How do political structures and cultural traditions constrain or facilitate effective responses?

- What are the current examples and future opportunities for transnational cooperation?
- What are the social, political, and security consequences of rapid change?

We have sought throughout to maintain a transnational perspective, to look at trends or threats that transcend national borders or are national in scope but recur in many societies in a region. In all our conversations, conferences, meetings, roundtables, and focus groups, we have sought to elicit the most candid possible discussion, and we have done so by explicitly placing all conversations off the record and not for attribution.

Each volume in the present series consists of essays on some of these questions by experts and thinkers from the regions covered, accompanied by one or more essays by Stimson scholars designed to synthesize and analyze our findings and describe the key trends that we have noted.

Amit Pandya

Director, *Regional Voices: Transnational Challenges*

## Acknowledgments

The analysis presented herein would not have been possible without the intellectual input, time, and enthusiastic cooperation of numerous experts from the three regions and the United States, as well as the talented and supportive staff at the Centre for Strategic and International Studies (CSIS) in Jakarta and Stimson.

It is impossible to say too much about the contribution of our partner institution CSIS-Jakarta in helping Stimson design and carry out the workshop in Jakarta during July 28–29, 2008, that formed the basis for this volume. Dr. Hadi Soesastro and his colleagues at CSIS—namely, Raymond Atje, Ira Titiheruw, and Tevy Poluan-Masengi—could not have been more gracious and effective co-hosts of the workshop. Pak Hadi’s knowledge, insights, and leadership hugely influenced the flow and quality of the discussion.

I also wish to express deep appreciation to the meeting participants and interviewees who provided valuable cross-regional and multidisciplinary insights into the complex issues surrounding the exploitation of natural resources. These include a group of knowledgeable experts in Washington who generously helped shape the conceptual and intellectual side of the workshop and indirectly this volume. Experts consulted in the research of this volume are listed in appendix 2. I am also indebted to many others not named here who provided valuable information and assistance.

Of course this volume could not have been produced without the chapter authors, especially Waleed K. Al-Zubari (water); Babar Shahbaz and Abid Qaiyum Suleri (forests); and Budy P. Resosudarmo, Ida Aju Pradnja Resosudarmo, Wijayono Sarosa, and Nina L. Subiman (mining). In addition to writing a chapter for this volume, Junko Kobayashi, Research Associate on the *Regional Voices* project, played an integral role in both the organization of the workshop and the coordination, research, and editorial work for the volume. I owe a personal debt to Junko for working so tirelessly and effectively to keep this project on track.

I am also grateful to the contributions of the *Regional Voices* team and others who worked behind the scenes. Stimson’s President Ellen Laipson and *Regional Voices* Director Amit Pandya, who co-edited this volume, provided vision and intellectual leadership apart from

their management roles. Stimson's Director for External Relations, Nancy Langer, played a major role in bringing this volume to completion; as did Laura Kim, who is largely responsible for the production values. We are grateful to Kendra Patterson and Elizabeth Benedict for their extensive editorial work, and Jumaina Siddiqui and Kendra Patterson for their valuable field research in Pakistan and Bangladesh, respectively. The project's indispensable Contract Analyst Nicole Zdrojewski managed the contracts and finances for the entire project. Tim Hamlin contributed research and graphics support and a text box for the final chapter. Project interns Rachel Kahan, Jong Woo Kim, Max Mealy, and Shirin Wertime provided essential logistical and research assistance.

Finally, I owe my sincere apologies and gratitude to anyone who inadvertently was not properly acknowledged.

Richard P. Cronin  
Senior Associate, Southeast Asia Program  
December 2008

## Introduction

**E**xploiting *Natural Resources: Growth, Instability, and Conflict in the Middle East and Asia* draws together commissioned papers and analysis by regional experts and Stimson staff on transboundary natural resource issues. It is one dimension of the work of the *Regional Voices: Transnational Challenges* project, which also includes climate change and river systems, maritime resources and security, and the relationship between Islam and politics in the Middle East, South Asia, Southeast Asia, and East Africa.

The content of this volume draws substantially on a two-day cross-regional workshop co-hosted by Stimson and the Centre for Strategic and International Studies in Jakarta during July 28–29, 2008. The workshop focused on forests, river basins, and mining, and gathered natural resource and environment experts from academia, think tanks, NGOs, and the private sector. The basis of our analysis also includes interviews and literature from the field as well as consultations with US experts.

All our conversations and meetings over the course of the past year yielded a number of significant points of broad agreement. These findings include the following:

- Current patterns of natural resource exploitation are environmentally destructive; socially inequitable; and contribute to human insecurity, political instability, and social conflict.
- Globalization and supply chains of developed countries and rapidly growing economies, such as China and India, are drivers of unsustainable development and environmental, socioeconomic, and related transboundary impacts such as the inequitable use of common resources.
- Unchecked population growth and urbanization in many parts of the world have led to wasteful consumption patterns and the rapid degradation and depletion of critical natural resources, especially water and forests.
- Regional cooperation on transboundary resources is hindered by nationalism and resource competition, which, unless checked, could be destabilizing to countries and regions.
- Community-based resource management is seen as the preferred solution, but reform faces seemingly insurmountable obstacles such as the dominance of bureaucracies

and departmental agendas, the collusion with locally powerful individuals, and the poverty and political marginalization of affected communities.

This volume is divided into two sections. In “Perspectives from the Regions,” three regional experts create the framework for a discussion on water, forests, and nonpetroleum mineral resources.

First, in “Water Resource Management Challenges in the GCC Countries: Four Scenarios,” Waleed K. Al-Zubari analyzes the growing gap between freshwater resources and the demand from burgeoning populations and economic development, and asserts that the current supply-driven approach cannot succeed. He introduces four policy scenarios as a means of examining the problem more systematically. Scenario 1, Market First, leads to shortsighted profit-driven development, increasing social inequality, and excessive reliance on fossil fuel-based water desalinization which seriously degrades the water of the gulf. In scenario 2, Gulf Cooperation Council governments adopt a top-down Policy First approach which envisions an improvement of human well-being and lessening of environmental degradation, but investment and economic development policies continue to exert great pressure on the environment. Scenario 3, Security First, focuses on external threats, rapid economic development, and food security measures that unwittingly accelerate the rate of water resource depletion. Scenario 4, Sustainability First, involves an entirely new paradigm emphasizing human development over material acquisition and proactive responses to the challenge of sustainability. Dr. Al-Zubari argues that the Policy First and Sustainability First approaches, which are more holistic, integrated, equitable, and cooperative, offer the best prospects for long-term water sustainability and reducing the potential for conflict.

Babar Shahbaz and Abid Qaiyum Suleri, in “The Political Economy of Forest Management of Pakistan,” show the multifaceted ways in which forests and trees relate to the livelihoods of rural communities. Moreover, they identify various factors responsible for deforestation and ineffective forest management in Pakistan. These include (1) the ignorance of bureaucracies about how local inhabitants pursue livelihoods, (2) lack of political will to improve resource management, (3) the local communities’ sense of loss of stake in state and other “protected” forests by communities that formerly depended on them for their livelihoods, and (4) the political connections of powerful timber smugglers. A major contribution of the chapter is explaining why various approaches to decentralized and participatory management have thus far usually resulted in increased deforestation.

Budy P. Resosudarmo, Ida Aju Pradnja Resosudarmo, Wijayono Sarosa, and Nina L. Subiman’s chapter, “The Socioeconomic Conflicts in Indonesia’s Mining Industry,” concentrates on the rise of tension and conflict in the mining sector in Indonesia that has deterred legal investment (foreign and domestic) and delayed the adoption of laws that

would better protect the environment and the livelihoods of local communities. Sources of conflict include policy and regulatory uncertainties, including those fostered by decentralization, and the inherent conflicts between mining and forestry and between mining interests and local communities. A new and improved mining law is now being considered, but the authors caution that having the “right” laws is “only a first step in resolving the many conflicts that plague Indonesian mining activities and areas.”

In the following section, “Interpreting the Trends,” Stimson analysts synthesize the findings, highlight the key trends, and emphasize their importance to policy discourse.

In “Making the Connections: Water, Forests, and Minerals Exploitation in South and Southeast Asia,” Junko Kobayashi uses examples drawn from the regions to call attention to the relationships among developments in mining, logging, and exploitation of water resources, and explores how the exploitation of one resource results in the degradation of another. She notes that the recognition of these linkages by governments is essential to correcting the mismanagement and unsustainable exploitation of natural resources and the resultant degradation of the environment, destruction of livelihoods, increase in human-engineered “natural” disasters, political instability, and transboundary conflicts.

Finally, Richard Cronin’s “Natural Resources and the Development-Environment Dilemma” analyzes the external drivers of natural resource depletion. He observes that globalization creates an ambivalent international environment that, on the one hand, encompasses both economic integration and regionalism, and on the other, fragmentation, conflict, and shifting centers of power. He makes cross-regional comparisons of resource exploitation, patterns, and practices, and calls attention to the emergence of China and, to a lesser extent, India as the biggest markets for the resource-based commodities of Southeast Asia. He also calls attention to the role played by the now deflating worldwide financial “bubble” in driving up global demand for raw materials, industrial inputs, and energy. Finally, Dr. Cronin considers whether the multilateral development banks and bilateral donors have been more a part of the problem than the solution, observing that, despite the new mantra of reducing poverty, their development projects are still based on the “trickle-down” theory.

Taken as a whole, the three chapters by natural resource experts from the regions and resource sectors and the two chapters by Stimson staff present a comprehensive picture and analysis of the drivers and impacts of the current unsustainable exploitation of water, forest, and nonpetroleum mineral resources across the arc from East Africa to Southeast Asia. The volume connects these issues both vertically and horizontally, encompassing the global, regional, national, and local levels; the political economy of natural resource decision making at the national and local levels; and the roles of a variety of official, economic, and nongovernmental actors. The chapters consider the linkages and impacts of the resource sectors with each other and the consequences for stability and human security, and

draw attention to the daunting challenges of reforming unsustainable practices and countering their transboundary impacts.

Ultimately, the volume provides a sober analysis of these issues and practical approaches to addressing them, but only in the context of a new paradigm and the necessary political will on the part of governments, which are not yet apparent. Optimistically, one glimmer of hope might be seen in the current global economic and financial crisis that began in 2008 if it provides a “breathing space” for governments and other actors to reconsider the short-term thinking and faulty development models that have been the most fundamental causes of unsustainable natural resource exploitation.

# Water Resource Management Challenges in the GCC Countries: Four Scenarios

Waleed K. Al-Zubari

**T**he arid, oil-rich countries of the Arabian Peninsula are facing some of the most severe water shortages in the world. In the Gulf Cooperation Council (GCC) countries—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates—rainfall scarcity and variability coupled with high evaporation rates limit the availability of renewable water resources. In recent decades, inadequate water resource management, rapid population growth, and accelerated socioeconomic development have created increasing demands for water that cannot be met by these scarce renewable sources. Groundwater is being over-exploited to meet mainly agricultural demands. Efforts to exploit technology have led GCC countries to build desalination plants, but these remain capital intensive, costly, and with negative environmental impacts. Treated wastewater is also available, but currently makes up only a small percentage of total water use in the region.

The region's supply-driven approach to water management gives inadequate attention to improving and maximizing water allocation and water use efficiency. There are few comprehensive, long-term water policies and strategies. There is duplication and overlap in water agencies, as well as inadequate institutional capacity development and community participation. The situation is so dire that the GCC countries are beginning to realize the necessity and urgency of instituting water policy reforms.

After an overview of water issues in the GCC countries, this paper explores four distinct development scenarios that these countries might choose to follow: Market First, Policy First, Security First, and Sustainability First. The scenarios explore how social, economic, and environmental trends may unfold along divergent development paths, and what this might mean for water policy and the environment, as well as for the region's economic and social development.

## **The Growing Disparity between Water Supply and Demand**

In the last four decades, the GCC countries have experienced an accelerated growth because of the discovery and exploitation of vast oil reserves, which have led to a rapid rise in living

standards. By 2000, life expectancy was 74 years, an increase of 10 years since 1980; literacy rates increased from 20 percent to 80 percent over the same period.<sup>[1]</sup> The total population increased from 8 million in 1970 to 30 million in 2000.<sup>[2]</sup> The GCC's population growth averages more than 3 percent annually and is considered the highest in the world. In addition to the rising standards of living and health, an influx of immigrants, to meet labor needs, has also boosted population; the latest figures on the number of expatriates in the GCC countries range from 25 percent of the total population in Oman to 90 percent in the United Arab Emirates.

While the population increased, overall per capita freshwater availability fell from about 680 cubic meters in 1970 to about 180 cubic meters in 2000. These figures are much lower than the approximate figure of 1,100 cubic meters for the Middle East and North Africa region as a whole,<sup>[3]</sup> and much below the international water poverty line of 1,000 cubic meters per capita per year.<sup>1</sup> Even worse, according to a 2005 World Bank water assessment report, by 2030 per capita freshwater availability in the GCC countries could fall by nearly one-half, to 94 cubic meters, if the population hits its projected level of 56 million.

The rapid increase in population, along with social, agricultural, and industrial development, are associated with substantial increases in water demand (see table 1). The GCC's total annual water demand has grown from about 6 billion cubic meters (BCM) in 1980<sup>[4]</sup> to about 28 BCM in 2000.<sup>[5]</sup>

This dramatic increase in water demand can be attributed primarily to two sectors: the agricultural sector (85 percent of total water demand) and the municipal sector (13.7 percent).<sup>[6]</sup> In the past three decades, the need for food security and food self-sufficiency has prompted decision makers to encourage the production of certain grains and crops characterized as "water-intensive." In most countries this was done through subsidy and incentive programs,<sup>2</sup> and has resulted in a large-scale expansion of farming, which is supported mainly by nonrenewable groundwater. Furthermore, unregulated pumping, along with lack of enforcement of rules against unlawful drilling, poor irrigation practices (irrigation effi-

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<sup>1</sup> Below 1,000 cubic meters per capita per year, water scarcity is a limitation to economic development and human health and well-being; below 500 cubic meters per capita per year, water availability is a main constraint to life (M. Falkenmark, "The Massive Water Scarcity Now Threatening Africa—Why Isn't It Being Addressed?," *Ambio* 18: 112–18).

<sup>2</sup> Subsidized prices of gasoline and electricity, subsidized credit for buying water pumps and irrigation equipment, exemptions of tariffs on imported fertilizers and equipment, subsidized prices of certain agricultural products, and protection against foreign competition in the domestic markets are all examples of the tools used to implement these agricultural-based economic policies (Al-Zubari 2003). It is obvious that none of these policies have been subject to serious assessment in terms of their impact on the sustainability of groundwater resources.

**Table 1: Water Demand in GCC Countries**

Country	1980 (million m <sup>3</sup> )	1990 (million m <sup>3</sup> )	Growth rate 1980–90 (%)	2000 (million m <sup>3</sup> )	Growth rate 1990–2000 (%)
Bahrain	138	223	162	269	121
Kuwait	186	383	206	993	259
Oman	665	1,236	186	1,303	105
Qatar	110	194	176	433	223
Saudi Arabia	2,362	16,300	690	20,800	128
United Arab Emirates	789	1,490	189	3,506	235
Total	6,230	19,826	318	27,304	138

Sources: Al-Alawi and Abdulrazzak 1994; Arab Gulf Programme for UN Development Organizations/World Bank 2005.

ciency is 30 to 50 percent), and the absence of agricultural water tariffs have all resulted in excessive agricultural consumption of water.<sup>[7]</sup>

To meet rising demands, water authorities have focused their efforts mainly on augmenting supplies, such as developing groundwater, installing desalination plants, and expanding wastewater treatment and reuse.<sup>[8]</sup> Groundwater resources in the GCC countries are divided into two types: renewable, shallow aquifers and nonrenewable, deep aquifers. Shallow aquifers are developed in the alluvial deposits along the main *wadi* channels (dry riverbeds or valleys that only contain water during heavy rains) and the flood plains of drainage basins. These aquifers represent the only renewable water source in the GCC countries, with an estimated annual recharge of about 3.5 BCM.<sup>[9]</sup>

All GCC countries possess a limited number of large deep aquifers, which contain nonrenewable supplies of fossil water. These have a finite lifespan and quality limitations. Only Saudi Arabia has substantial amounts of nonrenewable groundwater, amounting to about 430 BCM.<sup>[10]</sup> However, these are being mined extensively and are rapidly deteriorating; it is estimated that about 35 percent of nonrenewable groundwater resources in Saudi Arabia were already depleted by the mid-1990s.<sup>[11]</sup> Overexploitation of groundwater resources has resulted in a continuous and sharp decline in groundwater levels, and water quality has been severely compromised due to the resulting seawater intrusion into aquifers. Widespread pollution from agricultural, industrial, and domestic activities also threatens these water supplies.<sup>[12]</sup>

Although agriculture is the largest user of water in the region, rapid urbanization and improved quality of life have increased water needs for municipal purposes. A significant portion of oil revenues has been used to modernize infrastructure and raise living

standards. Twenty percent of the national expenditure throughout the region goes toward providing public utility services, such as electricity and water, which are provided free or at highly subsidized rates. Water and sanitation services have been made accessible to a large percentage of the population. Almost 100 percent of the population has access to safe drinking water, while 75 to 100 percent has access to improved sanitation.<sup>[13]</sup> However, the allocated water resources cannot keep pace with rising municipal water demands. As great as the need is for water, it is exaggerated by the lack of effective conservation programs, inadequate charges for water use, and excessive leakage from municipal supply networks, which lead to high per capita water consumption rates in the domestic sector.

Desalination technology was introduced in the region in the mid-1950s, and developed very rapidly out of necessity. Today, desalination plants provide most municipal water supplies in the GCC countries. The water is used directly or blended with groundwater. The total capacity of desalination plants including those under construction in the region is more than 3.4 BCM per year, more than 56 percent of which forms the drinking water supply.<sup>[14]</sup>

Treated municipal wastewater is an increasingly significant water source which only became available in the early 1980s in most of the GCC countries, when sewage water treatment facilities and sewage networks in large cities were completed. Almost all the countries now operate modern facilities with advanced treatment capabilities, but treated wastewater, which has limited uses, does not exceed 12 percent of the available domestic water supply. Treated wastewater is mainly used for irrigating urban gardens, parks, fodder crops, and highway landscaping—practices that do not give this water its true economic value considering present water shortage conditions in the region. The remainder is dumped in *wadis* to infiltrate the shallow aquifers, or into the sea. However, all of the GCC countries have ambitious plans for expanding the utilization of reclaimed wastewater as a strategic alternative source to meet future demands for irrigation water and to reduce groundwater overextraction.<sup>[15]</sup>

## **Main Issues and Challenges in Water Resource Management**

There are two main challenges to water resource management in the GCC countries: unsustainable use of groundwater and a growing urban water demand. The GCC countries are suffering from a deficit in their water resources of more than 19 BCM,<sup>[16]</sup> with demands mainly being met by overusing renewable and nonrenewable groundwater. If the current population growth rates, water management approaches, and water use practices continue, annual water demand may reach more than 50 BCM by the year 2030.<sup>[17]</sup> With future desalination capacity and wastewater reuse anticipated to be limited, this demand will have to be met mainly by further mining of groundwater reserves, with the associated negative impacts of depletion and loss of aquifer reserves, deterioration of water quality, and salinization of

agricultural lands. Under these circumstances, water will become an increasingly scarce commodity and will become a limiting factor to further social, agricultural, and industrial development. Water scarcity is also expected to contribute to increased health risks. Moreover, the development of many GCC countries relies heavily on nonrenewable fossil groundwater, and the issue of “sustainability” of fossil water is problematic because it is inherently unsustainable. Therefore, sustainability of nonrenewable aquifers needs to be interpreted in a socioeconomic rather than a physical context, implying that full consideration must be given not only to the immediate benefits and gains of using fossil water, but also to the long-term negative impact its depletion will have on development. An “exit strategy” needs to be identified, developed, and implemented in anticipation of a non-renewable aquifer’s depletion. The strategy must include balanced socioeconomic choices on the use of aquifer storage reserves, demand management to encourage transition to a less water-dependent economy, and plans for the eventual replacement of the water source with another as it is depleted.

As a replacement for or a supplement to other water sources, desalination plants are problematic. They are expensive, have limited operation lives of only 15 to 25 years, depend on fossil fuel, and pollute the surrounding air and water.<sup>3</sup> But the GCC countries are going ahead with plant construction and expansion in order to meet spiraling domestic water demands. Per capita average daily consumption in the domestic sector ranges between 300 and 750 liters, the highest in the world. Furthermore, despite the lack of hard data on unaccounted-for water in the region, leakage levels from water distribution networks in some countries are estimated to be between 20 and 40 percent.<sup>4</sup>

## Future Scenarios

While policies and management interventions undertaken by water authorities in GCC countries have a role in alleviating these problems, the most important choices affecting this sector in the future are not necessarily water sector choices. Achieving water sustainability depends on the adopted development paradigm and a multitude of potential interventions and circumstances, such as a country’s governance approach, its education system, and the implementation of technological innovations. The following four scenarios,

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<sup>3</sup> This includes air pollution by emitted oxides and seawater and marine life pollution by rejected brines, which have elevated temperatures, increase salt concentration, and may contain residual treatment chemicals and trace elements picked up within the desalination plant (W. Abderrahman and T. Hussain, “Pollution Impacts of Desalination on Ecosystems in the Arabian Peninsula,” in *Policy Perspectives for Ecosystem and Water Management in the Arabian Peninsula*, Amer et al., eds., UNESCO/UNU-INWEH, 2006).

<sup>4</sup> An important strategic issue is that despite the current and anticipated future dependence of the GCC countries on desalination to meet their domestic/drinking water supply, desalination will most likely remain an imported technology for the GCC countries, with limited R&D directed toward developing and adapting this technology according to regional requirements.

presented in a narrative storyline to the year 2050, lay out possible policy and societal approaches that GCC countries could take over the coming decades.<sup>5</sup>

The scenarios are not predictions, nor should they be taken as likely possible futures. At most, they portray a limited number of possibilities based upon certain assumptions about driving forces, critical uncertainties, and system relationships, including demography, human development, economic development, science and technology, culture, and regional integration. The scenarios focus on who is making the key decisions, and how and why they are being made. The assumptions in each scenario are summarized in the annex.

The scenarios try to answer a series of questions: Under the current fast pace of socioeconomic development and prevailing water scarcity, could the GCC countries achieve water sustainability balanced with socioeconomic and environmental stability? If yes, how? If not, why not?

More specific questions these scenarios address are: How do current socioeconomic policies affect people, the environment, and water? Under these conditions, is it possible to avoid negative environmental impacts or to mitigate them? What are the trade-offs involved? Can water and other natural and environmental resources continue to be exploited to increase economic development and human welfare without damaging these resources? What are the environmental, economic, and social costs that would come from long-term exploitation?

### **Market First Scenario**

In this scenario, development in the GCC countries is dominated by market forces and market mechanisms. “Economic growth at any cost” is the dominant paradigm. Exploiting natural resources, providing inexpensive labor, and promoting mass production and manufacturing efficiency are seen as the formula for lowering prices and fostering competition in regional and global markets. While economic development reigns, social problems and environmental stresses are left to the self-correcting logic of competitive markets. In the field of human development, the assumption is that economic growth will lead naturally to improvement in social conditions, and investing in education, capacity development, and health loses out to investments that offer more immediate returns. GCC societies adopt the values and expectations prevailing today in industrialized societies—materialism, individualism, and consumerism. Private sector investment and marketing initiatives play the

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<sup>5</sup> The framework of these scenarios is mainly based on the United Nations Environment Programme’s Global Environmental Outlook process, namely GEO-4 of 2007. They represent four archetypical visions of the future and trace their roots back to GEO-3 and earlier global scenario exercises. Sources: UNEP/RIVM, *The GEO-3 Scenarios 2002–2032: Quantification and Analysis of Environmental Impacts*, UNEP/DEWA/RS.03-4 and RIVM 402001022 (2004); and P. Raskin et al., *Great Transition: The Promise and Lure of the Times Ahead* (Boston: Stockholm Environment Institute, 2002).

main role in moving the wheel of the economy, while government officials and legislators are increasingly pressured to minimize intervening in the free market mechanism. The economic base is expanded, with less dependence on oil revenues and diversification in industrialization and the services sector. While the GCC countries witness positive socio-economic trends, they see natural and environmental resources depleted, environmental degradation, and increased health risks.

This scenario assumes fast transformation of the state role from service provider to service enabler and regulator. Privatization is promoted as a strategy to lower the burden on government budgets, eradicate corruption, attract investment, increase service efficiency, and enhance cost recovery. Privatization accelerates and includes vital sectors, such as desalination plants and treated wastewater and energy. In general, this has a positive impact on resource use efficiency and the overall performance of water services. However, the regulatory capacity of the governments does not keep pace with these rapid developments. In order to attract investments, environmental regulations receive low priority and are relaxed for investors, with minimal government interventions.

Water stress in the GCC countries continues to increase because of rapid population growth rates and the limitations of renewable water resources and nonconventional water resources.<sup>6</sup> Per capita available water share continues to decrease and remains under the absolute water scarcity line. Water demands, particularly in the agricultural sector, continue to exceed available groundwater replenishment rates. Overexploitation and intensive use of agrochemicals lead to degradation of groundwater quality, exacerbating water scarcity, increasing land degradation and water-related health problems, and reducing food production. Sectoral competition increases, mainly between the agricultural and domestic/industrial sectors because of rapid urbanization and industrialization, with more water diverted to cities and industry.

As water becomes more scarce, it becomes increasingly expensive, and the use of desalination and treated wastewater increases to meet escalating demands. Driven mainly by the multinational private sector, R&D in desalination and water treatment advances with time, which leads to a reduction in the unit cost of water from these sources. However, despite the GCC's almost complete dependence on these technologies, and its ownership of more than 45 percent of the world desalination capacity (estimates based on current capacity), due to low investment in R&D, it continues to be an importer of these technologies and is not able to acquire and localize them.<sup>7</sup>

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<sup>6</sup> This is due to the failure of government population policies and substitution programs to attract a foreign labor force to meet rapid economic growth requirements.

<sup>7</sup> GCC countries' previous efforts to coordinate regional research in desalination have failed, and there are no plans for future regional cooperation in this area.

Desalination (with dual production of water and electricity) continues to depend on fossil fuel to operate, so increased production continues to be associated with environmental problems, such as air and marine pollution, in addition to increasing carbon emissions.<sup>8</sup> Although steps are taken to control pollution from these plants (e.g., NO<sub>x</sub> burners), pollution controls fall short of what is needed. Despite GCC efforts to increase desalination capacity, the rate of increase in water demand surpasses these efforts. Moreover, sanitation services lag far behind water supply services, leading to raw wastewater discharge into shallow aquifers and the marine environment. As oil continues to dominate the world's energy supply, as well as the region's energy sector, GCC oil exports increase<sup>9</sup> and contribute to higher incidents of oil spills from offshore extraction and transportation, leading to higher hydrocarbon concentrations in the waters of the Arabian Gulf that negatively affect the desalination production process, human health, and the environment.<sup>10</sup>

The increased demand for food because of population growth and change in consumption patterns also leads to further water resource overexploitation and salinization, and overcultivation and rangeland overgrazing cause desertification. As a consequence, there is an intensive use of agrochemicals (i.e., fertilizers, pesticides) as well as overirrigation (to wash salts from soils) to increase productivity, leading to more groundwater pollution, quality deterioration, waterlogging, and soil salinization. Due to these deteriorating conditions and lack of regional strategic food production and management, policies of food self-sufficiency in some basic food items fail. Market forces lead to the gradual expansion of nontraditional agriculture (e.g., protected and soil-less agriculture), as well as the importation of genetically modified crops (i.e., drought- and salt-tolerant crops). While these increase agricultural productivity in the short term, little attention is given to the potential health risks and environmental impact of genetically modified crops.

In general, this market-driven model represents an ultimately depressing scenario for GCC countries. The region eventually faces considerable water and environmental problems resulting from an overreliance and emphasis on market forces without regard for environmental policies.

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<sup>8</sup> Use of clean renewable energies, such as solar and wind, both abundant in the region, remains limited, and their share in the region's energy sector continues to be marginal.

<sup>9</sup> The GCC countries together hold about 45 percent of the world's proven oil reserves, estimated to last at least another 50 years. Oil exports are expected to increase with time as other producers go out of the market.

<sup>10</sup> Sixty percent of the world's total oil exports pass through the Strait of Hormuz annually; it is estimated by the Regional Organization for the Protection of the Marine Environment that about 1.2 million barrels of oil are spilled in the Arabian Gulf from ballast water only.

## ***Policy First Scenario***

In this scenario, strong actions are undertaken by the GCC country governments to reach specific social and environmental goals. The countries place strong policy constraints on market forces to minimize undesirable effects on people and the environment. Environmental and social costs are factored into legislation, policy measures, regulatory frameworks, and planning processes. The private sector is brought on board with a set of incentives to encourage economic development, but strong regulatory bodies oversee the process. Constitutional democratization, public representation and voting, and auditing and transparency are gradually institutionalized. Civil society empowerment advances, and public participation has some impact upon major decision making (although less than in the following Sustainability First scenario). Health and environmental issues gradually become two of the main concerns of civil society, which has the effect of strengthening the role of environmental authorities and institutions in the decision-making process at the national level as an alliance is gradually formed among environmental authorities, environmental NGOs, and other related associations. At the regional level, there is greater harmony and cooperation through ministerial forums and organizations such as the GCC Secretariat, Regional Organization for the Protection of the Marine Environment (ROPME), and Council of Arab Ministers Responsible for the Environment (CAMRE). There is also more regional integration of transportation, energy, water, and human resources and other capacity-building infrastructure. This results in the emergence of a strong and diversified economic block that takes into account each member country's comparative advantage.

Population growth slows compared to the turn of the century. This occurs because of many factors, such as the general increase in education level and more women's entry into the employment market, but it is mainly the result of effective national population policies that control and reduce foreign migration and plan for their substitution by nationals.<sup>11</sup> Substitution programs are made possible by heavy investment in training and capacity development programs.

The reduction of the population growth rate, in addition to the adoption of strategic water resource management to increase water use efficiency and resource protection, further alleviates water stress in the region. Water moves gradually to the top of the national agenda priority list, and a policy shift from supply augmentation toward demand management and conservation is made. GCC countries implement different instruments and programs that include water pricing with targeted subsidies, awareness and education campaigns, legislation enforcement, management of marginal water, and efficient water resource allocations among the competing economic sectors.

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<sup>11</sup> The assumption is that these programs are already going on now and they will be accelerated.

However, water demand continues to exceed resources, and depletion and degradation of groundwater quality likewise continues (but at lesser rates than in the Market First scenario). The need for nonconventional resources increases, and there is more effort put into regionally coordinated and directed research for these technologies. The unit cost of desalination and waste treatment decreases in keeping with global trends, but fossil fuel continues to be the dominant energy source for plants, with the associated environmental problems.

Urbanization trends in GCC countries continue to increase, but at lesser rates than in the Market First scenario since there is a reduction in the population growth rate and because integrated urban planning methodologies are adopted. However, water supply and wastewater services and capacity continue to lag behind the urbanization rate, and related environmental problems persist.

Food demand increases at slower rates than in the Market First scenario, and GCC countries adopt strategic food demand management that addresses the increases in food needs while taking into account water and land use and eliminating the overexploitation of resources. In addition, there are heavy national and regional investments in R&D for improved farming practices and soil management, which help reduce or stabilize environmental degradation and increase levels of food security. The importing of genetically modified crops continues as in the Market First scenario, but with more consideration for the potential negative impacts, and with the effective implementation of the Cartagena Protocol on Biosafety (an international treaty governing the movement of organisms produced by biotechnology from one country to another). Furthermore, economic integration and regional cooperation among the GCC countries, as well as with the Arab countries, help modify agricultural policies for maximum food production and reduce water consumption by the agriculture sector.

This scenario envisions an improvement of human well-being and lessening of environmental degradation over the Market First model. However, investment and economic development policies continue to exert great pressure on the environment. The governance approach in this scenario is top-down in nature. It also suffers from being reactive rather than proactive and is slow to respond to change.

### ***Security First Scenario***

In this scenario, current instability in the region (such as the Israeli-Palestinian conflict or the US occupation of Iraq) intensifies, which stalls human and economic development, and cripples progress toward regional economic integration. Political conflicts and tensions, occupation, superpower interventions, sanctions, lack of economic and political reforms, and social inequity prevail in the region. The GCC countries are full of contradictory

pressures and security obsessions, and dominated by social inequality and conflicts at the national and regional levels. Social and economic ethics and moral values deteriorate, and a minority of elites who live in protected enclaves safeguard their privileges by controlling the majority and managing critical natural resources. Constitutional democratization, transparency, accountability, and public participation are absent, and the military and security establishments control the state. The GCC governments appropriate large amounts of their budgets for armaments/security at the expense of socioeconomic development and environmental protection. Under these conditions, corruption increases, causing instability and outward movement of national and foreign investments. These trends result in increased unemployment, decline of human development indexes to their lowest levels ever, and a widening gap between the rich and poor. Individuals transfer their loyalties from the state to tribal, ethnic, or religious groups, which leads to disintegration of the social fabric.

The region witnesses high levels of internal instability. Foreign pressure and interest in its strategic resources set the stage for further destabilization, plunging GCC countries into deep socioeconomic disparities and political turmoil. The affluent minority takes advantage of the chaos to impose authoritarian solutions on the rest of society. Meanwhile, the fragmented economies of the GCC countries are merged into the major economic blocs and superpower domains of the world, resulting in external hegemony, domination, and subordination of the region. The GCC countries are pulled into regional conflicts, leading to an escalation in military/security expenditures that adversely affects the economy and human resource development. Natural resources and the environment receive the lowest priority in the national agenda, and are continuously victimized to meet security needs.

This scenario assumes high population growth rates (greater than in the Market First scenario), which means increased water stress. Water scarcity reaches its highest levels, and groundwater resources are depleted and become unfit for direct use. Wastewater reuse is stepped up to compensate for agricultural water demands, but lack of adherence to treatment standards leads to major outbreaks of water-related diseases. R&D in nonconventional water resources is negligible. Desalination is intensified to meet domestic water demand, and continues to depend on fossil fuel with little concern for its environmental impacts. The management of water resources and services is auctioned off to multinational companies, particularly those having business ties with the military establishment and ruling elites. As higher taxation is required to finance governments' budget deficits and security and military needs, subsidies are entirely removed, leading to inequitable access to water resources and basic services.

On the other hand, as food self-sufficiency is high on the political agenda in the GCC countries as one form of security, subsidies are offered to encourage local agricultural production. This leads to immense stresses on remaining water resources and arable lands. Intensive agricultural production under conditions of deteriorating irrigation water quality

and soil salinization eventually leads to land impoverishment and loss. After a peak in agricultural production, food self-sufficiency starts to decline as land and water resources are mined beyond their sustainable limits.

Meanwhile, unplanned random urbanization occurs due to rapid population growth, with concentrated urban centers surrounded by mushrooming slums. There is an uneven distribution of public services between the rich and poor, leaving those outside of the small elite enclaves grossly undersupplied. Insufficient basic health care and sanitation, deteriorating infrastructure, increasing unemployment, and a high crime rate all contribute to growing social unrest.

This scenario, with results that make it an extreme case of the Market First scenario, ultimately envisions a complete breakdown of the GCC society and Arab world, with people and the environment abandoned to meet security needs.

### ***Sustainability First Scenario***

This scenario pictures the emergence of a new development paradigm in response to the challenges of sustainability, supported by new, more equitable values and institutions. The notion of human development, rather than material acquisition, is advanced as a form of cultural and social evolution. A more visionary state of affairs prevails, where proactive solutions to the challenges of sustainability are provided (such as sustained links between social, economic, and environmental policies). This is achieved by adopting long-term, integrated strategic planning, the main goals of which are superior quality of life and a healthy environment. Long-term policies emphasize heavy investment in human development through education, training, and capacity development programs. This creates a productive knowledge-based society without a need for the traditional government welfare support system that exists now in most of the GCC countries. Long-term environmental sustainability is pursued through changes in the education system that foster more positive behavior and attitudes toward the surrounding environment and natural resources. National governments fund more scientific R&D to solve social, economic, and environmental problems. In this scenario, investment is driven by policies that protect the environment and encourage the sustainable use of resources. This focus eventually leads to massive use of green technologies. Additional funds for these technologies come from eco-taxes and polluters-pay charges.

In this scenario, GCC societies adopt the positive features of cultural globalization and industrial societies. The materialism and consumerism associated with the West are rejected, while professionalism, productivity, awareness, public participation, and commitment toward the environment replace some of the existing widespread negative cultural habits and attitudes (e.g., noncompliance, the petition system, and wastage). National and

regional identity and positive indigenous societal values, such as family, social unity, and Islamic spiritual and moral values, are maintained and enhanced.

The current situation in GCC countries of centralization in the governance system is gradually reversed. Societies become completely democratic, and civil society empowerment reaches its highest levels, leading to public participation in the decision-making process at national and regional levels. Health, environment, and resource sustainability issues become the main concern of civil society, and there is a balance of power among government, the private sector, and civil society.

Within the region, integration and cooperation among the GCC countries eventually lead to the formation of a single confederated state (replacing the Gulf Cooperation Council, with, for example, the United States of Arabia). This presents a strong, united front when facing external challenges and threats. It also marks the emergence of a powerful, diversified economic bloc, with strong economic ties to the Arab world at large. The regional ministerial forums are enhanced and strengthened by this development. These organizations formulate policies at the regional level with full cooperation of the member states and implementation at national levels. The region is an active partner in setting global environmental policies.

Water stress in the GCC countries is significantly reduced by the implementation of effective population policies, leading to a stabilization of population growth and achievement of a high level of environmental awareness at all levels of society. Integrated water resource management (IWRM) strategies of economic efficiency and environmental sustainability, with strong emphasis on demand management and conservation, are adopted. This is made possible by establishing an enabling environment for water resource management through institutional, policy, and legislative reforms. Water conservation becomes a national priority.

There is strong cooperation among the GCC countries in nonconventional water technologies. The countries decide to own and localize water desalination and treatment technologies within a specific period of time (say, 15 years), and they allocate considerable funds to achieve this goal. These major investments in desalination R&D are mirrored in the development of clean and renewable energies (solar and wind), leading to major breakthroughs in desalination and treatment technologies with limited negative environmental impacts.<sup>12</sup> The unit cost of desalination may not be reduced significantly (as in the Market First scenario), but pollution of all kinds decreases considerably.

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<sup>12</sup> This is made despite the abundance of fossil energy in the region and its continued dominant share in the world energy market. In fact this will lead to prolonging the life of the fossil fuel reserves, while providing a considerable income for the countries of the region.

Water stress is also substantially reduced by abandoning old agricultural policies of maximum food production and national food self-sufficiency. This is a result of regional integration and cooperation among the GCC and Arab countries, as well as by the high investment in nontraditional high-tech agriculture (e.g., soil-less culture). As a result, groundwater resources cease to be overexploited at current levels. Furthermore, there is limited and rational application of biotechnology in food production, with careful and safe handling of genetically modified crops. These efforts, aided by the stabilization of population growth, lead to a significant modification of water stress, and the per capita share of available water resources stops decreasing.

Green cities spread throughout the GCC countries, and negative environmental and health impacts associated with urbanization are mitigated through better integrated planning and management, population stabilization, and widespread environmental awareness. The GCC countries ratify and jointly implement relevant multilateral environmental agreements (MEAs), particularly the International Convention for the Prevention of Pollution from Ships (MARPOL73/78 protocol). They also establish oil waste reception facilities and declare the Regional Organization for the Protection of the Marine Environment Sea Area as a Special Area, resulting in a significant reduction of marine oil pollution. The global program of action for the protection of the marine environment from land-based activities is also strictly implemented to control sewage releases into the marine environment (polluters pay). This leads to a considerable reduction of hydrocarbon and other industrial pollution in the marine environment, which significantly minimizes their threat to desalinated water production.

In this scenario, there is a long-term balance between natural and human-managed ecosystems. These practices lead to conservation, efficient use of natural resources, and sound management of the environment. Although economic growth is moderate and less than in the Market First and Policy First scenarios, the trade-off is a considerable improvement in health and environmental welfare, and a lesser burden of pollution costs on GCC countries' GDPs.

### ***Scenarios Policy Lessons***

Water demand in the GCC countries already outstrips supply. If current population growth rates and water use practices and patterns continue, water will become a frighteningly scarce commodity. Unless there are major policy changes across the board, water scarcity will severely limit social, agricultural, and industrial development.

Relying on the market alone is unlikely to achieve key environmental and human well-being goals. Although it may stimulate needed improvements in resource efficiency and the development of some new technologies, extreme reliance on markets, economic growth,

and technological fixes as in the Market First scenario is likely to result in significant increases in environmental pressures and slow advances in achieving social targets. In the Security First scenario, social and environmental ramifications are even more extreme than in the Market First scenario. The prolongation of political tension and conflict create a security obsession that dominates all other societal needs and exerts a negative influence on the region's overall development. Alternatively, Policy First and Sustainability First are likelier to lead to increased levels of investment in human resource development and other aspects of capacity building, along with increased integration among the GCC countries, without sacrificing economic development. In Sustainability First, the improvement of governance and a sustained link among social, economic, and environmental policies provide a solution to the sustainability challenge in the region. Integration, cooperation, and dialogue at the national, regional, and interregional levels replace tensions and armed conflict.

The most important policy lesson that these scenarios offer to the GCC countries, and probably to many countries in the developing world, is that the critical choices affecting water resources, as well as the environment, are not necessarily environment sector choices. Water and environmental policies should not be compartmentalized. They need to be integrated into national socioeconomic development plans. Achieving water and environmental sustainability relies on a vast complex of policies and considerations, but the stakes are high and the consequences severe if the GCC countries do not take action now.

## Annex: Overview of Drivers, Uncertainties, and Assumptions across the Four Scenarios

Driver and subdriver	Market	Policy	Security	Sustainability
<b>GOVERNANCE</b>				
Dominant actor and power balance	Private sector with strong government support; power more to the private	Government with civil society support; power more to the government	Government and private sector, civil society marginalized	Balanced civil society, government, and private sector; power more to civil society
Governance approach	Top-down (with emphasis on hierarchical structures)	Top-down (with stakeholder consultation)	Authoritarian	Balanced bottom-up and top-down
Level of public participation	Low	Medium	None	High
Priority	Maximum economic growth, with presumption that social and environmental concerns will naturally be dealt with	Social development and environmental management and economic development	Security and maintaining privileges of the elite	Social and environmental welfare with economic sufficiency
Mainstreaming of social and environmental policies	Low	Medium	Lowest if none	High
<b>ECONOMIC DEVELOPMENT</b>				
Economic growth	Highest	High	Lowest	Medium
Diversification	High toward services	High toward services	Military oriented	High toward services
Privatization	Highest, no control	High, with control	Highest	Medium with control (if government agencies are allowed to operate like private corporations, thereby achieving the same efficiency as the private sector)
<b>DEMOGRAPHY</b>				
Population growth rate	Highest	High	High	Medium/low
Urbanization	High due to population growth rate, random	Medium, more controlled but still exerting pressures on environment	Slums and shanty towns	Well planned, lower or stabilized in proportion to resources

<b>Driver and subdriver</b>	<b>Market</b>	<b>Policy</b>	<b>Security</b>	<b>Sustainability</b>
<b>HUMAN DEVELOPMENT</b>				
Level of investment in education and health	Medium	High	Lowest (only in the elite and military circles)	Highest
Capacity building and training programs	Medium, left to market demands	High, government is leading the efforts	Lowest as above	Highest, well planned by leading government efforts
Traditional government support system	Medium (decreasing trends)	Medium	Low	Low (population is highly educated and entrepreneurial, does not need help from government)
Environmental awareness	Medium	High	Lowest	Highest
<b>SCIENCE AND TECHNOLOGY</b>				
Level and type of investment	High, but market driven by the private sector for its own needs and problems; emphasis on profit	High, government and private sector, to solve societal needs and problems as well as make profit	High in the military field	High, government and private sector, to solve mainly societal needs and problems (e.g., desalination technology)
General level of technological progress and Science infiltration into society	Low	High	Lowest	Highest
<b>CULTURE</b>				
Global culture homogenization	Highest	High	Low	Diverse and accepting
Individualism versus community focus	Individual	More community	More individual	Community
Indigenous culture and heritage retention	Eroded with conflicts (religious retreat)	Retained with less conflict	Resentment by young population	Retained with least conflict
<b>REGIONAL INTEGRATION AND COOPERATION</b>				
Type, level, and rate	Market driven (trade focus), medium, slow rate	Policy driven, high, medium rate	Lowest level of integration, disintegration of state along religious and ethnic lines	Policy driven, highest toward or approaching integration, fast rate
<b>HEALTH AND ENVIRONMENT</b>				
General status	Medium	Better	Worst	Best

# The Political Economy of Forest Management in Pakistan

Babar Shahbaz and Abid Qaiyum Suleri

**F**orests play many roles in the development of a country, and especially in securing the livelihoods of people who live in and around them. Forest ecosystems are one of the greatest sources of biodiversity, but they are more fragile than many know. In particular, the natural forests of South and Southeast Asia, Africa, and Latin America are rapidly vanishing. Although the international community has issued policy responses for sustainable forest management, forest degradation has not been halted in most developing countries. This situation requires a comprehensive analysis of the political economy of forest governance and an examination of the underlying causes of deforestation.

Pakistan's forestry sector serves as an interesting case study for such an analysis in the South Asian context. Deforestation in Pakistan is one of the highest in the world, despite rigorous institutional changes in forest management paradigms. This paper attempts to provide an exploratory analysis of forest governance and deforestation and its consequences in Pakistan, to examine the interaction between forests and local livelihoods, and to identify the factors responsible for deforestation and the ineffectiveness of state forest management strategies. The paper argues that some of the main barriers to effective and sustainable forest management are a lack of understanding of local livelihood strategies, lack of political will on the part of state actors, lack of a sense of ownership of forests by the local communities, and the presence of powerful timber smugglers.

## Global Context

Over the past few decades, the international community has discussed the global problem of deforestation and forest policy issues. In 1992, the United Nations Conference on Environment and Development in Rio de Janeiro served to catalyze debate and develop a vision of sustainable forest management. It is widely recognized that the forestry sector carries potential for achieving many of the Millennium Development Goals for poverty reduction. The World Summit on Sustainable Development, the Kyoto Protocol, and the Intergovernmental Panel on Climate Change all recognize that forests are imperative to

achieving overall sustainable development, reducing poverty, improving the environment, compensating for general biodiversity loss, mitigating the impacts of climate change, and ensuring food security.

Despite these positive developments and a policy climate that advocates sustainable forest management at global, national and local levels, deforestation continues. Development practitioners, donors, and policymakers must keep working to find sustainable solutions. Apprehensions about forest degradation and deforestation in many countries and regions throughout the world have given rise to numerous research studies about its causes and effects. There is a growing realization that unsustainable forest management strategies and insecure and conflicting land tenure and property rights are some of the main underlying problems of forest degradation.

Deforestation is one of the most significant global environmental problems. Patterns of forest degradation are particularly visible in many parts of Asia and Africa. According to the Food and Agriculture Organization of the United Nations, some South and Southeast Asian countries, including Cambodia, Indonesia, Nepal, Pakistan, the Philippines, and Sri Lanka are losing forests at rates exceeding 1.4 percent per year. These are among the highest rates of forest loss in the world. Within South Asia, the rate of forest depletion is highest in Pakistan, despite intensive support from international donor agencies and numerous global and local initiatives for forest conservation, policy formulation, and improved governance. In fact, most of the national governments of South Asia have launched major initiatives since the 1980s to decrease deforestation through structural reforms in the forestry sector, decentralization of governance, and community forestry initiatives, with a similar lack of success.

Deforestation always brings negative consequences. In September 1992, Pakistan experienced the worst floods in the country's history, and the vanished forests in the northern watersheds were regarded as one of the main possible causes. Therefore, the federal government imposed a complete ban on logging in 1993. But the ban did not take into account the country's own timber needs, and the ban not only triggered illegal logging there, but also led to smuggling of timber from Afghanistan into Pakistan, causing extensive deforestation in Afghanistan. On October 8, 2005, Pakistan suffered its worst disaster in history, when an earthquake of 7.6 on the Richter scale struck South Asia, causing enormous destruction in the mountainous areas of northwest Pakistan. Massive landslides caused further loss to the region's inhabitants. The landslides occurred mostly in the denuded hills, whereas places with good forest cover suffered less destruction.

## **Forests of Pakistan: An Overview**

According to statistics issued in 2006 by the Ministry of Finance and Economic Affairs, forests cover about 4.22 million hectares in Pakistan, only 4.8 percent of the total land

area. However, there is considerable controversy over the precise forest area in Pakistan, as different national and international agencies have published statistics based on different definitions of what comprises a forest. Areas designated as “forest areas” are merely lands under the administrative control of the provincial forest department. Thus, officially designated forests may be devoid of trees while considerable tree cover may be found in areas other than the designated forests.

There is a large variety of tree species because of the country’s diverse physical geography and climatic contrasts. The important forest types are hill coniferous forests (46 percent of the total forests), scrub or foot hill forests (28 percent), irrigated plantations, farmland trees, and mangroves in the delta of the Indus River.

Most of the forests are found in the northern part of the country, with 40 percent in the Northwest Frontier Province (NWFP), 15.8 percent in northern areas, and 6 percent in Azad Kashmir.<sup>1</sup> Eighty percent of the forests in Pakistan are naturally distributed in the Himalayan, Karakoram, and Hindu Kush mountain ranges. Although Pakistan’s forest resources are scarce, they contribute significantly to its economy. These forests are imperative for the protection of the natural environment, production of various goods and services (such as timber, firewood, and medicinal plants), and the protection of land and water resources, particularly in prolonging the lives of dams, reservoirs, and the irrigation network of canals in the lowlands, where intensive agriculture is practiced.

### ***Legal Classification of Forests***

The provincial forest departments are charged with governing the forests, while the federal government is mainly responsible for policy formulation and international matters. The natural forests are managed according to their legal classification and tenure rather than according to species. These forests are divided between state and nonstate forests. More than two-thirds of the total forests are state-owned and are generally divided into reserved forests and protected forests. In reserved forests, the local people have very limited rights. They are only allowed to collect wood for fuel and extract timber for their personal needs. The main category of nonstate forests is the subsistence (*guzara*) forests in which the owners or holders of exclusive rights are entitled to use the forest wood for domestic purposes. Others may be given permission by the owners for certain uses, such as grazing animals and collecting firewood. Provincial forest departments are responsible for management and planning of all types of state- and nonstate-owned forests, except farm forest areas.

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<sup>1</sup> The total forest areas of the Pakistani provinces and territories of Punjab, the NWFP, Sindh, Baluchistan, Azad Kashmir, and the northern areas are 608,000, 1,684,000, 40,000, 59,000, 275,000, and 666,000 hectares, respectively.

### ***Forest Tenure as a Source of Conflict***

There is a wide gap between the legal status of forests and the actual practice of forest management. In some areas, state control of the forests is never accepted by the locals, particularly in those forests where traditional rights have long been recognized. In some cases, local communities still claim ownership of these lands. An especially interesting case is that of the protected state forests. Based on traditional institutions such as customary land titles, many local people are of the opinion that they themselves own the forest. They do not accept legal ownership by the state, even as state authorities strive to assert their legally designated control. Such conflicting interests between the state and local communities have placed forests under continuous strain. Uncertainties and inequalities regarding tenure are a major cause of forest depletion. The local communities perceive the state to be in competition with their interests rather than being a mandated caretaker of the forests. Recent empirical studies have indicated a marked communication gap and distrust between the state and local stakeholders.<sup>[1]</sup>

### ***Illegal Logging***

Timber harvesting from the mountain forests of northwest Pakistan has been banned since 1993, following the destructive floods of 1992, but illegal logging continued after the ban because of high demand for timber in the cities. Timber prices in Pakistan escalated after the ban, making illegal timber harvesting and smuggling from the highlands to the lowlands a very profitable business.<sup>[2]</sup> The term “timber mafia,” which came into common use after the ban, refers to a network of timber dealers, corrupt politicians, officials of the forest department, influential tribal leaders, and others who make money by illegally harvesting and smuggling trees from the highlands to the lowland cities. They rely on bribing, bullying, political networking, and blackmailing. Powerful politicians, including members of Parliament, are believed to support or be part of the timber mafia. It is widely believed that these individuals can manipulate legislation to serve their interests and resist changes in forest law that would make forest management more participatory and sustainable. The civil society and media in Pakistan often accuse the forest department of being involved in illegal logging.

## **Political Economy of Forest Management**

### ***Traditional Forest Management Practices***

Historically, forest ownership in most South Asian countries (Bangladesh, India, Nepal, Pakistan, and Sri Lanka) was mainly communal, and the forests were generally managed by indigenous customary practices that varied from region to region.<sup>[3]</sup> For example, in Pakistan, decisions related to access to resources and sharing of benefits and responsibilities were deeply rooted in sociocultural mechanisms such as customary practices (*riwaj*)

and the council of tribal elders (*jirga*) system. Forest ownership in most of the regions was held by the concerned landowners. Others in the community, including non-owners and the landless, held some privileges. They held free access to the forests of the concerned village for livestock grazing, cutting timber and collecting firewood for household purposes, cutting grass and lopping of trees for feeding cattle, and collecting minor forest products, such as mushrooms, honey, and medicinal plants. The owners rarely interfered with the exercise of these rights.<sup>[4]</sup> The local forest dwellers lived in harmony with the natural environment. Relatively small populations and the subsistence economy put limited pressure on the natural forests.

### ***Colonial and Post-Colonial Forest Management Strategies***

In South Asia, including in Pakistan, the forest management paradigms have been heavily influenced by the British colonial administration. After 1850, when the British came to rule this part of the globe, forest management became a centralized state function. The Indian Forest Act of 1878 brought the major part of the forests under government control and, as such, nationalized one-fifth of India's land area, while giving limited rights to the local people. Local people, who had once enjoyed customary rights over forest resources, were resentful. Although communities were granted some rights in 1923, and a new Forest Act was promulgated in 1927, local residents could no longer exercise their customary rights with the same freedom. In the case of reserved forests, for example, they could no longer cut trees, and they had to seek permission from the state authorities for subsistence and other access to protected forests.

Most of the forest policies and land regulations that were promulgated in colonial South Asia during the 19th century were retained by newly independent nations of the region. Pakistan was no exception. In 1947, at the time of independence, the policies, regulations, and hierarchies that administered the new nation's forests were largely left intact. The Indian Forest Act of 1927, which became the Pakistan Forest Act of 1927, introduced punitive sanctions against transgressors. The top-down, colonial approach of governance was also reflected in most of the national forest policies announced from time to time.<sup>[5]</sup> Such nonparticipatory approaches failed to stop forest depletion, and Pakistan's deforestation rate became one of the highest in the world. The policing efforts of the state forest department have hardly ever succeeded in protecting the forests; rather they have earned mistrust and provoked confrontation with local forest dwellers. This forced development practitioners, donors, and policymakers to push for a paradigm change, toward community participation.

### ***Institutional Changes—Toward a Participatory Approach***

In the last several decades, decentralized and participatory or joint forest management have become major policy trends in the forestry sector of many South and Southeast Asian

countries, including Bangladesh, India, Indonesia, Nepal, and Vietnam. In the forest-rich mountain areas of Pakistan, several participatory forest management programs and projects have been implemented since the 1980s. Although most of the interventions were on a pilot scale, they opened the doors for institutional change on a larger scale.<sup>[6]</sup>

The process of institutional change in the forestry sector was initiated in 1996 by the Forestry Sector Project (FSP) in the NWFP, funded by the Asian Development Bank. The FSP, together with the Institutional Transformation Cell, a joint Dutch–Swiss-assisted project, devised a setup to improve decision making and participatory ownership of the institutional reforms in the forest department of the NWFP, making use of existing experiences and proposals generated by other projects.<sup>[7]</sup> The project commenced under a loan agreement between the Asian Development Bank and the government of Pakistan. The Dutch government, the German federally owned development company GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit), and the Swiss Agency for Development and Cooperation also contributed to the project. It aims to protect and improve the hilly and mountainous environment of the NWFP. Doing so would raise the productivity of private, community, and government lands that are suitable for trees, fodder, and other crops through active participation of beneficiaries in the design, planning, and execution of project-related activities.

This project brought major reforms to the provincial forest department based on these principles and objectives:

- Institutionalization of the participatory forestry approach in the department
- Social organization and capacity building of local communities' organizations
- Creation of specialized management and enforcement units in important areas
- Increasing coordination, cooperation, and promotion of team-based management in the department
- Decentralization of planning and authority
- Redefining and reorienting the role of the forest department toward advisory functions
- Addressing gender concerns in the department
- Improving the training and education system of the department

These reforms provided considerable space for village-level institutions and joint forest management committees (JFMCs) to manage forest resources at the village level. The improvement of village infrastructure was also an objective of the FSP, in addition to the core objective of forest management.<sup>[8]</sup> Within the provincial forest department, a new structure was developed to decentralize planning and authority (i.e., by backstopping the JFMCs) and to increase coordination and cooperation within the department, thus enabling the department to actually implement the new participatory forestry approach.

A positive outcome of the participatory approach was the increase in awareness among the residents regarding forest protection, as indicated by the significant difference in the responses of residents of the project villages (i.e., those villages where FSP had interventions and joint forest management was in practice) versus those in nonproject villages (no interventions by the FSP). A 5-point Likert scale was used to record perceptions of the respondents regarding the change of forest cover and illegal cutting (by the concerned villagers and outsiders) during the last five years. The Likert scale (5 = increased, 1 = decreased) is shown in table 1.

**Table 1: Perceived Change in Forest Cover and Illegal Logging during the Past 5 Years**

	Village	N	Mean	t-test T
Change in forest cover	Project	200	2.22	
	Nonproject	200	1.66	
	Both	400	1.94	7.081
Illegal cutting (by outsiders)	Project	200	2.65	
	Nonproject	200	3.66	
	Both	400	3.16	-10.09
Illegal cutting (by villagers)	Project	200	2.97	
	Nonproject	200	3.97	
	Both	400	3.47	-10.48

Source: Shahbaz 2007.

The data in the table reveal that, although forest cover decreased in both the project and nonproject cases, the rate of forest depletion was significantly higher in the nonproject villages. Illegal cutting by outsiders of the project villages decreased, whereas it increased significantly in the nonproject villages. Similarly, illegal cutting by the villagers concerned increased in the nonproject villages, while it decreased in the project villages. These trends indicate the positive impact of participatory forest management. One of the reasons for this progress can be traced to the joint forest management process, in which the forest department used participatory rural appraisal tools, such as transect walks and group meetings, to inform local people of the forest's importance to their livelihoods and to future generations.<sup>[9]</sup> The negative consequences of forest degradation were also highlighted. For the majority of participants, such meetings were the first of their kind, and they understood that

they would benefit from organized forest protection. In most cases, the JFMCs imposed fines on the transgressors, and the JFMC members themselves guarded the forests.

## **The Failure of Participatory Forest Management**

In most developing countries, including those in South Asia, participatory forestry policies emerged as a response to rapid deforestation and institutional failure in the sustainable management of forest resources. Although the data shown in table 1 suggests a positive breakthrough is possible, empirical research suggests that there are still some weaknesses in the new paradigm of forest management. With the qualified exception of India, the rate of forest depletion in most South Asian countries has continued or actually increased since participatory policies were adopted. The rate of increase in Pakistan is alarming. Between 2000 and 2005, Food and Agriculture Organization data show that the annual rate of forest loss in Pakistan, Sri Lanka, Nepal, and Bangladesh was 2.1, 1.5, 1.4, and 0.3 percent, respectively. Studies based on remote sensing show that the rates of decline in forest cover in the NWFP will lead to a complete disappearance of forests from most areas within 30 years.

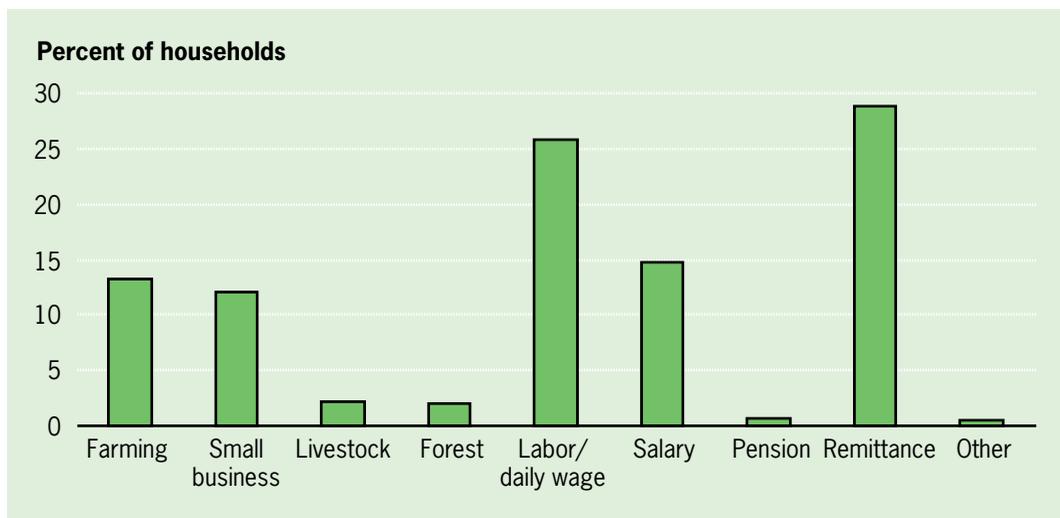
Institutions such as the JFMCs that are charged with the enhancement of trust between state officials and local communities have proven weaker than the state forest department and the timber mafia, and unequal to the impact of population growth. Some causes of forest depletion in the mountainous regions of Pakistan include the removal of forest tracts for crop production and road construction, overgrazing of land by cattle, population explosion and growing urbanization, the dependence of rural populations on wood for fuel, lack of awareness, and illegal logging by the timber mafia. Although significant progress has been made in tree planting, notably on farmland, it does not compensate for the loss of natural forests. The failure of the state forest department to reduce deforestation through participatory approaches and continued conflicts between the department and local populations both indicate a general ineffectiveness of Pakistan's new forest management paradigm.

## **The Forests-Livelihoods Nexus**

In contemporary literature on the linkages between rural livelihood security and forest management, two overarching issues stand out: (1) how and to what extent forest resources can contribute to poverty alleviation, and (2) how and to what extent poverty alleviation and forest conservation can be made convergent rather than divergent goals. The role of forest resources in meeting human needs has caused intense debate, but there has not been adequate consideration given locally and globally to the serious threats to the security of local people who depend on forests for their livelihoods. Devolution of forest management authority to local communities in the mountain regions does provide a good opportunity to improve the living standards of the poor. However, it may also lead to increased exploitation of resources in order to raise the incomes of local people.

Forests are an important part of the daily lives of those living near them in Pakistan. However, in-depth, empirical studies reveal that the majority of those living in and near the forests of northwest Pakistan are not dependent on natural resources, including forests and water, for their cash income. Rather, they have migrated or adopted activities that do not rely on natural resources, such as labor and small businesses. Figure 1 shows the primary source of cash income of 400 randomly selected households in the mountainous regions of the NWFP. Remittance and labor/daily wage are the main sources of income for the majority of households. Cash income from forests is insignificant.

**Figure 1: Sources of Cash Income of Respondents' Households**



Source: Shahbaz 2007.

Nevertheless, forest use patterns by the local communities show that a majority of people are dependent on forest wood for household needs, as well as forests and forest areas for firewood, timber, forest soil, pastures, and medicinal or edible plants. The intensive use of wood as fuel for cooking and heating houses during harsh winters is due to a lack of alternative energy sources.<sup>[10]</sup> Natural gas is not available in the mountain villages of Pakistan, and the higher cost of electricity limits its use for cooking and heating purposes. Similarly, most people cannot afford kerosene oil and liquid petroleum gas cylinders.

It can therefore be argued that forest resources continue to contribute to subsistence-oriented (or noncash) livelihoods of people living in and around these forest regions. Thus, the issue of participatory forest management becomes quite complicated in the sense that the NWFP model emphasizes institutional restructuring of the forest department, forest protection, and the regeneration of new trees. By contrast, local resident stakeholders are primarily concerned with meeting their subsistence needs with forest resources.

## Discussion and Outlook

Although many factors are responsible for the ineffectiveness of forest management strategies in Pakistan, some stand out more than others. One of the most important has been the unwillingness or inability at various levels of government to involve local communities in meaningful ways. Empirical research reveals that some forest department actors have tried to create obstacles to the working of the JFMCs. These actors fear the loss of informal income (that comes in the form of bribes for extraction of timber and firewood) that would result from the implementation of a more participatory approach. The strong political will that is critical to effective decentralized forest management has not been present.

The general absence of political will has encouraged the smugglers and mafia to expand their illegal activities in the timber trade. Local people, if given sufficient powers and state support, can effectively combat illegal logging, but a sense of ownership is critical. Similarly, an analysis of forest sector changes in India shows what has been vaunted as “decentralization” has actually increased state power at the village level because village organizations still have to depend on state forest department officials for the utilization and management of natural resources.

Another key factor that hinders the effectiveness of participatory forest management in northwest Pakistan is the ignorance of local livelihood realities in the state-led forest management initiative. The main livelihood strategies of people who live closer to the forests are based on remittances generated by labor migration. Forest dwellers often make their incomes in areas other than where they live, and are not invested in their local forests as sources of livelihoods. Thus, community forestry in South Asian countries often suffers from the lack of meaningful economic incentives. Nevertheless, there are some success stories in the region. The participatory approach adopted in Nepal’s Kanchanjunga Conservation Area succeeded primarily because it made exceptional provisions to include local stakeholders in the planning, implementation, monitoring, and benefit sharing of the project.

The results regarding the positive impacts of participatory forest management on the sustainability of forest resources (less decrease in forest cover and reduction of illegal cutting) indicate that participatory forest management has the potential to positively affect the natural capital (forests) of the local people. The results also show that the participation by local people in forest management raised their awareness of the need for forest protection and conservation. This substantiates the findings of some previous researchers, that the problems that frequently occur in the implementation of participatory or decentralization processes and policies are not flaws inherent in decentralization. Rather, they are a result of poor design of decentralization policies, procedural weaknesses, and a lack of pragmatic implementation strategies.

## Recommendations and Way Forward

Deeply rooted mistrust between the state actors and local stakeholders, lack of a sense of ownership in local communities, and the state's ignorance of local livelihood realities are some of the major causes of the ineffectiveness of Pakistan's current forest management paradigm. Below are some recommendations for improving the effectiveness of forestry-related interventions and the livelihood security of the forest dwellers:

- Trust can be strengthened if local institutions are given more authority, and if the state's support for the management of natural resources is in harmony with traditional practices and customary regulations. A continuing dialogue between state and local actors, moderated by independent groups, may be effective in overcoming the current gap among main stakeholders.
- One of the main causes of deforestation is the dependence of local people on firewood. Providing alternative energy sources such as natural gas at subsidized rates may ease the pressure on forests.
- An efficient procedure of giving incentives to the local communities for joint forest management should be introduced.
- Employees of the forest department should be continually educated and trained in the new paradigm of forest management.
- A systematic, periodic, external evaluation system should be adopted to ensure the proper implementation of joint forest management initiatives.
- The interventions made by either the state or donor agencies should incorporate sensitivity toward livelihood strategies, local resource use patterns, and the power relations of local stakeholders. Integrating national resource management initiatives with livelihood-related interventions could ensure the sustainability and effectiveness of such initiatives.

## **Acknowledgments**

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# Socioeconomic Conflicts in Indonesia's Mining Industry

Budy P. Resosudarmo, Ida Aju Pradnja Resosudarmo,  
Wijayono Sarosa, and Nina L. Subiman

Indonesia is blessed with abundant mineral resources which, if managed properly, could provide a strong base for the livelihood of its people. Indeed, the existence of mining projects in Indonesia has often been regarded as a catalyst for accelerating development of infrastructure and increasing community well-being in many areas. This is particularly true for many districts (*kabupaten*) where local governments generally lack the capacity to provide public services. Several early-generation foreign multinational mining companies,<sup>1</sup> operating for many years in remote rural areas, in some ways have acted as “proxies” for local governments (i.e., districts and subdistricts) in many development areas. The companies created wealth and jobs, delivered public services, and generally improved the welfare of the people. However, their operations have not been without adverse consequences, and problems have increased significantly in the last decade.

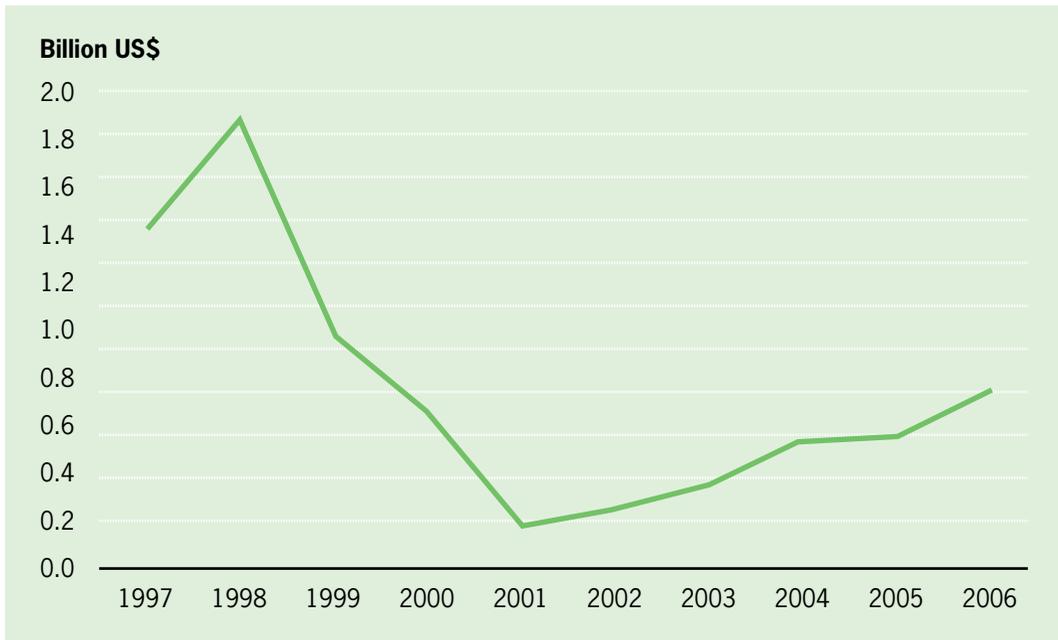
In frequency and magnitude, conflicts involving mining operations have intensified since the fall of President Suharto in 1998. As a result, there has been a serious decline in mining investments (see figure 1), with likely long-term consequences for Indonesia. The main goal of this paper is to examine the driving forces behind these conflicts. Understanding them is critical to developing informed future policies and to the sustainable growth of this important contributor to Indonesia's economy and the socioeconomic well-being of its people.

## Indonesia's Mining Industry and the Impact of Conflict

As a resource-rich developing nation, Indonesia relies heavily on its mining industry. Coal and mineral mining have contributed significantly to the country's economy and have become even more important in recent years. Mining activities contribute to government revenue and GDP at a higher rate than in other Association of Southeast Asian Nations

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<sup>1</sup> Examples are PT Freeport Indonesia in Papua, PT Inco in Sulawesi, and PT Kaltim Prima Coal in Kalimantan.

**Figure 1: Fixed Investment in Indonesia's Mining Sector**

Source: PricewaterhouseCoopers 2008.

(ASEAN) countries. In 2000, coal and mineral mining contributed approximately 3 percent of the total government revenue and 3 percent of Indonesia's GDP; by 2007, this had increased to approximately 8 percent and 4 percent, respectively.<sup>[1]</sup> The export of ores and minerals increased from US\$3.2 billion in 2000 to US\$7.2 billion in 2005—an annual increase of 18 percent. In 2005, the amount of exports was still slightly higher than India's, despite India's annual export growth of about 41 percent during the same period.

Indonesia is the third largest coal producer in the world, after Australia and China. Coal production in 2006 was more than double its production in 2000.<sup>2</sup> In 2007, revenue from coal made up 70 percent of that year's US\$6 billion mining contribution to government revenue, and Indonesia supplied approximately 26 percent of the world's coal.<sup>[2]</sup> The rise in coal production and revenue is in part because its export value has been the highest among mining commodities since 2003, reaching US\$6 billion.<sup>3</sup>

Mining activities have been the source of various conflicts caused by policy and regulatory uncertainties over land use and property rights, illegal artisanal mining (artisanal mining is often, but not always, small scale; it can also refer to larger and somewhat coordinated

<sup>2</sup> Production of copper and gold showed a slightly declining (or at most, steady) trend from 2000 to 2006, and tin and nickel a slowly increasing trend.

<sup>3</sup> In comparison, the export value of copper was around US\$4.6 billion.

mining operations that are not associated with legal mining companies), pollution and environmental impacts, and uncertainty surrounding the livelihoods of local residents after mining closure.<sup>[3]</sup> These conflicts are being exposed and have become more pronounced under the current structure of decentralization of authority to local governments, and a substantially freer social and political environment.

Since 1999, these tensions have hampered new legal investment in the mining sector. There have been almost no new mining contracts since 1998,<sup>[4]</sup> and, as shown in figure 1, investment has plunged from approximately US\$1.9 billion in 1998 to US\$0.2 billion in 2001. Total investment has bounced back again since 2002, but the amount in 2006 was still far below the levels in 1997 or 1998. Furthermore, most investments were earmarked for maintenance and expansion of production under existing contracts.<sup>[5]</sup>

## Land Use and Property Rights

Policy and regulatory uncertainties and overlapping land use and property rights have created conflicts between mining and forestry concerns, central and local governments, and mining interests and local communities.

### *Mining versus Forestry*

Mining activities in Indonesia are currently governed by an outdated law (Law 11/1967 on the Basic Provisions of Mining). On state forest lands, the mining industry must also comply with Forestry Law 41/1999.<sup>4</sup> As two-thirds of the nation's land area is recognized as forest lands (*Kawasan Hutan*) and is under the control of the Ministry of Forestry, this law is of critical importance for the issuance of mining rights or licenses. Much of the most commercially viable mineral ores and metals are found in forested areas, particularly in areas that are categorized as protected forests,<sup>[6]</sup> but the Forestry Law strictly prohibits open-pit mining activities in protected forests. This has severely limited the development of the mining industry in such areas. Prior to 1999, forest lands' uses and development were governed by the Basic Forestry Law (Law 5/1967), which did not contain prohibitions for mining activities in protected forests. Conflict between the mining and forestry sectors is thus almost certain to develop.

On the one hand, proponents of conservation applauded the Ministry of Forestry's effort to maintain the functions of protected and conservation forests amidst strong pressures from the business mining sector. On the other hand, this new policy is seen as a major setback in the government's effort to lure investors into the mining sector. This legal uncertainty has

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<sup>4</sup> On private lands, these activities are regulated by Law 5/1960 on the Basic Provisions of Agrarian Principles.

deterred many potential investors: between 1999 and 2005 there were no new investments in exploration activities.<sup>[7]</sup>

Fierce lobbying by the mining sector resulted in the issuance of Government Regulation in Lieu of Law 1/2004, later formally strengthened to become Law 19/2004. This law clarified that all mining contracts or licenses made prior to the issuance of the 1999 Forestry Law remained valid. As a result, 13 mining companies that had acquired a mining contract or license for protected or conservation forest areas before the enactment of the 1999 Forestry Law<sup>[8]</sup> were allowed to continue with their activities.<sup>[9]</sup> To maintain the level of protection and conservation, however, the government issued a regulation requiring companies to compensate for land lost to mining activities with a certain area of forested lands. Mining interests saw this requirement as a further barrier because compensation had to be in the form of land, and they continued to lobby the government. In 2008, a new regulation (PP 2/2008) changed the form of compensation for mining activities to money, but environmental and community NGOs strongly oppose this development. They consider the “rent” for land leased to mining companies too low. More fundamentally, they object to forsaking the protected forests.

The saga of changing government policies in the forestry sector reflects the fluidity and uncertainty of regulatory frameworks that govern mining activities in Indonesia and the growing power of conservation interests as they intersect with mining.

### ***National versus Subnational Governments***

Another uncertainty of the regulatory environment involves mining license authority. As many aspects of government administration are decentralized, authority over these licenses has devolved to local and regional governments, which have also been empowered to apply certain levies and taxes. Thus, all levels of government may issue mining licenses and apply certain levies/charges. This has added to the confusion and legal uncertainty over mining rights. For example, in 2008, a local government issued a license to a third party for a nickel mining area that had previously been secured for Rio Tinto Ltd. by the national government. Rio Tinto sued the local government in question.<sup>[10]</sup>

### ***Conflicts with Local Communities***

As in many other countries, mining activities in Indonesia have a long history of socio-cultural, economic, and environmentally driven conflicts between mining operators and local and/or indigenous communities.

In Indonesia, much of the conflict is triggered by the allocation of mining permits or contracts to companies on community or indigenous lands. Land tenure rights are at the heart of the problem. According to Indonesia's constitution, all of its land is controlled by the state, and while customary (*adat*) or indigenous lands are recognized, it is on the condition

that their use is not in conflict with national interests. In rural areas of the outer islands, land certificates are not the norm; rather, land rights are recognized traditionally and informally within and among local and/or indigenous communities.

Through the New Order period (the Suharto years, 1966–98), the national government granted many timber and mining concessions to large-scale companies—mostly without communities’ consent or consultation and proper compensation—on lands where traditional and indigenous communities have dwelled, earned their livelihood, and practiced their cultural heritage for generations. As a result, conflicts abound when these mining operations trespass or excavate communities’ villages, hunting areas, gardens, farms, or burial and sacred grounds. Problems also occur when large-scale operations force out artisanal local miners.<sup>[11]</sup> Furthermore, there is an issue of equity. Most mining revenues accrue to the national government, and employment of local population in the mining operations is often marginal.

In recent years, conflicts appear to have escalated in number and intensity, facilitated by a more open and democratic environment and the support of NGOs, which have consequently become more powerful themselves. In particular, conflicts increasingly revolve around environmental issues, amplifying the social problems in and around mine areas.

## Illegal Mining

The stigma surrounding illegal mining is closely associated with the way Indonesia controls its natural resources. Article 33, point 3, of the country’s constitution mandates the state to “control and exploit all the lands, waters, and natural riches contained therein for the greatest benefit of the people.” This article is the foundation of the state’s control right (*Hak Menguasai Negara*) which has inspired subsequent mining laws. This document defines illegal mining as “...mining business conducted by a person, group of people, or company/foundation which has legal entity, which in its operation does not hold a legal government permit.”<sup>[12]</sup> In Indonesian terms, these miners are often called PETI (*Penambang Tanpa Izin*, or mining without permit).

Around 90 percent of artisanal mining is regarded as illegal.<sup>[13]</sup> Under the current Mining Law (Law 11/1967), the state explicitly allows members of the local population in possession of a mining authorization (permit or *Kuasa Pertambangan*) to exploit minerals in areas designated by the Ministry of Mines to have no economic significance.<sup>5</sup> These activities are called “people’s mining” (*pertambangan rakyat*) and are defined as follows: “...the mining activity conducted by the locals on a small scale or in collectives with simple tools

<sup>5</sup> Mining Law 11/1967 clearly specifies the risk of imprisonment for a maximum of 6 years and/or an IDR 500,000 (US\$55) fine for illegal activities.

for their own income.” Because of license processing difficulties—mainly slow, complicated, and expensive red tape—these miners are often reluctant to obtain permits.<sup>[14]</sup> Thus, they automatically become engaged in mining activities considered illegal.

Although obtaining illegal mining data is not easy, researchers believe that these activities have a significant impact on the country's mining industry. Some data show that in the mid-1990s there were approximately 77,000 illegal mines in Indonesia with around 465,000 employees.<sup>[15]</sup> Indonesia's Central Bureau of Statistics recorded average informal sector employment in mining from 1997 to 2002 as 324,000.<sup>[16]</sup> This figure is about 10 times higher than the average number of legal mining workers—34,000—in the same period.<sup>[17]</sup>

### ***Trends behind the Rise in Illegal Mining Activities***

Illegal mining activities increased significantly following the 1998 economic crisis and resulting unemployment, and expanded further due to the decentralization and *reformasi* following the fall of Suharto in the same year. A rise in world ore and mineral prices since the late 1990s also contributed to this increase. For example, in the Pongkor gold mine in West Java Province, the number of *gurandil*—the local term for illegal gold miners—jumped from 500 in the early 1990s to 8,000 in 1998–2000. The spike followed massive unemployment created by the closing down of many manufacturing industries in the Jakarta-Bogor-Tangerang-Bekasi areas and the increase in the price of gold on the world market.

Overlapping authority and conflicts of interest between departments or even between the central and local governments in dealing with illegal mining problems have also played a part.<sup>[18]</sup> In South Kalimantan, PETIs have been indirectly or informally supported by the district head (*bupati*), since these miners have contributed more revenue to the region than the existing state-licensed mining companies. These *bupatis* have openly granted mining authorization to local miners within the mining companies' concession areas.<sup>6</sup> Meanwhile, the central government, which grants mining concessions to the large companies, regards these local miners as illegal. At various levels of government, regulations were developed to collect these fees, and whoever fails to meet any of these regulations falls into the illegal category.<sup>[19]</sup> Because of the confusion created by overlapping authority over mining concessions, the term “illegal mining” has become blurred and ambiguous.

In the last decade, lenient sanctions for violations and inconsistency in implementing regulations have also contributed to increased illegal mining. In general, the government rarely enforces its illegal mining regulations and policies. Of the numerous cases of arrest and equipment confiscation by the police, only a few select cases were actually brought to trial,

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<sup>6</sup> This was made possible by clauses of Government Regulation 75/2001 on the Implementation of Mining Law, which referred to Law 22/1999 on Decentralization/Regional Autonomy, where local governments are authorized to issue mining licenses.

in large part because the government treats various minerals differently based on strategic, vital, and other uses. Illegal tin mining is not the same as illegal diamond mining. Moreover, several environmental NGOs have accused the government of exercising a double standard, of only wanting to curb illegal operations within big mining companies' concession areas, as in the case of Indo Muro Kencana's gold mine in Central Kalimantan.<sup>[20]</sup>

Finally, widespread illegal mining is also the result of local resistance to government regulations. Perceiving that they have been treated unjustly for decades with regard to the mining situation, local people show little reluctance to defy government policies and regulations. They argue that all articles regarding people's mining in Mining Law 11/1967 are designed to restrict, rather than to promote, its existence.<sup>[21]</sup> People's mining is certainly prohibited from operating in large-scale mining companies' concession areas. Meanwhile, large-scale miners are not prohibited from operating on indigenous lands.

### ***The Role of Illegal Miners***

In terms of production, illegal miners cannot be regarded as insignificant players. Indonesia's coal mining company, PT Arutmin, recorded that in South Kalimantan during 2001–03, PETIs have “looted” some 28.2 million tons or an average of 9.4 million tons of coal per year, which is almost equivalent to Arutmin's 2002 production of 10.5 million tons. This means a loss of IDR 513 billion in royalties for the government, or approximately IDR 1.3 million per person if the money were to be distributed evenly among the 3 million people living in South Kalimantan.<sup>[22]</sup> About 40,000 tons of tin sand were produced by illegal mining (*tambang inkonvensional* [TI]) in Bangka-Belitung in 2001, a similar amount to the production in the same year of a state-owned tin company, PT Timah.<sup>[23]</sup> With a world demand of 200,000 tons of tin per year, this illegal mining production certainly affected the stability of the world's tin prices and the company's financial performance.<sup>[24]</sup>

The Indonesian government tends to deal only with the symptoms of illegal mining, and is generally reluctant to probe the core problems associated with it. This has created an opportunity for neighboring countries' business players to obtain minerals cheaply from Indonesia without having to internalize the sociocultural, economic, and environmental externalities that would come from mining on their own soil. Most illegal mining operations are funded by foreign investors. It is highly unlikely that, given the annual national income per capita of US\$725, locals would be able to self-finance billions of rupiah of mining operations involving trucks, excavators, 20-horsepower machineries, smelters, and even ships. Along the coasts of Batulicin, South Kalimantan, mountains of illegal stockpiles of coal abound, and barges line up to ship coal to investors' destinations, mainly China and India. In Bangka, tin smelters—with the exception of Timah's—are mostly funded by smelting companies based in Singapore and Malaysia. In 2002, the Indonesian government banned export of tin sand. Consequently, low concentrated tin sand has to be processed in Bangka-

Belitung prior to shipping it to Singapore and Malaysia. Establishing smelting facilities to process this tin is expensive.

Like other illegal activities, such as drug smuggling or illegal logging, the financing chain of illegal mining is always covert. Links between operators and the fund provider are difficult to trace. In the case of Bangka, investors assigned local figures to recruit former farmers, fishermen, or the unemployed and to pay them for mine work. In Pongkor, illegal gold miners (*gurandils*) only knew that some rich locals paid for their operations and that they were obliged to sell their gold to them. In fact, these rich locals were just intermediaries, people employed by some unknown bosses in the city. When it comes to arrests and confiscations, these investors have always managed to escape detection.

### ***Socioeconomic Impacts of Illegal Mining***

There are strong financial incentives for the locals to conduct these illegal mining activities since they have—at least so far—significantly supported local livelihoods and contributed to the local economies. For example, *gurandils* in Pongkor helped both locals and immigrants survive the 1998 economic crisis and transformed the area from quiet, shabby villages into lively, populated areas with permanent buildings and vehicle ownership.<sup>[25]</sup> A similar situation occurred in Bangka, where new, permanent houses flourished along the new road following an increase of illegal mining in 2001. In South Kalimantan, the Banjarese (the locals of the region) charter a Boeing 737 at least twice a year to take them to Jakarta, en route to their *umrah* pilgrimage to Mecca, Saudi Arabia. There is no doubt that illegal mining has benefited some poor and rural people. By engaging in these activities, they can develop their capacity, realize their economic potential, and overcome the challenges that arise from limited access to subsistence resources.<sup>[26]</sup>

But the presence of illegal miners increases conflicts among people in the surrounding areas. In Pongkor, for example, *gurandils* have always been associated with community conflict and social unrest. They frequently fight over mining territories. On many occasions, the role large companies play in tackling illegal mining causes conflict. Having been granted a concession by the state, some companies want to rid their mining sites of local miners. This often leads to violence as companies try to assert and maintain control over production, resulting in loss of land, livelihood, and above all, human life. Bringing in the military or police can complicate the situation. In a struggle between illegal miners and Freeport McMoran in Papua, for example, there have been indications that the military, while making a show of protecting the company from illegal gold mining activities, is actually behind the illegal miners.<sup>[27]</sup>

Alcohol abuse and prostitution have been associated with illegal mining. There are also instances of child labor. For example, some 10 percent of illegal miners in Kalimantan are

under 17 years old. These children are more susceptible to health risks and accidents as well as physical and psychological problems than their adult counterparts.<sup>[28]</sup> Community leaders and local people are concerned about the social impacts of illegal mining.

The problems associated with illegal mining in Indonesia lead some to consider legalization. It is often compared to prostitution: you cannot stop people from doing it, but you can make them do it safely.<sup>[29]</sup> Perhaps the authorities and mining companies in Indonesia could take Benguet's Acupan Mining Partnership in the Philippines as an example. This project enables a large-scale operator and small-scale gold miners to be grouped as mining cooperatives and work together legally.<sup>[30]</sup> Benguet Corporation acknowledges the existence of small-scale miners in its area of operation and assists them with safer and environmentally friendly operation methods, as well as agreeing to purchase their gold. In return, the small-scale mining community agrees to foster harmonious coexistence with the company, to protect the environment, and follow certain health and safety measures. The government also takes part by setting rules, regulations, and measures to accommodate the project, and oversees their implementation. This tripartite agreement is considered a success by many. Project manager Angelito Gomez reports that since the launch of the project in 2002, it has provided employment to 1,000 local residents, 800 of whom are small-scale miners from Acupan and the surrounding bays. He adds that the project has managed to improve the company's performance, improve the community's quality of life, and minimize illegal and destructive gold extraction.

On the one hand, illegal mining provides a breeding ground for social, economic, and health problems. On the other, it creates more employment than formal mining operations and accommodates those at the lower end of the economy. There are still ambiguities in the way the government, NGOs, politicians, and local societies define and take positions regarding these activities.

## **Environmental Issues**

### ***Large-Scale Mining***

Conflicts between local communities (often supported by NGOs) and mining operators—both domestic and foreign—typically occur over pollution or environmental destruction caused by mining activities. In general, mining operators are accused of being irresponsible in managing environmental damage caused by their activities. As Indonesia's social and political environment becomes substantially freer (as in other Southeast Asian countries in general), cases of social conflict arising from pollution and environmental destruction are receiving more public attention, and thus are of increasing concern in the mining sector.<sup>[31]</sup>

Environmental violations occur despite government regulations that require companies to satisfy certain environmental standards. For instance, companies are required to undertake

an environmental impact assessment (EIA) prior to the establishment of their operations. However, EIAs are frequently only an on-paper exercise; even appropriate EIAs do not necessarily lead to effective enforcement. Furthermore, foreign mining companies operating in Indonesia and other Southeast Asian nations often apply a double standard of environmental criteria.<sup>[32]</sup> The companies are largely enabled by slack enforcement associated with a range of factors, including inadequate capacity, ineffective regulatory oversight, and the absence of good governance.

Some of the environmental damage associated with large mining companies in Indonesia is the result of tailing, waste rocks, and acid leaching. These wastes poison surface water and groundwater with a high level of toxicity that harms aquatic plants, wildlife, and other organisms. In the American-owned Freeport mine area, one of the world's largest gold and copper mine operations, sites of significance for the indigenous Amungme people, including Lake Wanagon, have been completely destroyed and replaced by waste rock. The waste and pollution of the mine have also caused vegetation smothering, heavy metal accumulation in plants and wildlife, estuary habitat destruction, and contamination of the estuary food chain.<sup>[33]</sup> Ecological balance within and around mining areas is at stake. A study indicated that at least 8,000 species of plants are found within Freeport's area.<sup>[34]</sup> Freeport's mining operation threatens the majority of species, as well as putting a heavy environmental pressure on the Lorentz National Park, a World Heritage site that wraps around the area.

Other foreign mining operations share Freeport's environmental report card. Recently, Newmont, an American gold mining company operating in Eastern Sulawesi, was taken to court by domestic NGOs, accused of discharging tailings with dangerous levels of mercury into the nearby Buyat Bay. An Australian-owned gold and silver mining company operating in Central Kalimantan, PT Indo Muro Kencana (a subsidiary of Straits Resources), has produced over 48 million tons of waste rock in its 14 years of operation.

Open-pit mining, also known as opencast mining, open-cut mining, or strip mining, is the common practice in Indonesia and creates significant environmental destruction. The removal of trees, animals, and soil from a huge coverage area upsets the ecosystem. Reclamation is only conducted in small areas where the soil has been reallocated, and often it is done carelessly, for example by planting nonnative species. Large ex-mine areas are abandoned without bringing in new soil, leaving the land virtually infertile. Coal mining operations in Kalimantan are a particular concern, since they cover a huge forest area.

### ***Illegal Mining***

Illegal mining operations have also caused environmental problems. For example, in South Kalimantan, illegal mining activities cause hillsides and hilltops to be carved away,

resulting in substantial soil erosion and sedimentation in streams as well as acid rock drainage in some areas. Dumps of mercury, cyanide, oil, garbage, and tailings along the riverbanks are also a problem. Over 1 million hectares of land area in Kalimantan have been destroyed by local illegal mining activities.<sup>[35]</sup>

The land in Bangka Belitung is heavily damaged, with huge holes filled with standing turbid water everywhere. In the last 10 years, fishermen in the area have often complained about the significant drop in their catches because of the presence of floating tin mining vessels (*TI apung*). Rivers in the Pangkalpinang area are no longer swimmable because they are heavily polluted with solar fuel and soil, not to mention sedimentation.

The “rat” tunnels or holes created by illegal miners in Pongkor cause landslides and erosion in the nearby Gunung Halimun National Park. The mercury they use in gold processing pollutes the Cikaniki and Ciguha Rivers—important water sources for 16,500 residents.<sup>[36]</sup> In Sawahlunto, West Sumatra, hundreds of hectares of the areas exploited by illegal coal mining are subject to flooding because of the lack of rehabilitation work.<sup>[37]</sup>

There are also health-related concerns. Illegal miners often operate in poor conditions. Mining is dangerous work, and safety standards are often neglected.<sup>[38]</sup> Adnan (2005) records that gold miners in Kalimantan never use diving equipment or protect their bodies with wire while diving to the bottom of the river. These miners rarely wear gloves and allow their skin to be in direct contact with hazardous mercury and often inhale it; never put on ear caps, despite 6 to 8 hours nonstop exposure to loudly vibrating mechanical sounds; never wear boots or other protective gear when submerged in river water; drink mercury-contaminated river water; and prefer to see a traditional healer (*dukun*) than a doctor to cure them when they are sick. To make things worse, there is a lack of official government data revealing the health impacts of illegal mining, or the number of fatalities caused by mining accidents. Many accidents at illegal mining sites are not reported, and most injured miners do not receive proper medical attention.<sup>[39]</sup>

Environmental degradation in mining sites not only affects the workers but also their families and others in the area. Women and children are exposed daily to toxic fumes and poisonous water even though they do not work at the sites. In some places, including Tatelu, North Sulawesi, women work in mining, crushing ore at the plant or managing the whole operation.<sup>[40]</sup>

## Mining Closure

What happens in post-mining operations in Indonesia and other parts of the world is no less critical than what takes place during the operational period. Mine closures involve significant safety, environmental, economic, and social risks. In developing countries like

Indonesia, the closing of mine activities creates more complex and serious problems than in developed countries. In many of Indonesia's mining areas, local governments often lack development capacity. The closure of mining companies in such areas often means the end of a significant economic driver, which could lead to social and economic disturbance, or even collapse. In particular, it can lead to job redundancy, the absence of a regional economic driver, the discontinuation of company service delivery and outreach programs, a drop in government revenue, and environmental degradation. Such chaos occurred when tin mining operations closed in the Bangka and Belitung islands.<sup>[41]</sup>

There is also a justice issue. Local people receive only limited revenues, while mining operators get high revenues during the extraction period of the mineral. When the mineral supply is depleted, mining operators abandon the area with no means of survival for the locals. Mining operators, the government, and local communities have debated what should be done about this as well as about the extent of environmental reclamation required prior to the closure of the mining operation.

Mining closure has recently become a serious issue because most of the major companies operating in Indonesia are governed by the early generation of mining agreements (contract of work), which rarely have clauses relating to closure.<sup>[42]</sup> The draft of the new mining law (Mineral and Coal Mining Law or UU Minerba) contains clauses on mine closure. However, the draft has been under discussion in Parliament for several years, and at the time of this writing, it is still not clear when it will be passed.<sup>[43]</sup>

In the absence of closure regulations, civil society and the government impel mining companies in Indonesia to adopt corporate social responsibility (CSR) best practices that follow sustainable development principles and include comprehensive closure plans. CSR practices address integrative programs toward long-term ecological health, strengthening local economies, and improving community well-being, which simultaneously promote sustainable livelihoods after the mine closure. In pushing forward the implementation of CSR, the government of Indonesia promulgated Investment Law 25/2007. This law obliges investors operating in the country to carry out CSR.<sup>[44]</sup> In addition, Corporation Law 40/2007 specifically mandates extractive industries to adopt CSR.<sup>[45]</sup> This law also elaborates sanctions for noncompliance. The spirit of CSR is working together among government, companies, and communities to promote sustainable livelihood for all; corporations are not expected to take over the responsibility of the government in providing welfare to the people.

Under decentralization, in response to the augmented power of local authorities and local stakeholders, mining industry CSR practices need to balance the diverse demands of communities and the imperatives of protecting the environment. In doing so, the CSR practices must recognize newly empowered stakeholders (such as indigenous peoples); identify the interests, concerns, and objectives of all stakeholders; provide transparent and accountable

information on the mining operation to them; and recognize the need to balance or accommodate different interests.<sup>[46]</sup>

PT Kelian Equatorial Mining (KEM), one of the few mining companies in Indonesia to have recently closed its operation in 2004, provides a valuable lesson. KEM had tried to engage its CSR programs well in advance of its closure and had taken an integrated social and environmental approach in its closure process.<sup>[47]</sup> Nevertheless, conflicts occurred.<sup>[48]</sup> Under a decentralized system of governance such as in post-Suharto Indonesia, where local stakeholders have gained increased powers, companies that seek community acceptance of their operations face a situation in which collective social performance demands, such as compensation, environmental mitigation, and employment opportunities, cannot be established in an appropriate and timely manner. This kind of situation can drive a company into a “vicious trap” of having to cope with a wide range of demands from local stakeholders.<sup>[49]</sup>

It is not clear whether the implementation of CSR can help mitigate the challenges associated with mining closure. Clear written guidelines of the detailed actions undertaken within the CSR framework have not been established, and monitoring of CSR implementation is weak. In practice, mining companies are implementing CSR to varying degrees. So far, there are very few cases of mining closure in Indonesia that have not had a shocking impact on the livelihood of the local people and that have not caused environmental degradation in the affected areas.

## **Conclusion: The Way Forward**

In the last three decades, mining has had increasing significance in the Indonesian economy. Compared with other Southeast Asian countries, its contribution to the Indonesian economy is substantial. It has also played an important role in the world’s supply of strategic ores and minerals, such as coal, tin, and copper. With the world’s looming energy crisis, coal mining has probably become the most important mining operation in the country. However, mining operations are a source of substantial conflict with adverse social and environmental consequences. Since the early 2000s, the conflicts have become worse in number and severity, affecting the development of the country’s mining sector, and ultimately its overall economic performance.

Primary sources of conflict are policy and regulatory uncertainties over land use, property rights, and authority over mining licenses. These uncertainties have created a continuing tug of war between the Ministry of Forestry and conservationists on one side, and the Ministry of Energy and Mineral Resources and mining companies on the other. The uncertainties have also induced conflicts between central and regional governments over who has the authority to issue mining licenses. These uncertainties and overlapping authorities are

exacerbated by the issue of community land tenure, which was largely ignored during the New Order period (the Suharto years). Clearly the issues of land use and clear property rights need to be resolved to maintain existing investments in the country, as well as to secure new investments.

Secondary sources of conflict are illegal mining activities. Illegal mining is caused partly by regulatory uncertainties—notably those associated with the lack of secured and guaranteed property rights on the part of local communities—and partly by weak implementation of regulations, conflict of interest on the part of authorities, high financial incentives, and the burdensome process of obtaining a license. These complex issues suggest that there is no silver bullet to overcome the problem. One possible avenue might be to legalize these activities and provide guidance on operating safely and coexisting with the large mining operations in the area. Even though there are clearly huge challenges to pursuing this option, and it might not eliminate all conflicts, it should be considered.

The third and fourth major sources of conflict are environmental destruction caused by mining operations and the “leftover” condition after mining closure. In general, mining operators have historically been irresponsible in mitigating the environmental impact of their activities and in handling the socioeconomic and environmental conditions after a mine closure.

To resolve these challenges, at least four goals must be pursued. First, the government must create consistent standards and regulations, and insist on consistent implementation and monitoring. Second, government and mining operators should be more transparent and accountable in providing all socioeconomic and environmental information about mining operations. Third, all stakeholders, particularly mining operators, should take shared responsibility for the socioeconomic and environmental repercussions of mining activities. Fourth, distribution of revenues from mining operations among various stakeholders should seriously take into account equity and justice considerations from the perspectives of these stakeholders. In a democracy, it is important that mining operators obtain a “social license” from the locals.<sup>[50]</sup> Appropriate sociocultural considerations have increasingly become key to successful mining operations in Asia. While this is not easy, government and the private sector should move forcefully in this direction.

Some of the mining contracts or licenses issued under the New Order period have now expired and are bound to be extended. New investors are also attracted to the potential in the region. A new mining law is currently under consideration that will incorporate the various issues encountered in this sector, and changes that have occurred, since the enactment of the 1967 law. The new law is expected to provide legal certainty regarding licensing, land acquisition, and security, as well as to improve coordination among the different arms and levels of government. Having the “right” new mining law is, however, only a first step in resolving the many conflicts that plague Indonesian mining activities and areas.

# Making the Connections: Water, Forests, and Minerals Exploitation in South and Southeast Asia

Junko Kobayashi

**W**ater, forests, and minerals are interdependent. They are physically linked, for instance, in that minerals are found in forests and watersheds. Without water, forests cannot grow. Forests regulate water flows and act as barriers to coastal and river floods. Forests also contribute to climatic stability through carbon sequestration,<sup>1</sup> which then stabilizes water supply. Because of such close linkages, the exploitation of one can lead to the degradation of another.

Drawing examples from South and Southeast Asia, this paper highlights the ways in which mining, logging, and exploitation of water resources interact with one another. Recognizing such linkages is integral to addressing mismanagement and unsustainable exploitation of natural resources, and the resulting environmental degradation, natural disasters, loss of livelihoods, political instability, and conflicts. In Asia, in recent years, there has been growing awareness of the interdependence of key natural resources. At the policy level, a holistic approach—one that recognizes such linkages—is essential to the long-term sustainability of all the resources.

This paper is divided into two major sections. The first examines how logging, mining, and building dams for hydropower contribute to the degradation of the resources being exploited as well as of other resources. The second section discusses obstacles to a holistic approach, such as differing definitions of forests, competing sector interests and jurisdictions, lack of communication among the different sectors, insufficient data on how the exploitation of one resource affects another, and a development framework based on economic indicators.

Although mining, forestry, and water sectors are affected similarly in terms of policy, there are also significant differences. The impacts of logging are increasingly recognized by

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<sup>1</sup> Carbon sequestration is the process through which plant life removes carbon dioxide from the atmosphere and stores it as biomass.

governments and citizens, especially with the global attention to climate change and severe floods that have affected Asia's major cities in recent years. Policymakers have paid less attention to how mining pollutes water and destroys forests, perhaps because of the following factors: the profitability of mining that encourages governments to overlook environmental impacts, the difficulty of monitoring these impacts, and a pervasive lack of transparency in the sector.

## **Resource Exploitation and the Natural Environment**

### ***Impacts of Mining***

Mining has increased over the past decade in many mineral-rich countries in Asia, including Cambodia, Indonesia, the Philippines, and India, to meet the rise in global demand for coal, copper, and other minerals. Although mining is a significant source of revenue and economic growth for many countries, development of the mining sector is accompanied by serious social and environmental impacts, especially the degradation of forests and water resources. Most mineral deposits lie beneath forests and in watersheds that support livelihoods.

Current extraction methods, such as blasting and drilling, are crude, and no effort is made to rehabilitate areas once minerals are exhausted, because reclaiming the land would cost more than the value of the minerals. The negative environmental impacts of mining involve the mining process itself and related activities: the elimination of waste, transportation, and the processing of minerals. Forest degradation and water pollution caused by mining not only affects the ecological system of an area, but the livelihoods of people who depend on these resources for sustenance.

The three main methods of mining are damaging in different ways: open-pit mining for hard rock metals; quarrying for industrial building materials, such as sand and gravel; and leach mining in which chemicals are used to separate metal, such as gold, from the rest of the minerals. The scale of impact may seem greatest with open-pit mines, where all vegetation and soil are removed, dynamite is used extensively, and indigenous communities are often displaced. But quarrying leaves trenches in rivers, alters the aquatic ecosystem, and is likely to affect urban people. Companies regularly operate sand mines near cities in order to reduce transportation costs for the construction material. Leaching involves the use of chemicals hazardous to the health of living organisms.<sup>[1]</sup>

Sadly, mining companies have operated in developing Asian countries with little concern for environmental impacts, and governments have lacked the administrative and technical capacity, and the political will, to effectively regulate these operations. The problem is exacerbated by the fact that mining deals between governments and businesses

## Community Protests against Mining Companies

Civil society and local communities in Asia have been actively protesting mining activities that cause water pollution and illnesses. The American-owned Newmont mining company attracted national attention in July 2004, when the people of Buyat Bay, off Sulawesi Island in Indonesia, demanded compensation for the disposal of tons of tailings containing high levels of mercury and arsenic pollutants into the ocean between 1994 and 2002. The 20-month trial began after local villagers filed a US\$543 million lawsuit against Newmont in August 2004, contending that tailings from its gold mine had caused serious illnesses and the ruin of their fishing income. Initial assessment by the World Health Organization and the Indonesian Ministry of Environment found the water to be unpolluted, but a subsequent ministry study found that arsenic levels were 100 times higher at the waste-dumping site than in other parts of the bay. The district court that cleared the case in December 2007 claimed that it could not prove the company polluted the bay, and the mine waste did not breach local or international safety standards.

More recently, in August 2008, the chief of a Papuan tribe in Mimika Barat Jauh, Kaimana district, West Papua, urged the government to take action against US mining company Freeport, and demanded compensation for contaminated rivers from mine tailings. The chief claimed that as a result of Freeport's mining operations, local village communities were facing water shortages, and that crocodiles and tortoises of Teluk Etna were on the brink of extinction.

In 2006, a toxic tailings spill at an Australian-run mine on Rapu-Rapu Island, Philippines, spurred mining opponents, including the Catholic Church, nationalistic politicians, and NGOs to demand a total ban on mining activities in the country. An independent commission report urged the company to stop all mining in the area, revoked its mining rights, and forced the company to pay damages. Philippine President Gloria Arroyo declined the commission's request to ban all mining activities, but promised to carefully study the report's recommendations, including a review of the 1995 Mining Act's provisions for foreign participation and management.

*Sources: Asia Times Online (Thailand); Jakarta Post (Indonesia); Guardian (United Kingdom); WALHI-Friends of the Earth Indonesia.*

lack transparency, and efforts to properly regulate mining activities have been neglected because of mining's profitability. Exhausted mine sites are commonly abandoned, and the environmental damage is almost always irreversible.

## Deforestation

Mining is one of the major causes of deforestation and forest degradation, as commercially valuable minerals are often found in the ground beneath forests.

Large-scale, open-pit mining operations can result in significant deforestation through forest clearing in order to access mineral deposits and to open remote forest areas for miners. Infrastructure built for transient mine workers—roads, tunnels, and dams—also has an

impact. Large quantities of timber are often used as supports in mine shafts and in tunnels, in the case of underground mines, and as fuel for operating mines.<sup>[2]</sup>

This link is a major concern for India, where forest lands have been increasingly designated as mines in the last decade. Between 1980 and 1997, the Ministry of Environment and Forest (MoEF) only granted forest clearances for 317 mines, which destroyed a total of 34,527 hectares of forest area. By contrast, from 1998 to 2005, the ministry cleared 881 mining projects in forest areas, destroying 60,476 hectares of forest area.<sup>[3]</sup> As Chandra Bhushan of the Centre for Science and Environment in India observes, “This is an extremely worrying trend, since the mining industry has just begun expanding: with the new mining policy on the anvil, which is likely to give a significant boost to the industry, much more forest land is likely to be diverted for mining.”<sup>[4]</sup>

### River Sand Mining

Minerals and water resources are intimately linked in river sand mining. Extensive river sand mining substantially alters the physical, chemical, and biological environments of rivers. Mining and dredging activities, uncontrolled dumping of overburden, and chemical spills reduce water quality and poison aquatic life. Indiscriminate sand mining can make an area prone to flash floods. Sand mining has also been blamed for water shortage, as it deepens the riverbed and depletes groundwater. Bank erosion and channel deepening from sand mining can also undermine nearby bridges and other engineering structures.

With rapid urbanization and growth in the housing and infrastructure sector all over Asia, the demand for sand and gravel has grown significantly over the past few years. Most of this demand is being met by rampant, often illegal mining of riverbeds.

In July 2008, a professor observed the serious impact of sand quarrying in the Amaravathy River in Chettipalayam, India: “Amaravathy used to provide drinking water for the entire Karur town but now it is not even able to supply water to the villages on its bank.” In the Palakkad district, the diminishing stock of sand and increasing environmental concern forced the state government to ban sand mining in the district. But illegal mining still takes place, and some have been selling river sand mixed with cheap sea sand, which causes structural failures in buildings. Kelani River, one of the major rivers in Sri Lanka, has also been badly affected by sand mining in recent years. Overmining has caused problems such as salination of Colombo’s drinking water and the collapse of the river bank. However, it is difficult to ban sand mining in the river because many people living nearby depend on it as a source of living.

Sand mining has considerable implications for food security. It not only leads to water shortages affecting agriculture, but many farmers, seeing the high profits to be made, have abandoned their traditional ways of rice farming for it. Some in Bantul, Yogyakarta, have realized that sand mining is more profitable and less labor intensive than rice production.

Mining activities are threatening the forests of other Asian countries as well. In October 2008, the Indonesian Mining Advocacy Network (JATAM) and WALHI-Friends of the Earth Indonesia, protested BHP-Billiton's destruction of protected forest in Central Kalimantan for coal mining and in Gag Island, West Papua, for nickel mining.<sup>[5]</sup> From 1999 to 2004, BHP-Billiton, along with other multinational mining companies, put pressure on the Indonesian government to amend Forestry Law 41/1999, which prohibits open-pit mining in protected forests. Despite public protests across the country, a new law was issued in 2004 that permitted companies holding mining contracts issued before 1999 to operate in protected forests, including BHP-Billiton and PT Gag. In Central Kalimantan, BHP-Billiton's coal mine affects 65,858 hectares of protected forest covering the upper reaches of the area's main rivers.<sup>[6]</sup>

Some governments in the region have begun taking action against the devastating impacts of sand mining. In November 2008, Chief Justice Sarath Silva voiced his concern over illegal sand mining in Sri Lanka. Together with Environment Minister Champika Ranawaka, he recently participated in a program to promote awareness of the serious consequences of illegal sand mining. The government of Andhra Pradesh, India, has taken measures to control illegal and excessive sand mining by seizing vehicles that have been ferrying sand.

Sand mining became a transboundary issue in February 2007, when the previous usual supplier, Indonesia, abruptly banned its export of sand to Singapore, citing the impact of a recent Singaporean construction boom. Mari Pangestu, Indonesia's Trade Minister, banned the exports, saying it was necessary to protect the environment and maintain her country's maritime borders, threatened by rampant sand removal. Smugglers can ship as much as 10,000 cubic meters of sand from coastal areas in a day. Indonesia's Maritime Affairs Minister Freddy Numberi claimed that the ban was also aimed at pressing Singapore into signing a long-stalled extradition treaty. Singapore's Ministry of National Development expressed disappointment not only with the decision itself, but with Jakarta's rejection of Singapore's offer to help resolve Indonesia's environmental concerns.

Not all sand mining has lasting effects if done responsibly; sand mining is nonchemical and no blasting is required. However, there is still a need to increase awareness about the environmental impacts of increasing scarcity of sand and escalating construction costs. Research institutions in Asia are working to develop alternatives to river sand. The faculty of civil engineering of the Government College of Engineering in India has developed a technology to produce a cubical-shaped sand with excellent binding strength from hard granite.

*Sources: Asia Sentinel; Hindu (India); Jakarta Post (Indonesia); New Straits Times (Malaysia); South Asian Media Net (Sri Lanka); New York Times; Economic and Political Weekly (India); Centre for Science and Environment (India).*

Forest degradation due to mining projects has other effects: it causes a decline in the natural environment's productivity, and it renders the local community more vulnerable to fatal floods, landslides, adverse climatic shocks, and other natural disasters.

### **Water Pollution and Consumption**

Mineral reserves are often found in areas that are either near the origins or in the catchments of rivers. Mining significantly damages rivers and water supplies in a number of ways.

Heavy metal pollution occurs when some metals (i.e., arsenic, cobalt, copper, lead, and silver) found in excavated rock or exposed in an underground mine come in contact with water. Pollution in the processing stage occurs when chemical agents, such as the cyanide used to separate the target mineral from the ore spill, leak or leach from the mine site into nearby waters. Mining companies may also purposely discharge tailings (waste of extracted ore) into waterways, particularly rivers and oceans, to cut production costs.

Pollution and sedimentation of rivers and oceans caused by mining can threaten riverine and marine biodiversity, the health of nearby communities, and further impoverish those communities highly dependent on water. Tailings can affect the local availability of water as it breaches groundwater. For example, 40 percent of the captive limestone mines in India have breached the groundwater in their regions.<sup>[7]</sup> Run-off from deforested slopes makes rivers heavy with silt and more prone to flooding. Mining near river basins, especially in underground coal mines, involves additional risks of accidents from inundation.

Toxic cyanide and mercury used in Cambodia, Myanmar (Burma), and the Philippines for processing gold have polluted surface and groundwater resources. The untrained use of these chemicals introduces a high risk of damage to the environment and can seriously affect the health of the community and the ecosystem. The *Cambodia Daily* reported in late 2003 that cyanide pollution at Phnom Chi resulted in the death of mass quantities of fish and cattle, and the eruption of human illness along the Porong River.<sup>[8]</sup> Small-scale gold mining in the Philippines has been the target of strong opposition in recent years because of its environmental and social side effects, the most serious of which is mercury pollution.

The consumption of large amounts of water by mining and mineral processing adds stresses to water supply. Seventy-seven million tons of water used to extract iron ore in India between 2005 and 2006 would have been able to meet the daily water needs of more than 3 million people. At the Neyveli lignite mines in Tamil Nadu, 40 million liters of water is pumped out and wasted every day. In the numerous mining areas of India, people are experiencing water scarcity and pollution from mining.<sup>[9]</sup> Local communities in the Philippines fear that pollution and siltation of rivers caused by mining may deplete water resources, reducing rice production and fisheries.<sup>[10]</sup>

## ***Impacts of Logging***

Illegal logging, plantation development (especially palm oil), and mining have caused significant forest loss in many Asian countries. There has been increased awareness in recent years among policymakers, farmers, and the general public about the impact deforestation has on water, especially in exacerbating floods. According to a Filipino forestry expert, most forest areas in the Philippines are in watersheds, and there is growing awareness among people in these areas of the strong link between water and forests. They are also coming to understand the impact of upland human activity in the lowlands.<sup>[11]</sup>

## **Forests and Water**

Forests contribute to the constancy of water supply, reducing the risks of drought as well as floods. Forests help maintain a constant flow of water toward other ecosystems and urban centers. Natural resource experts in Thailand and the Philippines are concerned that there has been a decline in water supply during the dry season, and more severe floods during the rainy season. They attribute this phenomenon partly to deforestation and the impacts of climate change.<sup>[12]</sup>

Environment experts, government officials, and the general public in many countries, including Indonesia, Malaysia, and the Philippines, have recognized that deforestation can increase the risk of disastrous floods. Deforestation increases flooding in rainy periods because the soil cannot retain the water as it does when it is covered by forest. Every year, thousands of people in Bangladesh are displaced by river erosion from logging activities. Because the country is so densely populated, people are often pushed to live in unsafe coastal areas.

An increasing incidence of disastrous floods has prompted governments in the Philippines, Pakistan, and elsewhere to ban logging altogether. As Shahbaz and Suleri's paper on forestry in Pakistan points out, the federal government imposed a complete ban on logging in 1993, a year after the vanished forests in the northern watersheds were blamed for one of the worst floods in the country's history.

In recent years, in many countries in Asia, governments and civil society have pursued reforestation initiatives, not only to mitigate the effects of climate change, but also to prevent disastrous floods. The devastating impact of the tsunami that hit Asia in December 2004 has also helped build momentum for reforestation efforts. Wetlands International, for example, has been encouraging the people living in the Mahakam Delta of East Kalimantan, Indonesia, to look after the mangrove forests that have been increasingly converted to housing communities, because they are the "last line of defense" from floods.<sup>[13]</sup> In the Philippines, rehabilitating forests is high on the agenda, as heavy flooding and landslides that occur almost annually are often attributed to deforestation.

## Mangrove Forests

The consequences of the destruction of coastal mangroves demonstrate how forest, water, and minerals are closely related. Mangroves are trees and shrubs that live between the sea and land, in areas where water is brackish and that are regularly flooded by tides. Despite the many services and benefits provided by mangroves, these coastal forests have long been undervalued and viewed as wastelands and unhealthy environments.

Mangrove forests serve a number of important functions. They serve as spawning grounds and nurseries for marine and freshwater species. They also sequester large amounts of carbon (about 25.5 million tons of carbon every year) and help stabilize the climate. Mangrove roots filter pollutants that reach the sea from inland waters. Mangroves are also able to store large quantities of water, making it available for people to drink or irrigate crops, especially in the drought season.

Some of the largest mangrove forests in the world are in Asia, including Indonesia, Malaysia, Bangladesh, and India, but they have been reduced by 25 percent since 1980, the result of intensive logging (for fuel, housing, and boat construction), conversion to shrimp ponds and rice paddies, and urban development. Currently, the main threats to the Sundarbans—the forest covering approximately 1 million hectares in Bangladesh and India—are loss of diversity; pollution; increased salinity (because India's dam activities prevent enough freshwater from entering Bangladesh); and overuse by local people, who retain certain rights such as fishing and cutting small amounts of wood. External threats to the Sundarbans come from foreign companies that own contracts to develop Bangladesh's natural resources, especially coal.

Coastal mangrove forests reduce the effects of flooding, as their roots trap sediment and absorb flood water. Healthy mangrove forests, which are uniquely adapted to withstand the force of tides, may be able to absorb 70 to 90 percent of the energy of the waves. Thus, they have the ability to protect local communities and coastal resources by providing barriers to storm surges, cyclones, and other extreme weather events. This was clearly shown when the tsunami struck Asia in December 2004: areas behind intact mangrove forests were less affected than those without. In Sri Lanka, Kapuhenwala's dense mangroves protected its residents, and only two deaths occurred there. Scientists believe that if the mangroves had not been drastically reduced over the past few decades to make way for rice fields, the devastation could have been greatly minimized in the Irrawaddy Delta when Cyclone Nargis hit Myanmar (Burma) on May 3, 2008. According to the United Nation's Food and Agriculture Organization, the mangrove area in the delta now stands at 100,000 hectares, less than half the size it was in 1975.

Loss of mangroves in Asia is a continuing problem, but awareness of their importance is on the rise, especially after the tsunami of 2004. Many Asian countries have been planting mangrove greenbelts as protection against natural hazards through the initiatives of governments and NGOs. Among these are the Philippines and Vietnam, which are affected by destructive typhoons each year. Many countries have promulgated laws and regulations to protect remaining mangrove areas, but effective enforcement is often hindered by a lack of financial and human resources.

*Sources: Inter Press Service (Bangkok); Mongabay News; Food and Agriculture Organization of the United Nations; International Union for Conservation of Nature; interview in Bangladesh.*

Logging also affects water resources. Timber processing operations, like mineral processing, consume water and pollute rivers and streams.

## **The Role of Water Resources**

Water is a resource that seems to bear the largest burden from the exploitation of other natural resources, including forests and minerals. As discussed, mining pollutes the water, and logging degrades water supply by denuding the forests that stabilize the watershed. This is of particular concern as water is increasingly emerging as a scarce commodity, fueled by population pressures, intensive irrigation, and erratic weather patterns brought on by global warming.

Construction of hydropower dams can also destroy forests. Major hydropower dam projects in several Southeast Asian countries have been preceded by devastating logging operations in prospective inundation zones and in their vicinity for road construction. These projects have also resulted in deforestation elsewhere, as the local communities, displaced by the dams, have had to clear forests in other areas so they can settle, grow crops, and build houses.

## **Policy Issues**

### ***Definitional Issues***

#### **Forests**

Effective forest management is impeded by a fundamental problem: the absence of a clear and consistent definition of what constitutes a forest. As a result, much of the research on deforestation and proposed remedies is based on flawed or questionable data, which greatly complicates efforts to promote more effective resource management. Compiling accurate global statistics on the dynamics of deforestation and reforestation is also a challenge.

Definitions of a forest vary across countries and organizations because of the diversity and abundance of the world's forests, differences in culture and forest use, and the stage of a society's development. The definition of a forest can broadly fit into one of three categories: an administrative or legal unit (lands that are legally proclaimed "forests"), land cover (the extent to which the land is covered by trees), and land use (how the land is used).<sup>[14]</sup> In Pakistan, as noted in Shahbaz and Suleri's forestry paper, "forest areas" are lands that are under the administrative control of the provincial Forest Department. This may include areas that do not have a single tree, while other areas with significant tree cover may not be called "forests" because they are outside the department's jurisdiction. According to a definition reached by the United Nation's Food and Agriculture Organization in 2000, "Forests are lands of more than 0.5 hectares, with a tree canopy cover of more than 10 percent, which are not primarily under agricultural or urban land use."

Some countries in the region are now seriously addressing this definitional problem. India, for example, long debated the definition of a forest before reaching an agreement last year on specific definitions for different types of forests. However, many issues remain to be negotiated and rules are required before this change can take effect.

### **Coastal Zones**

In some countries, the definition and/or the property right of a coastal zone is unclear. This leads to inadequate zoning and other land use controls that contribute to ineffective management of mangroves.<sup>[15]</sup> In Asian countries, there is also a great deal of variation in the national laws for integrated coastal management and in how they are enforced.

### ***Obstacles to a Holistic Approach***

Significant benefits can be gained by adopting a holistic approach in the management of natural resources and the environment. Farmers and local communities directly experience the impact that the exploitation of one resource has on another. NGOs are raising awareness and engaging in projects to address this issue, and natural resource experts are stressing the importance of taking an integrative approach. Policymakers are also recognizing the interdependence of the resources, as they too have been feeling the impact of the increasing scarcity of resources and of extreme weather: devastating droughts, floods, soil erosion, cyclones, and polluted waters. However, adopting a holistic approach to correct these problems in most, if not all, the developing countries in Asia is impeded by the following six obstacles.

### **Competing Sector Interests and Jurisdictions**

Because forests, water, and mineral resources coexist and the exploitation of one resource harms another, different stakeholders fight over competing sector interests, including the various government ministries and businesses exploiting the resources.

The clash over how to manage forest resources in Indonesia is a classic case of sectoral and jurisdictional conflict. In Indonesia, many government institutions—namely, the Departments of Forestry, Finance, Industry and Trade, Mining and Energy, and the Ministries of Environment, Labor, and Resettlement—have direct or indirect interests in the management of forest resources. Each has different interests and views on how to manage the country's forests. The most important is the Department of Forestry. According to the 1967 Forestry Law, all forests are under its control. But the mining sector has long fought with the forest department for mining rights on land within its jurisdiction. For years, BHP-Billiton and other multinational companies put pressures on the Indonesian government to amend Forestry Law 41/1999, which banned operation of mines in protected forests. As a result of such pressures, an amendment to the law was passed in 2004, allowing 13 mining

companies that had acquired a mining contract before the enactment of the 1999 Forestry Law to resume open-pit mining in protected forests.<sup>[16]</sup>

In India, the Indian Bureau of Mines clears mine plans and closure plans, and oversees monitoring and regulation under the Mineral Conservation and Development Rules (1988), which includes air pollution and discharge of toxic liquids. Although the bureau is clearly responsible for environmental issues, it has no power to oversee environmental impact assessments and management plans, which are cleared by the MoEF. State pollution control boards (SPCBs) provide consent to establish and operate mines and monitor water and air pollution, much like the Indian Bureau of Mines but under different legislation: the 1974 Water (Prevention and Control of Pollution) Act and the 1984 Air (Prevention and Control of Pollution) Act.<sup>[17]</sup>

According to a Bangladeshi mining expert, the main problem in his country is a lack of coordination among different government departments, resulting in mismanagement of projects, with only some of the projects stringently following regulations.<sup>[18]</sup> In Sri Lanka, the Coast Conservation Act governs the coastal zone, but mangroves are governed by the Forest Act, which causes conflicts related to jurisdiction and poor enforcement of both laws.<sup>[19]</sup>

Not only are there uncertainties and lack of coordination for resource management among the various central government institutions, but central and regional governments often clash over the issuance of logging or mining licenses. The issue is especially problematic in countries such as Indonesia that have recently undergone decentralization.

### **Vague Laws and Lack of Capacity**

Vague laws and lack of capacity also play significant roles in natural resource management. The laws are particularly ambiguous in the mining sector. In India, the environmental law, especially tailored for mining under the 1998 Mineral Conservation and Development Rules, is full of indefinite statements, which leaves plenty of room for interpretation by miners. For example, the rules say that land should be restored to its original use “as far as possible.” They also say that trees logged to make way for mining have to be replaced by double their numbers but there is no mention of the type of afforestation to be done.<sup>[20]</sup>

Institutions responsible for managing the resources not only compete or are confused by overlapping jurisdictions, but are often too weak to effectively carry out their designated roles. According to the Centre for Science and Environment in India, the pollution control boards of mineral-rich states—Jharkhand, Orissa, and Chattisgarh—do not have the capacity to regulate mines.

### **Lack of Cross-Sectoral Discussions and Policies**

Another obstacle is that various governmental institutions and technical experts working on different types of resources do not communicate enough with each other. As a result, the issues that affect all natural resources are not reflected holistically in policies and laws. In India, there is currently little research on how mining affects rivers and groundwater, and no legislation exists to regulate the effect of mining on water resources.<sup>[21]</sup> There is a lack of transparency, especially in the mining sector, where much of the decisions are made behind closed doors, by the government and businesses.

### **Lack of Data**

Although there is a general recognition that deforestation destabilizes water supply and that mining is destructive to forests and water resources, there is still insufficient information and statistics showing these relationships. There is a lack of data, for instance, on how degradation of one watershed affects flood risks in the Philippines.<sup>[22]</sup> In India, although the civil society has been active in shedding light on the negative effects of sand mining, there has been little research on how mining affects rivers and groundwater in the country. The research on such linkages has not been carried out in most countries in the region due to lack of capacity or sufficient interest, or lack of communication between the scientists/researchers and the general public and policymakers. Governments and businesses may also purposely withhold information that may reflect negatively on them or conflict with their development strategies. Lack of sufficient information hinders the ability of local communities to reject proposals from industries for natural resource exploitation that would have a negative impact on them.

### **Development Framework Based on Economic Indicators**

The fact that countries put economic growth over protecting the environment is probably the most fundamental cause of resource degradation and social conflict. According to an Indonesian environmental expert, environmentalists recognize the linkages among the various natural resources, but difficulties arise in policymaking because development in Indonesia is based on economic indicators rather than an ecological or sustainable development framework.<sup>[23]</sup> Thus, water is seen as an economic commodity for agriculture, consumption, and industrial purposes, and timber as a concession to forest-based industries, but the impact of deforestation on the water supply is disregarded.<sup>[24]</sup> A Filipino forestry expert laments that most of his country's policies are driven by political pressures rather than scientific imperatives, and science in his country has not played a significant role in designing reforestation projects.<sup>[25]</sup> A natural resource economist in Thailand believes there is not enough attention paid to the fact that the royalties from river sand mining in Thailand are too low because they do not include the costs of erosion—the externality that it creates.<sup>[26]</sup>

Despite the significant damage it causes to the environment and natural resources, mining has been promoted by many countries in Asia, including Bangladesh, India, Indonesia, and the Philippines, because it is highly profitable. In the interest of generating revenue, environmental regulations and monitoring have taken a backseat. Efforts to eliminate illegal, small-scale mining and properly regulate large international companies have been largely unsuccessful. Governments of developing countries woo foreign investments by circumventing their own laws intended to protect the environment and human rights, and setting standards below international practice. The Indonesian government has given permission for submarine tailings disposal, while the United States and Canada have not because of its damage to the environment.<sup>[27]</sup>

### **Dangers of Policies Backfiring**

It should be recognized that simply banning logging or promoting reforestation activities will not immediately solve flooding or climate change issues. Instead, a logging ban might initially contribute to livelihood insecurity in communities that rely on the resources, and encourage illegal logging, or the exploitation of timber resources in neighboring countries.

In 2004, when a major typhoon and massive landslides claimed the lives of thousands of people in Luzon, Philippines, all logging activities were suspended throughout the country in response to pressure from civil society. A Filipino forestry expert observed that the government is too indiscriminate when reacting to disasters of this magnitude, and that banning logging in all forests in 2004 punished those who actually practice sustainable forestry management.<sup>2</sup> The expert also added that there are no typhoons in Mindanao, but timber harvesting, the sole source of livelihood to some communities in the region, was taken away.<sup>[28]</sup>

Moreover, laws prohibiting exploitation within a country have not prevented it in less affluent neighbors. For example, Thai businesses sought timber resources in Cambodia and Laos after logging was banned in their own country. Timber has been smuggled from Afghanistan into Pakistan since the latter banned commercial logging in 1993.

Finally, the establishment of national parks, such as those in Pakistan and Indonesia, for the protection of forests and biodiversity, might lead to increased degradation of natural resources because the local communities, which no longer have the sense of land ownership, are not as invested in conserving the resources.

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<sup>2</sup> Logging of primary forests in the Philippines was banned in 1990.

## The Way Forward and Its Obstacles

Recognizing the interdependence of water, forests, and minerals is essential in effectively managing the resources and reducing environmental degradation and the impacts of natural disasters. As more people have directly experienced the impacts of natural resource exploitation through loss of livelihoods, natural disasters, or public health problems, there has been increasing awareness that deforestation may make floods more severe and that mining causes water pollution. Understanding the interconnectedness between natural resources and human security issues is essential for effective policymaking, sustainable use of resources, and limiting further environmental degradation and natural disasters.

Unfortunately, responses have so far lacked cohesion, and the problem needs to be addressed in a much more integrated and strategic manner. As an initial step, all stakeholders—relevant government agencies, businesses, NGOs, local communities, scientists/researchers, and the media—need to communicate openly with one another, and share information and develop a common understanding of the interaction of water, forest, and mineral resources. Ideally, the process will result in a reduction of competitive behavior; provision of better definitions, laws, and institutions relevant to natural resource management; and policies that maximize economic and social development, while minimizing environmental degradation and threats to people's livelihoods. However, governments and businesses are likely to continue placing economic interests over the environment at the expense of community interests. Empowering communities to effectively manage natural resources cannot occur so long as bureaucracies are responsible for defining and representing community interests. The answers lie in the reform of governance structures and the political process, and genuine participation by everyone in decision making.

# Natural Resources and the Development-Environment Dilemma

Richard Cronin

**T**he recent rapid and environmentally unsustainable pace of natural resource depletion in the Middle East, South Asia, and Southeast Asia is one of the most visible consequences of globalization. The exploitation of natural resources is a key factor in economic growth and development, but one that can have serious negative environmental and socio-economic impacts. These include the destruction and degradation of old growth forests, the depletion and pollution of water resources, the decimation of fisheries, and the despoliation of land in order to extract mineral resources. In addition to the localized negative impact on livelihoods and human security, the environmentally unsustainable exploitation of natural resources can have significant transboundary impacts that pose threats to regional peace and stability. This paper is about the consequences—for domestic and regional stability and human security—of the unsustainable exploitation of forests, water, and extractable minerals in the three regions.

## Global Drivers of Natural Resource Depletion

Steadily rising global demand for raw materials, industrial inputs, and energy have been the main drivers of the depletion and degradation of natural resources in the three regions. China's hyper-growth has made it the single largest importer of natural resource-based commodities, and India is fast catching up. More recently, the rapid growth in global demand for energy has created a new Hobson's choice for many of the three regions' governments that subsidize food and fuel consumption. In several countries, efforts to reduce or reallocate fuel and food subsidies have been met by mass demonstrations and violence.

Except during the Great Depression, trade in natural resources has been increasing since the industrial revolution and the advent of fast and reliable motorized cargo ships. In recent decades, several developments have created an almost exponential growth in demand and prices. One of the most important has been the liberalization of trade and the free flow of international capital beginning in the late 1980s, commonly associated with the so-called "Washington Consensus" of the International Monetary Fund, the World Bank, and the

US Treasury Department.<sup>1</sup> The lowering of trade and investment barriers has generally fostered increased GDP growth in the low- and middle-income countries, but also rapidly growing income inequality as globalization has penetrated the world's remote primary forests, mineral deposits, and previously untamed rivers.

In the past several years, two more factors have also driven demand for natural resources and related industrial commodities. China's preparations for the 2008 Beijing Olympics, which began in 2003, created a major spike in global prices for construction-related commodities, such as timber, plywood, steel, and cement. The natural resource-based construction materials that China imported constituted a significant part of the US\$50 to 60 billion cost of preparing for the Olympics.

The speculative international financial bubble that began in about 2000 (and is now rapidly deflating) also created unsustainable levels of demand for natural resources. From 2002 to 2007, prices of natural resource-based commodities, such as metal and energy, grew by as much as 350 percent. As of late 2008, prices of energy and other industrial inputs have begun to fall, but global financial markets have lost 40 to 60 percent of their pre-crisis value, and most countries are struggling with a serious banking crisis and taking measures to stave off a deep economic recession. If there is any silver lining to the dark financial clouds, a short- to medium-term slowdown in the global demand for energy and natural resources could provide a breathing spell for the adoption of more sustainable resource policies.

## Threat to Regional Stability

Particularly because of its effect on the changing fortunes of nations, globalization is also a geopolitical phenomenon that poses a long-term challenge to interstate relations, and hence to peace and stability. Laurent Cohen-Tanugi, for example, argues that "economic globalization exists in a complex dialectic with the traditional geopolitics it has, ironically, helped to revive."<sup>[1]</sup> More simply put, globalization creates an ambivalent international environment that, on the one hand, encompasses both economic integration and regionalism, and on the other, fragmentation, conflict, and shifting centers of power. As a consequence, more traditional forms of power competition are carried out against a backdrop of emerging nontraditional security threats, such as terrorism, nuclear proliferation, and civil wars

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<sup>1</sup> As it evolved, the Washington Consensus went beyond the 10-point plan drawn up by John Williamson, a leading international economist, especially in regard to capital account liberalization. The plan originally responded to a series of financial crises in Latin America during the 1980s. The most widely adopted features include fiscal restraint, financial and trade liberalization, the elimination of restrictions on foreign direct investment, privatization of state-owned industries, and deregulation (Harvard University, Center for International Development, Global Trade Negotiations Home Page, [www.cid.harvard.edu/cidtrade/issues/washington.html](http://www.cid.harvard.edu/cidtrade/issues/washington.html), last updated April 2008).

at the national, regional, and global levels.<sup>[2]</sup> Resource scarcity can be a cause of conflict and the cause of further resource depletion.

## Cross-Regional Comparisons

The Middle East, South Asia, and Southeast Asia have radically different resource endowments. The Middle East, rich in oil and gas, is poor in coal and metallic minerals. Its oil-exporting countries, including Iran and Iraq, still account for nearly 30 percent of global crude oil production and hold about 55 percent of proven petroleum reserves.<sup>[3]</sup> Less favorably, almost the entire Middle East has a serious water deficit and little exploitable forest land. The Arabian Peninsula is one of the driest regions on earth. In some countries, energy resources are increasingly used for desalination, a process that includes huge capital investment and is causing degradation of shared water resources.

The natural resource picture for South Asia is mixed. Much of the region, dependent on highly variable monsoon rains to replenish groundwater, frequently suffers both drought and severe flooding. An ever-burgeoning population strains water supplies. The subcontinent has some of the world's largest rivers, including the Indus, Ganges, and Brahmaputra, which all originate in the Himalayas and Tibetan Plateau. All have been tapped for hydroelectricity production and irrigation. While minerals are an important resource, the region has few remaining stands of primary forest.

India and other South Asian countries are net importers of natural resources and related commodities, including timber, metals, coal, petroleum, and petroleum products. From 1999 to 2005, India's imports of wood products nearly doubled to about US\$1 billion. Logs—primarily from Myanmar (Burma) and Malaysia—make up 88 percent of India's wood imports.<sup>[4]</sup> Despite their own significant domestic output, South Asian countries, including India, generally have emerged as major net importers of copper and other metallic minerals, as well as coal and coke (hard coal baked under high temperature to remove impurities and used in steel making).

Southeast Asia is rich in forest, mineral, and water resources, but all are under severe pressure from population growth, the destruction of watersheds, and river pollution resulting from rapid urbanization, mining, and hydropower development. Despite an alarming rate of deforestation, Southeast Asia still has some of the largest remaining stands of primary forest. Indonesia, Malaysia, and Myanmar (Burma) are all major log exporters. Strikingly, as of 2000, some 33 percent of Indonesia's land mass was in the hands of timber concessions.<sup>[5]</sup> The region also has some of the world's largest deposits of coal, tin, nickel, copper, and gold. Indonesia's exports of coal and metal ores grew by about 18 percent per year from 2000 to 2007, and accounted for close to 8 percent of government revenues and 4 percent of the GDP.<sup>[6]</sup> The vast and highly controversial operations of subsidiaries of Freeport-

McMoRan Copper & Gold (a US company) in Indonesia's province of West Papua (formerly Irian Jaya) include the world's largest gold mine and third largest copper mine.

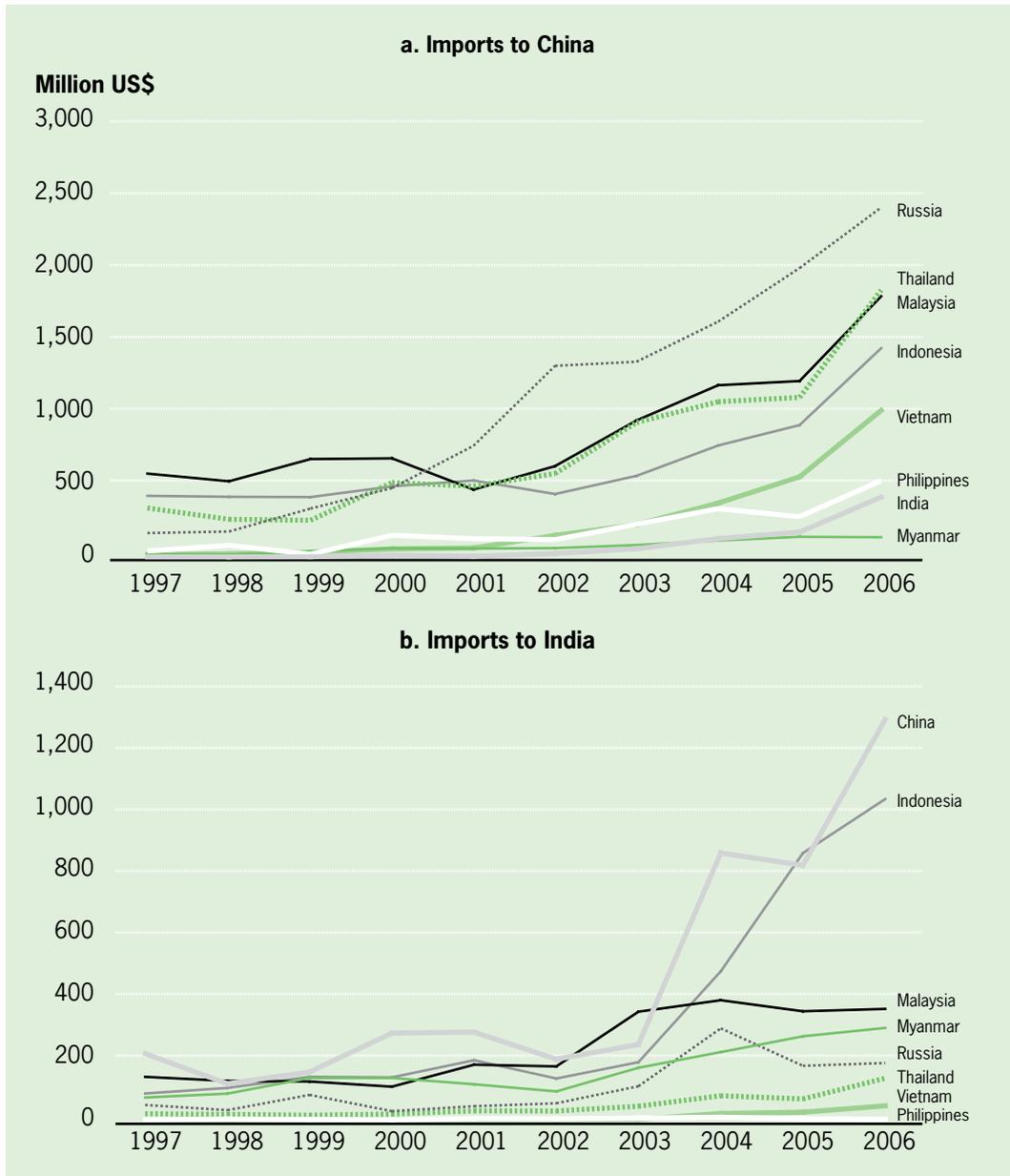
Since major policy reforms in the 1990s, both China, and to a lesser extent India, have become voracious consumers of raw materials from Southeast Asia. Both are major importers of timber and wood products from the neighboring region. Despite their own significant production of coal and minerals, China and India together are the most important markets for coal, coke, copper, and other minerals, as well as rubber and edible oils from Southeast Asia. Figures 1a and 1b show, respectively, the value of imports by China and India of selected natural resource-based commodities, as well as the most important source countries, mainly in Southeast Asia. They both have also tapped into the hydroelectric potential of their less developed neighbors.

On a cross-regional basis, the *causes* and *problems* of inadequate and/or unsustainably developed natural resources tend to be more similar than different. The main differences stem from the different resource endowments and/or stages of development. Historically, resource-rich countries exploit those resources as the foundation for development and to strengthen the state.

Forms of government and ideology have remarkably little influence on natural resource exploitation, except in the few countries with functioning democratic institutions and well-developed civil societies. Regardless of professed ideology, most political systems have pursued the same policies toward resource exploitation: reducing direct costs by creating economies of scale. While the locus of resource policy formulation varies from country to country, long-entrenched bureaucracies dominate the execution phase. In remote areas, where natural resources are found, career officials of relevant ministries and police are the primary face of government. The most important differences in outcomes have to do with governmental competence and capacity, the means of valuating resources, the extent of corruption—which is commonly widespread—and the political balance between vested interests (both state and private) and the interest of those who occupy the land whose resources are to be exploited.

Somewhat ironically, countries dominated or strongly influenced by the military often appear the least alert to the national security implications of their natural resource policies. The worst case is Myanmar (Burma), whose military regime is all but a kleptocracy. Natural resources also tend not to be well managed in countries where the armed forces have a widespread role in maintaining political order or are substantially supported by allocations of natural resource tracts rather than by the national budget. These include Pakistan, Indonesia (but less so since the withdrawal of the military from politics after the fall of Suharto), Laos, Cambodia, and Vietnam. In Laos, three military-run companies control the allocation of timber rights to commercial loggers, many of whom are from China,

**Figure 1: Value of Nonpetroleum Mineral and Select Resource Imports to China and India, by Exporting Country**



Source: UN Comtrade Database ([www.comtrade.un.org/db](http://www.comtrade.un.org/db)).

Thailand, and Vietnam. By falsifying chain of custody certifications that the timber has been cut sustainably, corrupt military and civilian officials engage in wholesale cutting of assigned tracts, carry out illegal cutting in adjacent forests, and illegally export logs to neighboring countries.<sup>[7]</sup>

## Resource Exploitation in Southeast Asia: The Unanticipated Costs

Timothy Hamlin

Southeast Asian exports of wood, minerals, and other natural resources have risen dramatically on a year-on-year basis since the end of the 1997 Asian financial crisis, largely to serve fast-growing demand from China and India. Until very recently, Chinese demand for construction materials and industrial inputs has seemed insatiable. India's accelerated growth is attributable to the major policy reforms of the early 1990s, and how these changes further boosted demand for Southeast Asian resources and resource-based commodities.

In their rush to capitalize on rising demand and prices, a number of Southeast Asian governments made dubious choices between exploiting their resources and the needs of environmentally sustainable development. Short-term thinking in resource-rich developing countries has created long-term damage to the environment, the sustainability of their resources, and the human security of some of their poorest citizens who depend on traditional access to forests, fisheries, and agricultural land for their food and livelihoods. The already doubtful economic logic of this breakneck pace of resource exploitation is now being brought into further question by the fast-spreading global financial crisis, which has begun to sharply reduce demand and prices for many natural resources. Additionally, the sharp downturn in demand for a number of key natural resources and resource-based commodities may make a number of environmentally unsustainable projects *financially* unsustainable. The negative consequences for the economic and financial stability of a number of countries could be significant.

As the “world’s factory,” China’s economy requires vast inputs of commodities and raw materials. In addition to the rapid growth of inputs to meet fast-rising demand for Chinese-manufactured exports, a boom in infrastructure development and construction related to the 2008 Beijing Olympic Games also contributed to the skyrocketing of Chinese natural resource imports since about 2003. For

## Four Systemic Obstacles to Reducing the Transboundary Impacts of Natural Resource Development in the Middle East, South Asia, and Southeast Asia

Hard science and social science experts from all of the regions have identified four important systemic problems:

1. *Globalization and regional economic integration are outpacing domestic and regional governance capacity.* At least until the current global financial meltdown, the Asian financial crisis that struck Southeast Asia and South Korea in 1997 was one of the most dramatic examples of the failure of governance to keep up with the forces of globalization. Under the combined pressure of the US Treasury Department, the International Monetary Fund, and the World Bank—the so-called “Washington Consensus”—countries opened themselves to the free flow of “footloose”

instance, imports of rough wood grew from US\$1.69 billion in 2001 to US\$3.93 billion in 2006, while copper imports grew from US\$4.89 billion to US\$17.19 billion during the same period.

Southeast Asia has served as a bountiful and convenient source for the lumber, plywood, industrial minerals, coal, and other inputs required to sustain China's extraordinary GDP growth, which has averaged 10 percent per year for the past 30 years.

Thai and Malaysian rubber exports to China increased 4- and 10-fold respectively between 2001 and 2006, with annual exports from both reaching well over US\$1 billion. Tropical hardwood forests are being clear-cut and burned to make way for plantations of palm oil and rubber and the monoculture of other export crops. Vietnam has increased coal production exponentially in the last five years, but is already preparing to cut back exports due to falling market prices and anticipated increases in domestic demand. Indonesia is blessed with immense mineral wealth, but the exploitation of its coal and copper deposits by both small-scale local and multinational companies has had severe environmental and socioeconomic costs.

In addition to the environmental impact of the rapid and environmentally unsustainable exploitation of natural resources, the hidden economic costs may also be high. Some extensive investments made prior to the global financial crisis or during the construction bonanza that preceded the Beijing Olympics may have been based upon now-faulty expectations of ever-rising demand and prices. As the global market corrects, much of the investment in establishing plantations or expanding capital-intensive mining operations may be not recoupable for several years, at least. Unfortunately, this object lesson will come too late for the environment and the traditional livelihoods of millions of Southeast Asians, not to mention lost capital.

*Source:* UN Comtrade Database ([www.comtrade.un.org/db/](http://www.comtrade.un.org/db/)).

capital before they had put in place adequate financial regulatory and supervisory capacity. The rapid development of new transportation links has taken place without a parallel increase in governmental capacity to protect natural resources such as forests. Improved roads into forested areas significantly increase opportunities for increased legal and illegal logging and mining.

The growing popularity of public-private partnerships, build-operate-transfer (BOT), and related commercial approaches to development has also overwhelmed the ability of governments to adopt long-term planning strategies. Poor countries' governments tend to view privately funded commercial projects in terms of short-term financial benefits, such as earning hard-currency royalties and taxes on both domestically used and exported electricity, rather than long-term development needs. Although the electricity may be badly needed for development, the companies see the projects purely as commercial opportunities. Their offers are often

take-it-or-leave-it proposals that cause governments with low capacity to ignore the environmental and socioeconomic costs, or to exclude alternative options that would be more financially or environmentally sound in the long run but would require near-term outlays from financially weak governments.

2. *Governments are ignoring the inseparable relationship between forests, water, and mining.* Many hydropower dams are built specifically to provide power for mining or industry. The dams destroy forests and watersheds, and both the dams and the mines pollute rivers. Shrinking supplies of water and land subsidence in many cities in South and Southeast Asia are largely the result of allowing the destruction of forested watersheds. The prospect for a more holistic approach to exploiting these three resources is fading fast. Some after-the-fact efforts are being made in some countries, such as replanting forests in import watersheds and adjacent to dam reservoirs, but few governments thus far have managed to stop development in one resource sector for the sake of the others.

The fragmented distribution of bureaucratic responsibility, and in many cases weak control over cabinet ministers, are two major reasons for the lack of an integrated approach to resource development. In the case of Pakistan, for instance, the institutional structure of forest management dates from the British colonial era and operates with considerable autonomy.<sup>[8]</sup> In Indonesia, directly elected President Susilo Bambang Yudhoyono heads a minor party in a multiparty government. Cabinet ministers and other party leaders often have stronger political bases than the President, including close ties with commercial operators, investors, and powerful local politicians and business interests.

3. *Decisions about resource development projects tend to overestimate benefits and underestimate costs.* In hydropower dam projects, for example, governments seldom conduct credible environmental impact assessments, estimate the full value of lost fisheries and livelihoods, or accurately judge the useful life of the project or the cost of demobilization. Hydropower and mining projects seldom consider the full cost of mitigation measures, and mine approvals almost never require companies to even minimally restore the land to its previous condition once the mines exhaust the minerals.
4. *Meaningful regional cooperation on transboundary resources has yet to materialize.* Most regional organizations have failed to achieve significant cooperation on transboundary and nontraditional security (NTS) issues, whether in regard to natural resources and the environment, or other issues such as transboundary crime and the spread of diseases with pandemic potential. Several regional organizations remain more outward looking than focused on cooperation in economics, security,

or transboundary issues. For example, the Gulf Cooperation Council (GCC) has had very limited success in coordinating economic policy, and still depends on extra-regional relationships for most trade, investment, and security support. The adoption of a common market, which occurred in January 2008, will likely not produce much change, as regional cooperation depends on state-owned companies and slow-moving bureaucracies.

The South Asian Association for Regional Cooperation (SAARC) tends to be paralyzed by mutual suspicions of domination by India on the part of the smaller countries, and Indian concerns about the smaller countries uniting against India. With a few exceptions, intra-regional trade and cooperation on transboundary issues remain low. Although India has bilateral cooperation with Nepal, Bangladesh, and Sri Lanka, it is largely on New Delhi's terms.

The Association of Southeast Asian Nations (ASEAN) has yet to achieve meaningful regional cooperation on transboundary natural resource issues. For instance, ASEAN has an agreement on haze that is caused by the burning of trees and peat, but Indonesia has thus far refused to join. In the Mekong Basin, none of the four members of the Mekong River Commission (MRC) has yet agreed to compromise its sovereignty for the sake of cooperative water management, and the upstream countries, China and Myanmar (Burma), have declined to join the organization. For the foreseeable future, the best that can be hoped for is that countries will achieve bilateral or trilateral solutions to issues that become sufficiently serious to require resolution.

## **Natural Resources and Development**

While the development of natural resources for domestic use and export has been an engine of growth for resource-rich developing countries, the environmental and socioeconomic costs tend to be high and are rising. Resource-based development often has significant negative transboundary and even global costs, ranging from cross-border damage in the case of upstream hydropower dams to the regional and global impacts of coal burning and deforestation. The dry season burning of trees and peat bogs in Indonesia and Malaysia to make way for plantations spreads haze throughout Southeast Asia and the Southern Pacific islands, and releases vast amounts of carbon dioxide (CO<sub>2</sub>) into the atmosphere. Creating and operating large hydropower dams in South and Southeast Asia usually involves the destruction of large tracts of carbon-absorbing forests, and their reservoirs can give off more CO<sub>2</sub> than thermal power plants. The destruction of coral reefs from the warming of the oceans, industrial scale trawling, and pollutant run-off from cities, farms, and mines has threatened the viability of important fisheries in the Gulf, Indian Ocean, and Western Pacific.

The unsustainable development of natural resource endowments also has several basic limitations as a means of promoting broadly based economic development. Primary product exports have low value added compared to processed and manufactured goods. The lion's share of value added occurs in more developed countries, where raw materials are converted into manufactured goods. Prices of natural resource-based exports tend to fluctuate widely as global economic activity rises and falls. At times of high world demand, as in the past decade, natural resources have commanded high prices and boosted export earnings in resource-rich countries. In times of low global growth, falling prices for natural resources lead to economic setbacks. Additionally, most natural resources are limited in supply and/or are developed unsustainably. Finally, exports of natural resources can fuel overall GDP growth for many years, but eventually, primary forests and mineral deposits become exhausted. In the meantime, in the least developed countries, hydropower dams, the cutting of primary forests, and mining usually benefit urban dwellers more than those whose livelihoods and food security are damaged or destroyed. This is a particularly serious problem in countries where 60 to 80 percent of the population still carry out subsistence farming and fishing, or the small-scale production of items fashioned from natural materials.

## **Natural Resource Exploitation and Widening Income Gaps**

The assumption of state control over land and natural resources, and the poor governance of those resources, have become the two greatest threats to human security and livelihoods. Despite considerable efforts by the multilateral development banks (MDBs), bilateral aid donors, and governments themselves, efforts to involve affected communities in decisions about the development of natural resources have largely failed in South and Southeast Asia. The reasons are not difficult to understand. Especially in relatively remote regions, someone nearly always has some kind of claim to land, fisheries, and minerals, either by right of customary use or legal title. These rights are almost always overridden by government and private sector development imperatives that involve interests that are far more powerful than local rights. Typically, local communities are consulted long after the key decisions have been made.

Since the colonial era, the main objective of the state and forestry departments has been to alienate the people from their land. "Timber mafias" operate in concert with corrupt officials. Community forestry experiments have generally failed because the process remains under the control of state bureaucracies, and because governments are more interested in managing forests for revenue than providing livelihoods. Establishing trust between local communities and the state is impossible when the forest department police officer is the face of government. Ironically, deforestation often rises when governments alienate people from their lands by establishing state forests and other protected areas. Where governance is weak, those who have lost their lands have little hesitation about "illegally" continuing

to utilize resources while assuming no responsibility for maintaining sustainable conservation practices and stewardship.

The situation is largely the same in regard to dam construction and the awarding of mining concessions. The people who will lose their land and livelihoods are, at best, represented perfunctorily in so-called “stakeholder” consultations that are dominated by government agencies and developers. The decisions were made long before—the only question is how much environmental damage will be mitigated, if at all, and how much effort and expense will be devoted to relocation and the provision of alternative livelihoods.

Mining may present the most difficult problem because mitigation is normally expensive and/or impractical, and the cost of returning land to its original condition is so high as to make it uneconomical. Although large commercial mining operations are often carried out with technically sophisticated machinery, mining remains crude by the standards of any other industry. Because of mechanization, the industry employs relatively few workers, and local people do not normally have sufficient skills for employment. Mining is particularly prone to social conflict because, while big operators are given concessions by the government, numerous small, “artisanal” operators may already be working the sites, often backed by financing from criminal syndicates, which purchase and transport the output to the global market.

## **Urban Winners and Rural Losers**

The inescapable reality is that economic development in poor but resource-rich countries involves the exploitation of rural-based resources, such as timber, minerals, and water, to serve the interests of the politically important urban areas. Pinkaew Laungaramsri underscores the inevitability of this process when he says, “Commodifying nature goes hand in hand with the growth of urban middle-class society and its increasingly intense lifestyle in big cities.”<sup>[9]</sup> Despite the rationale that the exploitation of natural resources will give governments more money for anti-poverty programs, rural villagers displaced by hydropower projects and other large-scale uses of natural resources are inevitably net losers. However poor their existing subsistence livelihoods, they almost always end up with insufficient compensation and lands that are less productive than those from which they were evicted. Fishermen are relocated to areas without fisheries, forest people must leave entirely or take insecure jobs as plantation workers, and farmers often have to learn to grow new crops on less fertile land.

Rural dwellers in South and Southeast Asia, as in other less developed regions, bear the brunt of natural resource–based development. Because of the failure of most environmental mitigation and relocation efforts to date, displaced people who already live a subsistence existence more likely than not will become part of the swelling ranks of the urban

poor, often homeless and jobless. The 60 to 80 percent of the population in developing countries that live in poor rural areas is effectively subsidizing the lifestyles of the 20 to 40 percent that live in cities.

This is a global phenomenon, but the tragedy in South and Southeast Asia, as in Latin America, is that most countries are not failed states in which competition for control of valuable resources is a source of civil war and external conflict. Not yet, at least. Rather, these destructive decisions about resource exploitation are made by at least nominally responsible political leaders and bureaucracies.

## **Development Failures and Their Causes**

In theory, developing countries should be making a transition from commodities production to higher value added production, as has occurred in the more advanced developing countries such as Thailand, Malaysia, and China, but those countries remain the exceptions. In fact, for a variety of reasons, the poorest countries have done little to reduce their dependence on natural resource exports, whether legal or illegal, and instead have traded forests for oil palm, rubber, and acacia plantations that provide comparatively little employment. In general, the poorest and most politically marginalized citizens are the primary victims.

In reality, natural resource exploitation is an essential, but not a sufficient, component of broad-based and stable economic development. Even more important are education, technical training, and other forms of human capacity building. In tropical Southeast Asia, only Thailand, Malaysia, and Singapore thus far have made the transition to middle-income status. As shown by the Asian financial crisis, even these gains tend to be subject to reversals, especially since only tiny Singapore, which has no significant natural resources, has made the necessary investments in human capital to sustain its gains in the face of rising competition from China.

One obstacle to balanced and sustainable development is that the industrializing countries of South and Southeast Asia often become the exploiters of resources in neighboring countries with poor governance and systemic corruption. Laws against timber cutting in natural forests that were enacted in China, India, Thailand, Malaysia, Pakistan, and other countries with few remaining primary forest resources have not stopped deforestation. Instead, companies from these countries have moved into neighboring countries that are weakly or corruptly governed and still have exploitable timber. Chinese timber and plantation companies appear to operate with impunity in Cambodia, Laos, and Myanmar (Burma). Malaysian companies are particularly active in Myanmar (Burma) and Indonesia. Pakistan imports timber from Afghanistan.

As the process of deforestation proceeds, Western and Asian companies are looking further afield, to formerly remote parts of the islands of Borneo (Indonesia, Brunei, and Malaysia) and New Guinea (Indonesia and Papua New Guinea) that are the “new frontier” for timber and extractive industries in Asia and Australasia.

Freshwater and ocean fisheries are likewise under relentless pressure from soaring demand and diminishing supplies. Even water becomes a global commodity when the dry countries of the Gulf invest in the production of wheat, rice, and other food crops in developing countries with water and irrigable land. For instance, Saudi Arabian investment in wheat production in Pakistan and imports of rice from South and Southeast Asia represent a transfer of water from water-rich areas to dry regions.<sup>[10]</sup>

Sadly, resentment at what is seen as Western arrogance and a perceived double standard regarding environmental concerns has caused some countries, especially in Southeast Asia, to reject opportunities to leapfrog over the most environmentally destructive forms of resource-based development. The argument is frequently heard and read that Western admonitions regarding unsustainable development are self-serving and in conflict with their rich countries’ own early development phases. Many also argue that the West is ignoring the pull factor in natural resource exploitation, i.e., that the very developed countries that are most concerned about climate change and other aspects of natural resource degradation are the main customers for these resources and products.

This gives rise to considerable self-defeating cynicism. For instance, some political leaders and opinion makers in resource-rich developing countries argue that it is the Western countries that overconsume the world’s resources and have the biggest carbon footprint. The developed countries, the argument continues, should cut back their own CO<sub>2</sub> emissions and be willing to compensate the developing countries for practicing sustainability. Others talk about a related but different kind of developed country “footprint,” that of the multinational companies that lay claim to natural resources, both financing and otherwise carrying out mining, for example, as well as transporting and marketing the resultant ore or coal.

This perspective is understandable but counterproductive. Moreover, some of the argument ignores important differences in the development experiences of the rich countries compared to the less developed ones. Some of the biggest per capita carbon consumers, such as the United States, Canada, and Australia, are lightly populated in comparison with the developing countries of the Middle East and Asia, which have little or no room for expansion into new frontiers. Water in most of the three regions is already oversubscribed and polluted. Forests in the northern and southern latitudes regenerate more quickly and easily than tropical forests. In other words, once the finite natural resources of the three regions are depleted, the adjustment will be especially wrenching.

## Questionable Role of the MDBs and ODA Donor Countries

Arguably, MDBs and major sources of bilateral official development assistance (ODA) have been more a part of the problem than the solution. While reducing poverty has become the mantra for the World Bank, the Asian Development Bank, and other MDBs, their programs are still based largely on the trickle-down theory. Traditionally, their main purpose has been the development of infrastructure designed to integrate poor resource-rich countries into the global economy. Their priorities are apparent in their budgets, which overwhelmingly favor infrastructure development.

Although the MDBs and major donors do not finance development projects without environmental impact assessments and mitigation measures, these tend to be applied after projects are so far along that refusing to fund them or supply risk guarantees for private developers would create major political problems. It was a wrenching decision for the World Bank to pull out of India's Narmada Dam project and China's Three Gorges dam.

Even when the MDBs adhere to strict environmental criteria, they are being marginalized by the increasing ability of developing countries to obtain alternative funding for environmentally damaging projects. China and Thailand have emerged as the primary sources of funding for large-scale hydropower projects in the Lower Mekong River basin, and for the development of monoculture plantations of rubber. Most of these projects could not pass muster with the Bank's environmental and socioeconomic criteria.

In 1995, the World Bank and the Asian Development Bank decided not to finance Laos's highly controversial 1,075-megawatt Nam Theun 2 dam. Ten years later, in 2005, the banks agreed to provide financial risk guarantees to the developers, including Thailand's electrical generating authority (EGAT), and to provide tens of millions of dollars for environmental mitigation and an expanded relocation and livelihoods program. The banks portrayed their role as a means to set a new standard for future dam projects in Laos. Instead, Laos, which has signed memorandums of understanding with Chinese, Thai, and Malaysian companies for feasibility studies on nine environmentally destructive dams on the Mekong's main-stream, has indicated that the Nam Theun 2 standard will simply be an ideal goal that will not be met in other projects.

## The Chimera of Sustainable Development

The MDBs, major aid donor countries, environmentalists, and civil society advocates have long championed the cause of sustainable development. The term has a variety of interpretations, but the most basic definition is the use of resources in a way that allows them to continue to be available for future generations. At best, this is an ideal to be aimed at. The reality is that the development of natural resources inevitably involves trade-offs. In South

and Southeast Asia, most of the costs tend to be borne by impoverished and politically marginalized groups who had a claim to the resources before the state or developers preempted them. How the benefits and costs should be estimated, and who should bear them, are the central challenges of the political economy of natural resources. Reducing the environmental and socioeconomic costs of resource development remains the most attractive solution, but is very difficult to achieve in the face of the economic and political forces arrayed on the side of short-term benefits.

Unsustainable development policies tend to be rooted in short-term thinking, and inadequate understanding of the consequences at the decision-making level. Other important causes can include the lack of ministerial and center-provincial coordination, inadequate rule of law, dysfunctional relationships between policy and enforcement, weak civil society institutions, and corruption. Until they are nearly depleted, governments in all three regions tend to favor the present value of resources over the longer-term benefits of environmentally sustainable development.

Policies that deal with resource scarcity, such as water in the Gulf countries or in huge conurbations such as Jakarta, have a somewhat more urgent short-term focus than the exploitation of resources for development and export purposes. That is, policy having to do with scarce resources is oriented toward trying to catch up with a widening supply-demand gap, mainly through efforts to expand supply by measures such as drilling deeper to reach underground aquifers that will eventually run dry. One reason for this approach, identified in Waleed Zubari's paper in this volume, is that water authorities have no control over the factors driving consumption, including population growth, development policies, weakness in governance, social attitudes and expectations, and the false assumption that nature is sufficiently "robust" to accommodate endlessly growing demands. The only practical approach for the long term is to "mainstream" water and other environmental policies into a broader socioeconomic approach to development, including improved planning, governance, and education to change societal expectations. The best scenario does not rely on market forces or other demand-based approaches, but rather focuses more comprehensively on the welfare of the entire population.

## **Potential Silver Lining in the Impending Global Recession?**

In retrospect, it seems clear that a considerable part of the fast rise of prices since 2004 for timber, plywood, minerals, and resource-based industrial inputs such as energy, steel, and cement was artificially stimulated by the international financial bubble now collapsing with such devastating effect. One consequence has been more environmental degradation, transboundary impacts, and harm to human security than warranted by longer-term demand growth. If, as widely expected, the bursting of a global financial bubble causes a

global economic recession of some years running, the falling demand could cause the postponement of some investments in natural resource development projects that have marginal cost-benefit ratios.

## **Implications for Human Security and Regional Stability**

Two aspects of globalization and the exploitation of natural resources have significant implications for human security and regional stability. First, globalization expands the market for important natural resources and also provides much of the capital needed to develop them. Because the state, in one way or another, has taken ownership of the resources, those who formerly had traditional rights to the land, forests, and fisheries that are to be developed or exploited usually lose much more than they gain. In many countries, those who lose their rights and livelihoods are already politically marginalized ethnic minorities. Second, the transboundary effects of the unsustainable depletion and degradation of natural resources, and competition for scarce water resources, may undermine regional peace and security.

### ***Natural Resource Exploitation and Domestic Instability***

Experience to date suggests that in the three regions, the exploitation of natural resources for development, without regard for the livelihoods and human security of those most affected, often becomes a source of internal destabilization. Many governments in the least developed countries lack the ability to generate new sources of livelihood, or even to provide minimum food security. Some of the dispossessed accept their fate and hope that increased state social services will create better lives for their children. Others migrate to nearby cities to seek work in the growing manufacturing and service industries. In countries with expanding economies, some enjoy new amenities and higher incomes, while others become unemployed urban squatters and/or get caught up in illicit occupations, such as drug dealing and prostitution. Still others, perhaps those with more resources or ambition, become unwanted transborder migrants seeking a better life in larger and more dynamic cities in neighboring countries. During boom periods, these migrants may be unofficially regarded as a means of keeping labor costs down, but in periods of national or global economic recession, the foreign workers become a perceived threat to economic and social stability.

Whether the connections are causal, casual, or caused by conflicts themselves, some of the most troubled parts of the world are also areas of severe environmental degradation and water scarcity, and stand as a warning of the consequences of unsustainable resource exploitation. The most extreme current example is the Darfur region of Sudan, but examples can also be found in parts of the Middle East, South Asia, and Southeast Asia.

The lack of economic opportunity in the denuded hills of Pakistan's Northwest Frontier Province (NWFP) and adjacent areas of Afghanistan has fostered the production of opium and narcotics trafficking. In this case, the potential for natural resource-based development, which dates from long before the 1979 Soviet invasion and the subsequent decade of bitter conflict, continues to form a backdrop to ongoing instability. At this point, it is difficult to know whether resource degradation is causing, or being caused by, tribal rebellions, endless struggles to control smuggling routes, cross-border intrigue, and even the rise of the Taliban. Most likely, the interaction has become circular.

In a wide swath of eastern and central India today, a violent Maoist movement has taken hold among tribal and low-caste groups that have been displaced by mining operations or the establishment of factory sites. In Nepal, which has also been devastated by deforestation and commercial-scale agriculture, the recruitment of landless laborers by Maoist groups, and secessionist movements among politically marginalized ethnic minorities, have played a major role in ongoing political instability and conflict. Similar underlying causes of tension, strife, and ethnic nationalism can be discerned in Kurdish and other ethnic minority areas of Turkey, Iraq, and Iran.

Warlordism and highland-lowland conflict have long affected the discontinuous mountain ranges of South and Southeast Asia, from Assam and Myanmar (Burma) through Malaysia, Thailand, Laos, Vietnam, and into southwestern China. Expanding populations and economic growth, fostered in large part by globalization, have accelerated the long historical encroachment of lowland ethnic majorities in South and Southeast Asia into upland areas. Lowland majority populations continue to move deeper into the mountains to harvest decreasing stands of timber, plant crops including coffee and rubber, and build hydroelectric dams to power industrialization. The upland minorities, who tend to have even higher fertility rates than lowland ethnic majorities, find themselves increasingly pressured in their traditional lands. Historical conflicts have been reignited, in some cases under the false guise of religious conflict.<sup>2</sup>

The recent worldwide rise of fuel and food prices, also partly a feature of globalization, has generated unrest in major urban centers throughout South and Southeast Asia. The current sharp slowdown in global growth will also create more migrants, even though demand is falling and overseas workers in the Gulf, Hong Kong, and elsewhere are being sent home. The Philippines, which depends on some US\$8 billion a year in remittances from Filipino workers abroad, may face a serious economic, financial, and social crisis if the global recession continues to deepen.

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<sup>2</sup> Some local strife in areas such as the Central Highlands of Vietnam involves conflict between politically marginalized ethnic minority hill tribes who adopted Christianity during the colonial era and a predominantly Buddhist lowland majority, but the actual causes appear to be mainly conflicts over land rather than religion.

## ***Globalization and Geopolitics***

Contemporary globalization and the related unsustainable consumption of natural resources have also reinvigorated some of the traditional causes of insecurity, power rivalries, and conflict. To the extent that the exploitation of natural resources benefits the stronger countries over the weaker, the result can destabilize societies and regions, and alter the geopolitical landscape.

One of the more arguable contentions of globalization's advocates is that global economic integration and interdependence, as well as the creation of new regional and multilateral institutions, will reduce conflict. In a number of cases, countries with state-led development models, most notably China, have been unwilling to depend on the working of markets and the mediation of multilateral organizations to maintain secure sources of energy and other critical resources.

In the case of three major Asian river basins—the Mekong, Nu/Salween, and Brahmaputra—China, the biggest and most powerful country in the region, controls the headwaters and is expanding its economic sway and geopolitical influence. None of China's southern neighbors, including India, is capable of successfully using force against China, but the reduction of the total resources available to the smaller neighbors could become a source of potential conflict. The United States has an important interest to promote sustainable development of these resources.

## **Prospects for Solutions**

The poor record of regional cooperation is rooted in nationalism and other factors that reduce trust and provide negative incentives. There have been a few encouraging examples of constructive action, especially the development of transboundary civil society linkages based on the premise of the common good. The most obvious reason is that regional organizations, whether the GCC, SAARC, ASEAN, or the MRC, have been unable to overcome their often prickly nationalism. Even in the case of transboundary river basins, countries regard their stretch of the river as a national river, even more so when it rises in their own territory. One of the most celebrated examples of successful water cooperation in the three regions, the 1960 Indus Water Treaty between Pakistan and India, is less substantial than it seems, since it simply divided six rivers of the river basin between the two countries. Even in this case, rancor continues over water sharing. In the other shared river basins of the three regions, water must be apportioned between upstream and downstream countries, which is a far more difficult proposition, technically and politically.

Thus far, efforts toward the environmentally sustainable development of natural resources and regional cooperation on transboundary issues have been frustrated by at least four

obstacles, two relatively obvious and the other two less so. The first is the excessive dependence on natural resource exploitation as the primary basis for economic development. This ensures the continuance of domestic conflict and instability, and also raises the stakes in regard to transboundary resources. The second is the related lack of adequate incentives for regional cooperation so long as the dominant countries are unwilling to accept genuine multilateral approaches, or upstream countries or air polluters disregard the interests of their downstream or downwind neighbors.

The third obstacle has to do with the shift of the locus of development from multilateral bank financing to public-private projects in which developers promote projects on the basis of their individual profit potential rather than a broader national cost-benefit analysis. Leaving aside the possible effects of a global recession and financial crisis, this trend is likely to become worse before it becomes better because of the short-term thinking of cash-poor governments. One of the worst aspects of public-private partnerships is that they tend to privatize profits and socialize losses.

Finally, little progress toward sustainable and cooperative natural resource exploitation is likely as long as the interests of affected local communities are represented by bureaucracies charged with ascertaining their wishes and speaking for them. Even when NGOs become involved in representing local “stakeholder” interests, the process is normally perfunctory. As in many other areas of governance, democratic politics and representation produce better outcomes in domestic policy, and they better facilitate transboundary cooperation.

Democratic politics can be unruly and sometimes lead to instability, but over the long term, decisions reached by some form of democratic process tend to garner broader public support and last longer. The formulation of national policy through negotiation and consensus can create a stronger and more stable platform for transboundary and regional cooperation. Put another way, the broader representation of domestic stakeholders’ interests tends to promote internal stability and decisions that do not threaten other countries’ interests as do authoritarian and bureaucratic decision making, which typically uses nationalism to support legitimacy.

Political change of this kind is likely to be a long process in most of the three regions, if achievable at all. In the shorter term, some are hopeful that broadly shared international alarm about the near-term consequences of climate change, the rate of worldwide environmental destruction, and food insecurity may promote better decision making and cooperation. Thus far, there is little evidence of change, but it remains in the interest of both the United States and other resource-rich countries and their developed country partners to find better ways to promote it.

# Appendix 1: Author Biographies

## Authors from the Regions

**Budy P. Resosudarmo** is a Fellow at the Arndt-Corden Division of Economics of the Research School of Pacific and Asian Studies at the Australian National University. His research interests include determining the economic impact of environmental policies, analyzing the impact of fiscal decentralization on regional economies, and understanding the political economy of natural resource utilization. He has published papers in scientific journals such as *Economic Record*, *Ecological Economics*, *Oxford Development Studies*, and *Bulletin of Indonesian Economic Studies*. In 2005, he edited *The Politics and Economics of Indonesia's Natural Resources* published by the Institute of Southeast Asian Studies, Singapore. Dr. Resosudarmo received his PhD in development economics from Cornell University.

**Babar Shahbaz** is a Visiting Fellow at the Sustainable Development Policy Institute in Islamabad, Pakistan. He is also a senior researcher at the National Centre of Competence in Research (NCCR) North-South in Switzerland, where he is conducting postdoctoral research on the impact of development intervention disparities on the poverty-environment nexus. His research fields include natural resource management (especially of forests), decentralization, and livelihoods. Dr. Shahbaz's most recent publications include "A Critical Analysis of Forest Policies of Pakistan: Implications for Sustainable Livelihoods" in the journal *Mitigation and Adaptation Strategies of Global Change*; and "Impact of Participatory Forest Management on Financial Assets of Rural Communities in Northwest Pakistan" in *Ecological Economics*. He earned his PhD in agricultural extension from the University of Agriculture in Pakistan and from Zurich University in Switzerland. His dissertation examined institutional changes in the forest management paradigm and local livelihood strategies in the Northwest Frontier Province.

**Abid Qaiyum Suleri** is Executive Director of the Sustainable Development Policy Institute (SDPI) in Islamabad, Pakistan. Dr. Suleri serves on various policy forums and advisory boards at national, regional, and international levels, as well as on the boards of studies of various universities. He represents the civil society of Pakistan in various working groups

and committees formed by the government of Pakistan. Dr. Suleri also trains and gives lectures on various aspects of sustainable development to parliamentarians, academics, government officials, journalists, and development practitioners. He contributes to major national and regional papers, and in electronic media. Prior to joining SDPI, he served as the head of Oxfam Great Britain's Pakistan Programs. Dr. Suleri has conducted intensive research on globalization and rural livelihoods. His other research interests include institutional reforms, disaster management, the poverty-environment nexus, and sustainable natural resource governance. He earned his PhD in food security from the Natural Resources Institute, University of Greenwich, United Kingdom.

**Waleed K. Al-Zubari** is Vice President for Academic Affairs, as well as Director and Professor of the Water Resources Management Program at the Arabian Gulf University in Bahrain. He is also Editor-in-Chief of the regional *Arabian Gulf Journal of Scientific Research*. He has taught many courses in water resource management and planning in arid regions, and has published more than 45 papers for peer-reviewed journals, conferences, and seminars. In December 2002, he received the Best Researcher in the Arab World award in the field of water resources from the Arab League Educational, Cultural and Scientific Organization (ALECSO). He has also served as a consultant for many international and regional organizations, including UNESCO, UNEP, UNDP, and the FAO. Dr. Zubari has been active in the Water Science and Technology Association (WSTA), a regional NGO in the Gulf Cooperation Council countries, and was elected as its president from 2001 to 2003. In March 2008, he published *Water Drops: Water Issues and Challenges in the GCC* (in Arabic). Dr. Zubari obtained his PhD in hydrogeology (groundwater modeling) from Colorado State University.

## Authors from Stimson

**Richard P. Cronin** heads the Southeast Asia program at Stimson. He also works on broader transboundary and nontraditional security issues from the perspective of political economy. Currently, he is working on issues concerning hydropower in the Mekong Basin, US-ASEAN relations, and China's engagement with Southeast Asia. Before joining Stimson in July 2005, Dr. Cronin was a senior Asian affairs specialist in the Foreign Affairs, Defense and Trade Division of the Congressional Research Service. He conducted and managed research on a wide range of US policy issues regarding South, Southeast, and Northeast Asia. Dr. Cronin has taught Asian comparative political economy at Johns Hopkins University, at various Washington, DC-area universities, and in Japan. He has also lectured on Asian political, economic, and security issues in more than a dozen Asian-Pacific countries. Dr. Cronin received his PhD from Syracuse University.

**Junko Kobayashi** is a Research Associate covering Southeast Asia with Stimson's *Regional Voices: Transnational Challenges* project, which she joined in March 2007. Her current work

focuses on natural resource issues in South and Southeast Asia, and the Middle East. Previously, Ms. Kobayashi served as a consultant for the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), and has interned at the United Nations Office on Drugs and Crime (UNODC) Regional Centre for East Asia and the Pacific in Bangkok. She holds a BA in government and Asian Studies from Dartmouth College, an MA in East Asian studies from Harvard University, and a graduate-level certificate from the Hopkins-Nanjing Center, China. While at Harvard, Ms. Kobayashi was an Associate Editor for the *Harvard Asia Quarterly*.

## Appendix 2: Experts Consulted

### **Jakarta Meeting Participants**

Mubariq Ahmad, World Wildlife Fund-Indonesia, Indonesia  
Qazi Kholiquzzaman Ahmad, Bangladesh Unnayan Parishad, Bangladesh  
Raymond Atje, Centre for Strategic and International Studies, Indonesia  
Shihab Najib Al-Beirut, Inter-Islamic Network on Water Resources Development and Management, Jordan  
Chandra Bhushan, Centre for Science and Environment, India  
Tep Bunnarith, Culture and Environment Preservation Association, Cambodia  
Robert Delinom, Indonesian Institute of Sciences – LIPI, Indonesia  
Erwinsyah, United Nations Development Programme, Indonesia  
Ismid Hadad, KEHATI – Indonesian Biodiversity Foundation, Indonesia  
Asclepias Rachmi S. Indriyanto, Indonesian Institute for Energy Economics, Indonesia  
Rusdian Lubis, PT ERM, Indonesia  
Dia El Din El Quosy, Academy of Scientific Research and Technology, Egypt  
Mohamed Abdel Raouf, Gulf Research Center, United Arab Emirates  
Budy P. Resosudarmo, Australian National University, Australia  
Babar Shahbaz, Sustainable Development Policy Institute, Pakistan  
Quamrul Islam Siddique, Bangladesh Water Partnership, Bangladesh  
Hadi Soesastro, Centre for Strategic and International Studies, Indonesia  
Simon Tay, Singapore Institute of International Affairs, Singapore  
Ira Titiheruw, Centre for Strategic and International Studies, Indonesia  
Vute Wangwacharukul, Kasetsart University, Thailand  
Waleed K. Al-Zubari, Arabian Gulf University, Bahrain

### **Regional Experts Interviewed**

#### ***Bangladesh***

Junaid Choudhury, Mangrove Expert (Independent Consultant)  
Chowdhury Quamruzzaman, Department of Geology and Mining, University of Rajshahi  
Mushfiqur Rahman, Asia Energy Co. (Bangladesh) Pty. Ltd.

#### ***Cambodia***

Hor Serey Vath, Ministry of Commerce  
Kan Pharidh, Ministry of Foreign Affairs and International Cooperation

Yumiko Kura, WorldFish Center  
 Ly Se, Ministry of Economy and Finance  
 Nov Mean Samnang, Community Legal Education Center  
 Blake Ratner, WorldFish Center

### **Indonesia**

Istiqlal Amien, Agroclimatology and Hydrology Research Institute  
 Krystof Obidzinski, Center for International Forestry Research  
 Agus P. Sari, PT EcoSecurities Indonesia  
 Farah Sofa, Indonesia Legal Aid Foundation  
 Purbasari Surjadi, Sustainable Fisheries Partnership  
 I. Nyoman Suryadiputra, Wetlands International Indonesia Programme

### **Laos**

Christopher Barlow, Mekong River Commission  
 Sychath Boutsakitirath, Ministry of Energy and Mines  
 Patchamuthu Illangovan, World Bank  
 John Metzger, Hydrology Consultant  
 Peter-John Meynell, Environment and Natural Resources Consultant

### **Philippines**

Nicolas Bailly, WorldFish Center  
 Joan L. Castro, PATH Foundation Philippines, Inc.  
 Rex Victor O. Cruz, College of Forestry and Natural Resources, University of the Philippines Los Baños  
 Angela Consuelo S. Ibay, Manila Observatory  
 Rodel D. Lasco, World Agroforestry Centre  
 Antonia Yulo Loyzaga, Manila Observatory  
 Deanna Marie P. Olaguer, Manila Observatory  
 Juan Pulhin, College of Forestry and Natural Resources, University of the Philippines Los Baños  
 Ronaldo R. Quintana, PATH Foundation Philippines, Inc.  
 Ramon Faustino M. Sales, Jr., Philippine Rural Reconstruction Movement

### **Thailand**

Sanit Aksornkoe, Thailand Environment Institute  
 Amrit Bart, Asian Institute of Technology  
 Rujarek Bumrasarinpai, Southeast Asian Fisheries Development Center  
 Premrudee Daroung, Towards Ecological Recovery and Regional Alliance (TERRA)  
 Richard Friend, Mekong Program on Water Environment and Resilience (M-Power)  
 M. Zakir Hussain, World Conservation Union  
 Penporn Janekarnkij, Department of Agricultural and Resource Economics, Kasetsart University  
 Somnuk Pornpatimakorn, Southeast Asian Fisheries Development Center  
 Thumrong Suthawaree, South East Asia Energy Limited  
 Surachet Tamronglak, Charoen Energy and Water Asia Co., Ltd.

Ruangrai Tokrisna, Department of Agricultural and Resource Economics, Kasetsart University

Nualanong Tongdee, Southeast Asian Fisheries Development Center

Phansiri Winichagoon, United Nations Development Programme

### ***Vietnam***

Bui Truong Giang, Institute of World Economics and Politics

Doan Thuy Loi, Institute for Water Resources Economics and Management

Nguyen Van Be, Can Tho University

Nguyen Viet Dung, People and Nature Reconciliation (PanNature)

### **US Experts Consulted**

Charles Benjamin, International Resources Group

Scott Bode, United States Agency for International Development

Leo Bottrill, World Wildlife Fund

Assheton L. Stewart Carter, Conservation International

Richard Cincotta, National Intelligence Council

Gib Clarke, Woodrow Wilson Center

Robert Engelman, Worldwatch Institute

Ian Gary, Extractive Industries, Oxfam America

Alexander Gritsinin, Nature Conservancy

Colin Kahl, Georgetown University

Alphonse La Porta, Consultant; Former President of the United States-Indonesia Society

Jill Shankelman, World Bank

Dorothy Zbicz, International Environmental and Marine Policy Consultant

## Appendix 3: Partner Institutions

### Middle East

**Gulf Research Center (GRC).** Based in Dubai, United Arab Emirates, the Gulf Research Center is a privately funded, nonpartisan think tank, education provider, and consultancy specializing in the Gulf region (the six Gulf Cooperation Council countries, and Iran, Iraq, and Yemen). Established in 2000, the Center conducts research on political, social, economic, security, and environmental issues from a Gulf perspective, redressing the current imbalance in Gulf area studies, where regional opinions and interests are underrepresented. With “Knowledge for All” as its motto, the GRC strives to promote different aspects of development and facilitate reforms in the region in order to secure a better future for its citizens.

**Issam Fares Institute for Public Policy and International Affairs (IFI).** The Issam Fares Institute for Public Policy and International Affairs at the American University of Beirut (AUB) was inaugurated in 2006 to harness the policy-related research of AUB’s internationally respected faculty and other scholars in order to contribute positively to Arab policymaking and international relations. In the established tradition of AUB, IFI is a neutral, dynamic, civil, and open space where people representing all viewpoints in society can gather and discuss significant issues of the day, anchored in a long-standing commitment to mutual understanding and high-quality research. The main goals of IFI are to raise the quality of public policy–related debate and decision making in the Arab world and abroad; to enhance the Arab world’s input in international affairs; and to enrich the quality of interaction among scholars, officials, and civil society actors in the Middle East and abroad. It operates research-to-policy programs in the areas of climate change and environment, Palestinian refugee camps, youth-related issues, and think tanks and public policymaking in the Arab world.

### South Asia

**Asia Foundation, Sri Lanka.** Recognizing that a sustainable peace is tied to overcoming deeper problems of a weakened democracy, lack of justice, and human rights violations,

the Asia Foundation's program in Sri Lanka seeks to identify and support organizations and institutions that promote democratic governance and the rule of law as essential for lasting peace and prosperity. The Asia Foundation programs in Sri Lanka date back to 1954. The Foundation has been a pioneer in strengthening community-based legal services and mediation for the poor in Sri Lanka. The Foundation supported a definitive study on the relationship between aid, conflict, and peace-building in Sri Lanka, and a follow-up study on the US involvement in the country's peace process. The Foundation distributes some 80,000 new English-language publications a year to libraries throughout Sri Lanka.

**Institute of Peace Studies and Conflict Resolution (IPSCR).** The Institute of Peace Studies and Conflict Resolution was established in January 2007 under the aegis of the Centre for Study of Society and Secularism, Mumbai. The overarching goal of the Institute is to create enabling conditions for peace and security by creating awareness in the society of factors affecting peace; addressing myths attributed to religious teachings; research and study into communal and sectarian conflicts; capacity building and peace advocacy, especially among youth; and supporting women's empowerment. IPSCR collaborates with other institutions, including the Tata Institute of Social Science Research, and the Department of Civics and Politics and the Department of Sociology, University of Mumbai.

**Institute of Policy Studies (IPS).** The Institute of Policy Studies based in Islamabad and founded in 1979 is an autonomous, nonprofit, civil society organization, dedicated to promoting policy-oriented research on Pakistan affairs, international relations, and religion and faith. IPS provides a forum for informed discussion and dialogue on national and international issues; formulates viable plans; and presents key initiatives and policy measures to policymakers, analysts, political leaders, legislators, researchers, academia, civil society organizations, media, and other stakeholders. Periodicals and publications, interaction, dialogue, thematic research, and capacity-building programs are instrumental in its research endeavors. IPS garners collaboration as well as extends its active cooperation to other organizations in one or more areas of research.

**Pakistan Institute of Legislative Development and Transparency (PILDAT).** The Pakistan Institute of Legislative Development and Transparency is an indigenous, independent, and nonpartisan research and training institution committed to strengthening democracy and democratic institutions. PILDAT works to increase the legislative capabilities of elected officials, carries out in-depth analysis of the democratic developments of the country, provides performance reviews of the Parliament and provincial assemblies, and encourages the culture and value of democracy in youth through the first-ever Youth Parliament of Pakistan. The Institute also facilitates the formulation of issue-based caucuses across party lines, including the Young Parliamentarians' Forum, the Parliamentary Consultative Group on Women's Issues, and the Parliamentary Group on Inter-Faith Relations. PILDAT also facilitates non-Parliamentary groups of leading intellectuals and thinkers for

discourse on issues such as free and fair elections, the electoral process, youth and politics, and dialogue between Muslims and the West.

**Regional Center for Strategic Studies (RCSS).** Based in Colombo, the Regional Center for Strategic Studies is an independent, nonprofit, and nongovernmental organization that fosters collaborative research, networking, and interaction on strategic and international issues pertaining to South Asia. RCSS coordinates research on strategic and security-related issues; promotes interaction among scholars and other professionals in and outside the region who are engaged in South Asian strategic and international studies; and fosters relationships and collaboration among institutions studying issues related to conflict, conflict resolution, cooperation, stability, and security in South Asia.

**Sustainable Development Policy Institute (SDPI).** The Sustainable Development Policy Institute, based in Islamabad, was founded in 1992 as an independent, nonprofit organization which would serve as a source of expertise on socioeconomic development and environmental issues in Pakistan. The Institute works to conduct policy-oriented research and advocacy from a broad multidisciplinary approach; promote the implementation of policies, programs, laws, and regulations of sustainable development; strengthen civil society through collaboration with other organizations; disseminate research findings through media, conferences, lectures, publications, and curricula development; and contribute to building up national research capacity and infrastructure. The Institute acts as both a generator of original research on sustainable development issues and as an information resource for concerned individuals and institutions. SDPI's function is thus twofold: an advisory role fulfilled through research, policy advice, and advocacy; and an enabling role realized through providing other individuals and organizations with resource materials and training.

**The Energy and Resources Institute (TERI).** The Energy and Resources Institute was formally established in 1974 in New Delhi with the purpose of tackling the acute problems that mankind is likely to face in the years ahead resulting from the depletion of the earth's energy resources and the pollution their unsustainable use causes. The Institute works to provide environment-friendly solutions to rural energy problems, tackle global climate change issues across continents, advance solutions to the growing urban transport and air pollution, and promote energy efficiency in the Indian industry. TERI is the largest developing country institution devoted to finding innovative solutions toward a sustainable future. TERI has established affiliate institutes abroad: TERI-NA (North America) in Washington, DC; TERI-Europe in London, UK; and has a presence in Japan and Malaysia.

## **Southeast Asia**

**Centre for Strategic and International Studies, Jakarta (CSIS).** The Centre for Strategic and International Studies based in Jakarta and established in 1971, is an independent,

nonprofit organization focusing on policy-oriented studies on domestic and international issues. Its mission is to contribute to improved policymaking through research, dialogue, and public debate. CSIS believes that long-term planning and vision for Indonesia and the region must be based on an in-depth understanding of economic, political, and social issues including regional and international developments. In the area of foreign policy, the Center's research is complemented and strengthened by its relations with an extensive network of research, academic, and other organizations worldwide. CSIS's research is used by government, universities, research institutions, civil society organizations, media, and businesses.

**S. Rajaratnam School of International Studies (RSIS).** Based in Singapore, the S. Rajaratnam School of International Studies was established in January 2007 as an autonomous school within the Nanyang Technological University. RSIS is a leading research and graduate teaching institution in strategic international affairs in the Asia-Pacific region. Its name honors the contributions of Mr. S. Rajaratnam, who was one of Singapore's founding fathers and a well-respected visionary diplomat and strategic thinker. RSIS includes the International Centre for Political Violence and Terrorism Research, the Centre of Excellence for National Security, the Centre for Non-Traditional Security Studies, and the Consortium of Non-Traditional Security Studies in Asia. The focus of research is on issues relating to the security and stability of the Asia-Pacific region and their implications for Singapore and other countries in the region.

**Singapore Institute of International Affairs (SIIA).** The Singapore Institute of International Affairs is a nonprofit, nongovernmental organization dedicated to the research, analysis, and discussion of regional and international issues. Founded in 1961 and registered as a membership-based society, SIIA is Singapore's oldest think tank. Its mission is to make Singapore a more cosmopolitan society that better understands the international affairs of its region and the world.

## Notes

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